TRANSPORTATION RESEARCH RECORD 831

Rural Public Transportation: Fifth National Conference Proceedings

TRANSPORTATION RESEARCH BOARD

COMMISSION ON SOCIOTECHNICAL SYSTEMS
NATIONAL RESEARCH COUNCIL

NATIONAL ACADEMY OF SCIENCES
WASHINGTON, D.C. 1981

Transportation Research Record 831
Price $11.60
Edited for TRB by Mary McLaughlin

mode
2 public transit

subject areas
11 administration
12 planning
14 finance
16 user needs
53 vehicle characteristics
54 operations and traffic control

Library of Congress Cataloging in Publication Data
National Research Council (U.S.). Transportation Research Board. Meeting (60th: 1981: Washington, D.C.)
Rural public transportation.

(Transportation research record; 831)
Reports presented at the 60th Annual Meeting of the Transportation Research Board.
1. Rural transit–Congresses. I. Title. II. Series.
TE7.H5 no. 831 [HE152.5] 380.5s 82-6368
ISBN 0-309-00308-X ISSN 0361-1981 [388'.09173'4] AACR2

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Special Report 201

page 17, column 2, second paragraph, should read

"Tools also need to change as the nature of options changes significantly. Emerging policy options are not largely focused on network-expansion investments, whereas traditional models were developed long ago to deal with such options."

Special Report 200

page 3, column 1

Change the caption for the bottom figure to "A new AM General trolley bus starts down the 18 percent grade on Queen Anne Avenue North in Seattle in October 1979 (photograph by J. P. Aurelius)".

Transportation Research Record 1040

page ii

Under "Library of Congress Cataloging-in-Publication Data," delete "Meeting (64th: 1985: Washington, D.C.)" and "ISBN 0361-1981"

Transportation Research Record 1020

page 7, Figure 1

The histogram should reflect that the rail mode is represented by the black bar and that the highway mode is represented by the white bar.

Transportation Research Record 1017

page 19, column 1, 7 lines above Table 1

Change "ranged from 1 $in.^2$ to nearly 30 $in.^2$ of runoff" to "ranged from 1 area inch to nearly 30 area inches of runoff"

page 22, column 1, last line

Change "1 to nearly 30 $in.^2$" to "1 to nearly 30 area inches"

page 22, column 2, first line

Change "13 $in.^2$" to "13 area inches"

Transportation Research Record 1011

page 12, Figure 4

Figure does not show right-of-way structure for O-Bahn. See discussion on page 11, column 1, paragraph 3.

Transportation Research Record 996

page 49

Insert the following note to Figure 2:

"The contour lines connect points of equal candlepower."

page 49

Insert the following note to Figure 3:

"The candlepower contours are superimposed on a 'headlight's-eye-view' of a road scene. The candlepower directed at any point in the scene is given by the particular candlepower contour light that overlays that point. For example, 1400 candlepower is directed at points on the pedestrian's upper torso. For points between contour lines, it is necessary to interpolate."

page 50

Insert the following note to Figure 3:

"Where

ρ = the azimuth angle from the driver's eye to a point P on the pavement;
θ = the elevation angle from the driver's eye to a point P on the pavement;
EZ = the driver's eye height above the pavement; and
DX, DY, DZ = the longitudinal, horizontal, and vertical distance between the headlamp and eye point.

Then

$EX = EZ/\text{Tan}\,\theta$ $\quad HZ = EX\text{-}DZ$
$H1^2 = EZ^2 + EX^2$ $\quad HX = EX\text{-}DX$
$EY = H1\ \text{Tan}\,\rho$ $\quad HY = EY\text{-}DY$
$H2^2 = H1^2 + EY^2$ $\quad H3^2 = HX^2 + HZ^2$
$\alpha = \text{Tan}^{-1}\,(HZ/HX)$, $\beta = \text{Tan}^{-1}\,(HY/H3)$, $H4^2 = H3^2 + HY^2$,"

Transportation Research Record 972

page 30, column 2, 22 lines up from bottom

Reference number (5) should be deleted

page 31, column 2, 5 lines up from bottom

Reference number should be 5, not 4

page 34, column 2, 8 lines above References

Reference number (5) should be deleted

Transportation Research Record 971

page 31, reference 3

Change to read as follows:

Merkblatt fürLichtsignalanlagen an Landstrassen, Ausgabe 1972. Forschungsgesellschaft für das Strassenwes en, Köln, Federal Republic of Germany, 1972.

Transportation Research Record 965

page 34, column 1, Equation 1

Change equation to

$$r_u = \gamma_w \cdot h/\gamma \cdot z$$

where

γ_w = unit weight of water,
γ = moist unit weight of soil,
h = piezometric head, and
z = vertical thickness of slide.

Transportation Research Record 905

page 60, column 1, 9 lines up from bottom

Change "by Payne (6)" to " by us"

Transportation Research Record 819

page 47, Table 1

Replace with the following table.

Table 1. Summary of interactions between signal-timing parameters and MOEs.

Timing Method	Parameter	Total Delay	Stops	Fuel Consumption	Emissions HC	CO	NO_x
Manual	Cycle length	⊕	⊕	⊕	⊕	⊕	⊕
	Speed of progression	+	⊕	+	+	+	+
	Priority policy	+	+	+	+	+	+
	Split method	+					
TRANSYT	Cycle length	⊕	⊕	⊕	⊕	⊕	⊕
	K-factor	+	⊕				
	Priority policy				+		

Note: + = main effect detected from TRANSYT output, and ○ = main effect detected from NETSIM output.

Transportation Research Record 869

page 54, authors' names

The second author's name should read "Edmond Chin-Ping Chang"

Transportation Research Record 847

page 50, Figure 3

Add the following numbers under each block in the last line of the flowchart:

R1, R2, R3, R4, D1, D2, D3, A1, A2

page 50, Figure 4

Make the following changes in the last line of the flowchart.

Change "R4" to "D1" and "Recognition" to "Decision"

Change "R5" to "D2" and "Recognition" to "Decision"

Change "R6" to "D3" and "Recognition" to "Decision"

Change "R7" to "R4"

Change "R8" to "D4" and "Recognition" to "Decision"

Change "R9" to "A1" and "Recognition" to "Action"

Change "R10" to "A2" and "Recognition" to "Action"

Transportation Research Record 840

page 25, column 1, line 5

Change "money" to "model"

Transportation Research Record 831

page ii, column 1

Change ISBN number to "ISBN 0-309-03308-X"

Transportation Research Circular 255

page 6, column 1, third paragraph

Change "Marquette University" to "Northern Michigan University"

NCHRP Synthesis of Highway Practice 87

page ii

Change ISBN number to 0-309-03305-5

NCHRP Synthesis of Highway Practice 84

page ii

Change ISBN number to 0-309-03273-3

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ADDRESS CORRECTION REQUESTED

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Foreword

The Fifth National Conference on Rural Public Transportation, held on August 18, 19, and 20, 1981, on the campus of Humboldt State University in Arcata, California, brought together a diverse group of people to share their ideas about, experiences in, and predictions for rural public transportation. The decade of the 1970s foretold what the 1980 census confirmed: America is reruralizing. After decades of first urbanizing, then suburbanizing, a mobile American populace is now demonstrating a decided preference for rural living. Added to the existing rural population, these rural residents are likely to experience another problem that has its roots in recent population trends in urban and suburban areas--adequate transportation.

Of course, rural transportation problems are not unique to current times. The earliest transportation programs of the 20th century were focused on "farm-to-market" roads. Their stated goal was to get the farmer's wagon wheels out of the ruts of the gravel and dirt roads of the day. It is indeed important to remember that there were rural transportation problems before the focus shifted to more densely developed environments. Thus, with the reemergence of a rural emphasis in the transportation agenda, it appears that we have come full circle.

Four times previously, practitioners in rural public transportation have gathered to exchange ideas and build on the successes of others. The enthusiasm was contagious, and seemingly isolated experiences synergistically complemented each other. After a year, the rural public transportation agenda again warranted a renewal of that enthusiasm and synergy. The first national categorical assistance program for rural public transportation had been in place long enough to permit evaluation. Its continuance was sufficiently threatened to stimulate discussion. Its managerial structure had performed sufficiently to permit debate concerning its effectiveness in implementing public policy. Its history was sufficiently rich to translate the fears and trepidations of several years back into actualities.

Perhaps the best perspective in which to put the state of the art of rural public transportation is to glance briefly in retrospect at the agenda for the First National Conference on Rural Public Transportation held in 1976 at North Carolina A&T State University. Several conclusions can be drawn. First, that 1976 conference focused on the preparatory. Topics included the use of existing resources; planning, needs, and feasibility studies; estimating demand for rural transportation; and interagency cooperation. In choosing the topics for the 1981 conference, the focus was on the accomplishments and experiences, successes and nonsuccesses of actual rural systems: Where have we been, what have we done, why did it work or not work, and on whom can we call for help and advice? Second, many concerns on that agenda of five years ago remain equally important, if not more so, today. Among the topics in 1976 were securing support; operations, management, and maintenance; marketing and promotion; and specification, selection, and purchase of vehicles. These themes were recurrent in 1981. Finally, it had become apparent in 1981 that the prophets of doom (and the prophets of apathy) who dismissed rural public transportation as a narrowly parochial concern were finding it increasingly difficult to demonstrate the credibility of their position.

Space limitations preclude a complete record of the proceedings of the Fifth National Conference. What follows, however, is a fairly representative sampling of the contributions of system managers, representatives of several state departments of transportation, academicians, consultants, and spokespersons for federal agencies as well as several insightful reports of experiences outside the United States.

Bruce S. Siria
Conference Chairman

Part 1
Past, Present, and Future Issues

Rise and Fall of Rural Public Transportation

JON E. BURKHARDT

The long process of developing a viable program of federal aid to help overcome rural transportation problems is reviewed. Despite its successes, the Section 18 program (the Urban Mass Transportation Act of 1964) is now under attack. A series of proposals have been advanced that would effectively destroy the program's usefulness and, ultimately, the program itself. Unless the important decision makers can be made aware of crucial rural transportation interests, the Section 18 program may be emasculated by the budget cutters.

In many ways, rural public transportation faces the same issues in 1981 that were current in 1978 and appeared to be on their way to resolution in 1979. A significant difference between then and now is that the past situation involved reaching forward for new gains and new goals whereas the current situation represents a loss of hard-won achievements.

Those of us who have fought for years to bring dependable transit service to people in rural areas apparently have more battles to fight before we can relax. We have not yet been able to achieve a program with the necessary combination of flexibility, stability, innovation, and caring. Our major achievements have always been compromised by external forces and unrelated events. The current status of rural public transportation can still be characterized as one of substantial achievements, great potential, and an uncertain future. Our progress in technical areas is still greater than our progress in politics.

This situation will only change if we--acting as individuals and also jointly--make it change. We need a strategy for a process of action, and we need an agenda of achievable goals. In a step toward building both the strategy and the agenda, a brief review of recent history shows some of the events that should be avoided next time. The next step is to decide the key program attributes that we wish to create or protect. This paper presents a preliminary list. The final step would be the plan for action. This paper does not present that plan but is intended to stimulate those who are interested in developing one.

TRANSPORTATION PROBLEMS IN RURAL AND SMALL URBAN AREAS

The past few years have finally witnessed the recognition of the transportation accessibility problems of residents of rural and small urban areas. In particular, the lack of effective public transportation services is now recognized as a major barrier to the full development of rural America. Although many rural areas now have truly fine all-weather road systems, some persons and communities still remain isolated from the mainstream of modern American society because of their inability to travel. In some cases, this immobility is due to their inability to pay the price for existing transportation services; in other cases, transportation services are nearly nonexistent for them (especially if they do not own an automobile).

Relatively few transportation problems are faced by those in rural areas who are able to drive and can afford to maintain reliable private automobiles. Compared with this mobile segment, those who do not have access to an automobile or are not able to drive can be considered "transportation disadvantaged". For the transportation disadvantaged, the social and economic isolation fostered by distances between people and communities is compounded by the expense of traveling. As a result, they are often unaware of available measures for improving their living conditions or they are unable to take advantage of those they know about. This substantially decreases their opportunity to participate in the activities and transactions characteristic of our modern, complex, specialized society. In turn, this lack of opportunity is thought to maintain, if not produce, many of the cultural and economic problems of rural residents. Awareness of this complex causal chain has led some to regard transportation as a crucial resource in improving the quality of life in rural areas.

Rural transportation has always been difficult for the types of persons for whom it is now a problem. What has led to the recent acceptance of rural transportation as an issue worthy of official concern? The answer is as simple as it is disconcerting: The problem is getting worse. Whether or not the problem is worse in absolute terms may be arguable, but the fact that transportation is a relatively greater problem today than it was before is unquestionable in rural and small urban areas and, especially, for those without cars. By its focus on automotive transportation, our society has decreased the relative mobility of those without automobiles.

While the personal benefits of automobile ownership are increasing, the attractiveness and availability of alternatives to the automobile are decreasing. This is especially true in rural and small urban areas. Consider the following facts (1):

1. Rural and small urban areas contain about one-third of the nation's population but more than half of its poor.
2. Automobile ownership is generally low. Fifteen percent of rural households have no car, 57 percent of the rural poor have no car, 45 percent of the rural elderly have no car, and 52 percent of the households with cars have only one car (meaning that the family is often without transportation while the breadwinner is at work).
3. Many of the automobiles that are owned are in poor condition.
4. Less than 1 percent of rural workers working outside the home use or have access to public transportation.
5. Only 284 of the nation's 20 000 towns that have populations less than 50 000 are served by fixed-route, regularly scheduled public transportation (2).
6. Sixty percent of towns that have fewer than 2500 people have no taxi service.

In parts of rural America, the profound economic and social effect of this inadequate transportation is expressed in (a) a lack of cultural or social contact with the rest of society, (b) an inability to envision social or economic self-betterment, (c) a widening difference between the life patterns of the rural poor and those of better-accommodated urban or small-town residents, (d) an ignorance of employment opportunities, and (e) an inability to respond to those opportunities. Transportation is a critical element in our society, a society that has become increasingly complex, increasingly specialized. Many residents of rural and small urban areas cannot obtain the benefits of the larger society

because they do not have access to, and are in that sense not even a part of, that society.

GOVERNMENT ASSISTANCE TO RURAL AND SMALL URBAN TRANSPORTATION SYSTEMS

The year 1964 was a banner year for significant transportation legislation. Passage of the Urban Mass Transportation Act and the Economic Opportunity Act created the foundation for our current efforts. But neither piece of legislation specifically addressed the needs of the transportation disadvantaged. It was not until the McCone Commission report (3) following the Watts riots in Los Angeles in 1965 that transportation was seen as a means of combating poverty. Shortly thereafter, the U.S. Department of Housing and Urban Development sponsored demonstration projects in almost two dozen urban areas to meet the "transportation needs of the low income neighborhoods".

It took longer to recognize the connections between rural poverty and transportation, but by 1967 the Office of Economic Opportunity (OEO) had authorized the use of funds to obtain and operate surplus General Services Administration (GSA) buses in a number of rural localities. (Another agency involved in these early activities was the Appalachian Regional Commission.) But OEO did not program the funds to evaluate the effectiveness of these experiments; it was the Bureau of Public Roads that finally funded an investigation of the costs and benefits of rural transportation (4). OEO responded with a major planning study (5), and the number of local transportation projects it sponsored grew to more than 60. Interest then seemed to wane at the federal level, but after the enactment of Section 147 of the Federal-Aid Highway Act of 1973, studies by the Federal Highway Administration (FHWA) and others followed (6,7). Some states began to actively investigate and sponsor rural transportation projects (8).

Passage of Section 147, known as the Rural Highway Public Transportation Demonstration Program, began the long process of bringing rural transportation to the forefront of national attention. Not until 1974 did Congress appropriate the funds it authorized the previous year for the program. FHWA (chosen as the head agency for the program) issued administrative guidelines for the program after the funds were appropriated, and thus the regulations implementing the program did not appear until November 1974. These guidelines were revoked in February 1975 because Congress had changed the provisions of Section 147 in Section 103 of the Federal-Aid Highway Amendments of 1974. New regulations were issued in April 1975, and in September the first 45 project awards were announced. The first transportation operations of a Section 147 project began in March 1976. From the more than 500 applications received by FHWA, 102 grants (which resulted in 134 projects) were awarded by 1979. Total expenditures for the Section 147 program were nearly $25 million, approximately the total amount Congress eventually appropriated (which was only one-third of the amended program authorization of $75 million).

In the meantime, the National Mass Transportation Act of 1974 became law on December 10, 1974. This Act made available up to $500 million (out of the total of $11 billion authorized) for grants between 1974 and 1980 "exclusively for assistance [with capital expenses] in areas other than urbanized" (Section 101b). However, these nonurbanized areas were forced to use the procedures urban areas used to apply for these funds, eligibility was limited to public bodies only, and, although funds in the Act could pay for operating expenses in urban areas, no such provision existed for areas other than urbanized. The Urban Mass Transportation Administration (UMTA) only allocated $23 million of the $500 million, and most of this money went to small urban areas; little was spent in rural areas (9). (Other sources say that up to $30 million of the $500 million was obligated between 1974 and 1978.) Use of these set-aside funds for rural areas was, in effect, terminated when the Section 18 program began. (On December 14, 1978, the Secretary of Transportation announced in a letter to the governors of the 50 states that, after 1980, Section 18 was intended to be the sole source of capital and operating assistance for nonurbanized areas, although rural areas would be allowed to compete with urban areas for Section 3 capital funds and Section 16b2 funds for a period of two years. Section 3 funds could be used in nonurbanized areas "after a state has demonstrated that the demands upon Section 18 will exceed the state's apportionment over the 4-year period of the legislation". The two-year limitation was later removed in congressional testimony by UMTA staff. Thus, while Sections 3 and 16b2 funds are still theoretically available to small urban and rural areas, the requirement that Section 18 funds be fully committed and the competition from urban areas effectively put Section 3 funds beyond the reach of nearly all nonurbanized areas. The allocation of Section 16b2 funds is decided by each state.)

The practical and political successes of the Section 147 demonstration projects led directly to creation of the non-urbanized-area public transportation program as part of the Surface Transportation Assistance Act of 1978, which was approved November 6, 1978. That program became Section 18 (Formula Grant Program for Areas Other than Urbanized) of the Urban Mass Transportation Act and now provides the first full-scale federal assistance program for public transportation in rural areas. On November 30, 1978, FHWA and UMTA executed a memorandum of understanding regarding the joint administration of the Section 18 program, and FHWA was designated as the lead agency. On December 13, 1978, an emergency regulation (23 CFR 825) was issued that implemented the program. That regulation is still in effect today.

SECTION 18: PHILOSOPHY AND FUNDING

The Section 18 program offers federal financial assistance for public transportation in rural and small urban areas. The states administer the formula grant program by establishing a state program of projects. The goals of the program are to "enhance access of people in nonurbanized areas for purposes such as health care, shopping, education, recreation, public services and employment by encouraging the maintenance, development, improvement, and use of passenger transportation systems." The program was authorized for a four-year period (FY 1979 through FY 1982).

The total funding for Section 18 is small in comparison with the overall funding needed to maintain and develop viable public transportation systems in rural and small urban areas. Because of the relatively low level of funding, major themes of the program include coordination with other funding sources by or with the Section 18 projects and simplicity and flexibility in administering the program.

The authorizations for the Section 18 program (the total amount that Congress legally allows to be spend on a program in a particular year) have never been matched by the actual appropriations for the program (the amount of money Congress actually provides). When the program was enacted, the budget

Table 1. Status of Section 18 program funds.

Fiscal Year	Authorization ($000 000s)	Appropriation ($000 000s)	Obligations ($000 000s)	Percentage of Appropriations Obligated
1979	90	75	7.9	10.5
1980	100	85	55.9	8.25
1981	110	72.5	73.0	58.7
1982	120	72.5	105.0[a]	79.2

Note: Based on Section 313 of the Surface Transportation Act of 1978 and FHWA mimeo, "Section 18 Program Status for Fiscal Year 1981".
[a]Estimate by FHWA.

authorizations showed a pattern of steady increases. However, the money actually made available by Congress has remained at about the same level, as given in Table 1. The FY 1982 appropriations were $72.5 million, which is a far cry from the $120 million authorization. Actual obligations by the states have ranged from approximately $8 million in FY 1979 funds to $73 million in FY 1981, and FHWA has estimated that the obligations for FY 1982 will total $105 million. Although the program was criticized for starting slowly--perhaps unjustly, given the history of other programs--most of the funds appropriated have now been spent. These figures are also given in Table 1.

By the end of December 1980, more than 600 projects had been approved, including 500 or more projects for capital and operating expenses. As of late 1981, all states had initiated capital and operating assistance projects. Summaries of Section 18 obligations at specific points in time are available from FHWA.

Funds may be used for capital and operating assistance by state agencies, nonprofit organizations, and public transportation authorities operating services. For capital and administrative expenses, the federal share is 80 percent and the local share 20 percent; for net operating expenses, as much as 50 percent is supplied by the federal government. As much as 15 percent of the state apportionment may be used for state administrative and technical assistance activities; the federal share for these funds is 100 percent.

REVIEW OF RECENT HISTORY

It is said that those who refuse to learn from history are doomed to repeat it. What we can conclude from this should give us all a jolt or two.

First, it takes much longer than expected to get something going. At every step of the way--from OEO to the Section 147 program to the Section 3 nonurbanized funds to the Section 18 program--progress has been made very slowly at the beginning. Some programs have moved so slowly that they have been summarily terminated. This should speak to the precious nature of the current Section 18 program.

Second, you never get as much money as you were promised. The same litany of previous programs demonstrates the validity of this sad observation. This demonstrates the necessity of continually guarding against appropriations that fall far short of authorizations.

The third observation is a corollary of the second: What you get today may well be taken away tomorrow. Apparently the only feasible strategy is one of eternal vigilance.

Fourth, the substantial accomplishments of a handful of individuals wielding both positive and negative influence on rural transportation point out both the potential power of an organized advocacy group and the serious loss of opportunities due to the lack of such a group. The challenge here is obvious. The lack of defined roles, power bases, and interest groups regarding this issue is, not surprisingly, reflected in a most tenuous commitment to the rural transportation program at the highest levels of the bureaucracy.

The fifth observation is a more positive one. There has been a slow but unmistakable growth in the recognition of rural public transportation as an issue worthy of concern and attention. Some states and localities have even committed dollars in excess of federal matching requirements. This one development is cause for significant hope and may constitute the foundation for future efforts.

STRATEGY FOR CHANGE

Our apparent operational consensus (did we choose this consciously or just slide into it by default?) has been that we will approach the problem of rural transportation with a governmental solution. To do that, we need executive, legislative, and bureaucratic commitment to rural transportation. At the moment, we have none of these. Rural problems and rural characteristics currently receive little attention.

If it is true that the squeaky wheel is the one that receives attention, then it is time for the wheel to squeak. The government agencies that could have provided effective leadership and have so far failed to do so need to be supported and stimulated by rural voters. Left to its own devices, the bureaucracy will move painfully slowly. To put it another way, without active support, the bureaucracy can really do very little alone. If rural transportation is to be more than rhetoric, it must achieve political importance. Political importance is achieved only by the activities and the votes of large numbers of persons at the local, state, and federal levels. Do not leave this up to someone else. The responsibility belongs to all of us.

There are two possible strategies, one involving our own individual efforts and the other involving collective action. The targets for the activities can be individual members of Congress, the Congressional Rural Caucus, various public interest groups, the U.S. Department of Transportation, FHWA, governors, state departments of transportation, and others. FHWA has been extremely receptive to instituting procedural changes that are within its power. However, some of the important decisions regarding the program have been made at a higher level than FHWA, and FHWA needs support to function effectively.

It has been said that there are three critical needs for public transit--money, management, and innovation--and that, until the first is confronted, efforts on the other two will not progress. Having temporarily made some progress on the first of these, we now must turn our attention to the second. It appears that the gains we have made in financial stability and funding continuity may be wiped out if we fail to pay attention to the management of the program. We need to develop a powerful public interest group that will advocate the needs for rural transportation to the appropriate decision makers.

ALTERNATIVE FUTURES FOR SECTION 18

A variety of changes could occur to the Section 18 program just as it has started to provide a framework for viable rural transportation systems. Some of the proposals may be nothing more than political posturing, but most of them deserve to be taken seriously because their implications could be quite

serious. Although some of these proposals have been presented in a combined fashion, we will deal with them separately.

Elimination of Authority for Operating Assistance

Most rural transit systems have a substantially more difficult time finding operating funds than finding capital funds. Operating costs are a higher proportion of total costs in rural systems than in urban systems. For this reason, the Reagan Administration proposal to eliminate transit operating assistance is quite serious. While UMTA Section 5 operating assistance funds are proposed to be phased out over five years, the Section 18 operating funds would be phased out much quicker--in just two years. Even if all operating assistance were to disappear, the rationale for doing it more quickly in rural areas is certainly not apparent. UMTA officials have said that elimination of operating assistance would not cause much damage because, in their analysis, they have found that New York City would only have to raise its transit fares by 5¢ to cover the loss. What do we have to do to show them that rural transportation is not like the New York subway system?

This proposal continues an interventionist policy on the part of the federal bureaucracy--telling state and local officials what federal funds can and cannot be used for. This proposal would also kill the demand for assistance for rural transportation.

Making Section 18 Part of a Transportation Block-Grant Program

One block-grant proposal is to meld Section 18 into Section 3. Another is to take that combination and mix it together with highway assistance and deliver both in one package to the governor of each state. Governors, being political animals, respond to political influence. The relative influence of highway interests versus transit interests and the relative influence of large-city transit interests versus rural transit interests should be apparent to everyone. Rural transportation gets a very small fraction of the pie now; the block-grant scheme would probably reduce the share drastically.

Eliminate Federal Assistance to Rural Transportation

The elimination of federal assistance to rural transportation is a distinct threat, but the threat may be not so much that this will actually happen as that the discussion of this possibility will eliminate the local support necessary to make rural transportation work. Local politicians are understandably reluctant to begin programs when they might suddenly be stuck with 100 percent of the costs of a program that initially cost them 25 percent. For example, in Wisconsin such fears are chasing county board members away from new transit systems in droves.

Elimination of the Section 18 program would mean that, with the exception of three or four state assistance programs, most of the persons in rural America who lack mobility would once again be stuck. The progress we have made would disappear overnight.

An Alternative

It is worth spending some time thinking about what we do want to have happen. Among some of the more obvious things are

1. At least maintain the current level of funding,
2. Continue the critically important operating assistance funds,
3. Do not allow rural transportation to be overwhelmed by larger transportation interests,
4. Maintain a program administration with maximum flexibility at the local level,
5. Strive for and reward outstanding projects,
6. Continue the learning process with regard to efficiency and effectiveness, and
7. Promote local commitment to and local responsibility for decision making and a share of the funding.

To convince the powers that be of the worthiness of these ideas will obviously take some effort and some organization.

SUMMARY

Rural transportation has been around long enough now that it ought to be obvious to its practitioners--if not so much to politicians--that the form and substance of federal actions will have a large influence on the future of rural transportation. Although the past has been marked (marred?) by the slowness and uneven nature of progress, progress has definitely been made. We are now faced with proposals that could seriously alter the Section 18 program as we know it. If anyone cares, this is the time to stand up and be heard.

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Rural Public Transportation: An Alaskan Perspective

LLOYD RODINSON

The development and current role of public transportation in the state of Alaska are discussed. The state role in public transit began in 1975, with the hiring of a planner to manage federal transit assistance programs in the state. Statewide annual ridership in 1975 was 500 000 trips, and annual system capital and operating expenses were $750 000. In 1980, annual ridership had risen to 6 million trips and system fiscal requirements amounted to $20 million. Data indicate that there is significant potential for growth of the statewide public transportation system, largely because of the high density of population in most Alaska communities. Steps being taken to ensure the future credibility of Alaska's public transportation program in the areas of planning and policy-making are outlined. Finally, the Alaska experience is related to national issues, including the need for a uniform and effective method of apportioning federal transit funds.

This paper has three main themes: first, the history of transit development in Alaska; second, the sorts of things the state is doing now in order to prepare for the future; and, third, how we view the national scene.

HISTORY

The development of an Alaska state government role in transit as an ongoing set of activities originated in 1975, when the then Alaska Department of Highways hired a planner to manage the Urban Mass Transportation Administration (UMTA) nonurbanized planning program and the UMTA program for the elderly and the handicapped and to develop an urban planning program with Federal Highway Administration metropolitan planning funds.

In 1975, there was one publicly owned general-service bus system in the state and there were three general-service bus systems that were privately held. There were at that time perhaps 15 or 20 paratransit operations in the state serving restricted client groups; these paratransit operations were nearly all supplemental program services operated by private, nonprofit corporations.

Funding for general-service bus operations during the period 1975-1980 entailed a combination of federal demonstration grants [the Section 147 program (Federal-Aid Highway Act of 1973), the model cities program, and other such ventures], UMTA Section 3 funds, Section 5 funds (in Anchorage only), and, more recently, Section 18 funds (Urban Mass Transportation Act of 1964, as amended). In total, it is estimated that these funds accounted for between 10 and 20 percent of general-service bus capital and operating requirements during this period.

State funding during this period consisted of a categorical program for operating assistance, provided on a per capita basis through the state revenue-sharing program, as well as line item appropriations lobbied through the Alaska Legislature by individual communities. State funding during the five-year period amounted to between 30 and 35 percent of capital and operating expenses.

The remaining fiscal requirements for general-service bus operations during this period were derived from farebox receipts and from local taxes.

Ridership in the state grew from perhaps 500 000 trips in 1975 to about 6 million trips in 1980. The combined general-service bus fleet in this period grew from about 12 to about 100 buses. System fiscal requirements rose from perhaps $750 000 in 1975 to about $20 million in 1980; again, these figures are for both capital and operating expenses.

Paratransit characteristics changed very little during this period, although ridership grew from about 300 000 in 1975 to about 500 000 in 1980. Federal funds from all sources contributed about 50 percent of the costs for these systems during this period, state funds contributed about 30 percent, and the remaining costs were derived from contributions by local governments, "fund raisers", and private individuals. Although accounting procedures and program diversity make precise estimates difficult, it is nonetheless believed that paratransit capital and operating requirements during this period grew from $750 000 to $2.5 million.

Until 1980, the staff role in planning and technical assistance changed little from the description given at the beginning of this paper. But 1980 marked the beginning of a very critical period for transit development in Alaska, a period of significant opportunity and of not insignificant potential for a fall from public favor.

STATEWIDE PLANNING

In late 1979, the Alaska Department of Transportation and Public Facilities (DOT/PF) initiated a contract with the local (Juneau) League of Cities, formally called the Alaska Municipal League. The contract was for a modest $40 000 and called for the completion of three tasks through a series of visits to communities:

1. An assessment of the knowledge among community leaders of the availability of transit program funding, their perceptions regarding local mobility constraints and opportunities, and their attitudes toward the viability of general-service transit operations in their communities;
2. Working with the then seven general-service transit providers in the state, the League was to report back to the Department on the feasibility of forming a Transit Operators Association in Alaska as a technical resource center that could assume many of the planning functions required by a growing program, functions that put strong pressure on the Department for staff expansion; and
3. The League was to conduct three technical seminars for transit operators on subjects of interest to the operators.

The League reported back its findings, and the Department subsequently forwarded those findings on to the Legislature. What the League found was that in Alaska there is significant potential for the expansion of existing systems as well as the creation of new systems. In fact, based on the findings of the report, it is estimated that between 15 and 20 new systems will be created in Alaska in the next five years, which would bring the statewide total of communities providing general-service transit to between 25 and 30 by 1986 and bring the statewide fleet total to between 400 and 500 buses within that same general time frame. This sort of aggressive expansion is a midcase extension of the 1975-1980 growth curve sketched previously and may culminate in the existence of transit in Alaska as a major industry with a ridership of perhaps 40 million and annual capital and operating requirements in the range of $150 million.

It is my opinion that Alaska has this growth requirement for transit because most communities in the state have a very high urban population density. Although this statement may sound ironic, it

is nevertheless seen as logical when it is considered that the vast majority of Alaska communities in the 500-3500 population range are not connected to other communities by road and are developed in a linear fashion, along one of the coasts or along rivers. A demonstration of the potential for mobility requirements among these insular, linear communities can be found in Barrow, where a transit system was initiated in 1978. After three years of operation, the Barrow ridership reached about 350 000 last year, and it is my understanding that, due to an increase in seating capacity, this year ridership may increase to between 450 000 and 500 000. Barrow is a town of 2500 people, which means that per capita ridership in 1981 may be between 180 and 200 trips.

State Funding

In 1980, DOT/PF received the first of what will become a series of biannual appropriations for transit capital requirements; this appropriation was authorized by the Legislature and approved by the voters by a 70 percent to 30 percent margin and consisted of about $9 million.

Before the Legislature adjourned, the state revenue-sharing program was amended to reflect a consensus view that revenue-sharing funds should not be tied to state priorities but rather to the development of local decision-making expertise. This basic philosophy culminated in the revenue-sharing program being moved toward a block-grant program rather than a collection of categorical programs. Transit was among the categories removed. In its study, the League found that most communities desired a separate transit operating assistance program tied to a percentage of cost. However the Governor in the meantime agreed to increase the total block-grant funds available to communities by a factor of about 250 percent. Following this announcement, the League repolled its constituents and found that the majority of communities favored holding a categorical transit program in abeyance, provided that certain caveats regarding local tax reduction and diminishing capital funding were not tied to the block-grant increase. So for now there appears to be a truce on the subject of categorical operating assistance for transit in Alaska.

PROGRAM CREDIBILITY

As stated previously, Alaska and the Alaskans involved in transit now face a period of rapidly growing user requirements and thus face great opportunity and considerable potential for error. It is probably true that most (major) errors made in the public sector result in a loss of program funding or at least a lack of funding increases to match what staff may perceive to be program requirements. This reprisal on program funding may be tied to a lack of communication with policymakers, a lack of information to provide to policymakers, or a lack of credibility on the part of those who provide information.

People involved in transit have already witnessed a move in this direction on the part of the Reagan Administration, and it should come as no surprise in this context to find Business Week magazine, in its June 8, 1981, issue, describing transit as one of the worst-managed industries in America (I would also point out here that Business Week has not to my knowledge taken any radically "antitransit" position but has rather approached the question of mobility in a more or less reasonable fashion, as it would approach any other industry). Now it is not only the federal government that is able to make this sort of political maneuver; state and local governments have decision-making powers as well.

We have tried to address this question of information exchange and credibility in Alaska. The Municipal League study was the first venture in this direction and provided a statewide overview to the Department, the Governor, and the Legislature. Statewide efforts will continue in the future; in fact, phase 2 of the Municipal League study is under way.

By the same token, local credibility and sound local management are also important to transit funding and probably more important than anything the state or federal government might do. It should be evident that local government must act before nearly any program, regardless of what priority the state or federal government may place on it, is implemented in an incorporated community. What this means to me is that local elected officials want to know community sentiment, cost, and manageability in order to make effective decisions. And here we are on the grounds of market research.

At the present time, DOT/PF is sponsoring public transit market plans in 20 communities throughout Alaska. These plans involve a survey of the community, an analysis of the data acquired, a segmentation of potential markets, a design of a system based on that analysis, and a summary showing costs and community sentiment for different alternatives. This may sound like old stuff to marketing professionals, but the point here is that local staff must be able to approach local policymakers with information such as, "We conducted an assessment using such and such a methodology; a certain percentage of the population favors this or that proposal; this is the cost of the proposal and these are the life-cycle costs; these are the management and other labor force requirements and opportunities for the proposal. What is your pleasure?" This is the sort of stuff on which local elected officials both maintain their tenure and build good programs.

The first of these market plans will be completed in late July or early August, and we would hope at that time to begin refining the model for a market plan as well as to assess the viability of different techniques for instituting market planning as an ongoing process. This strategy, if successful, would entail locally generated documents that, when viewed in sum, would provide a statewide picture for the Department, the Governor, and the Legislature of what the fiscal requirements of the Alaska transit industry are and how effective that industry is. Again, at the local level the market planning process provides management with an ongoing method for communicating information to policymakers as well as a method for judging the relative user and interest-group approval of management actions. Through the ongoing statewide process, we are seeking to assist local managers with their technical requirements in order to improve the efficiency side of transit operations.

Over the past three years of this program development, the state and the operators owe a great deal of thanks to groups such as the Transportation Research Board, the American Public Transit Association (APTA), the American Association of State Highway and Transportation Officials, Seattle Metro, the state of Oregon, and the state of Washington for their assistance at meetings and through information exchange.

Before turning to the national scene, I would like to make a few remarks concerning paratransit in Alaska. As I stated above, the nature of paratransit changed little during the period 1975-1980, although ridership increased substantially during that period and costs increased dramatically.

DOT/PF recognizes that significant state and

federal funding is currently available for paratransit. Funds for the aging, for nutrition, and for developmental disabilities, to name a few major sources, are provided to a large number of private, nonprofit corporations throughout the state for the purpose of providing clients with certain necessities and some social amenities that those client groups would not otherwise receive for reasons, as we know, of diminished mental or physical capacity. And this sort of service is both good and justifiable.

Transportation services range to about 15 percent of the total budget of any given nonprofit agency. In Alaska, this amounts to about $3 million annually, which accounts for about 550 000 trips (1981 estimates).

DOT/PF does not at this time see its role as a coordinating agency for paratransit activities throughout the state. Department policy at the present time is that paratransit is an important local issue that should receive local attention. To this end, the market planning that we sponsor includes, at the discretion of the local government, a paratransit element.

Given a paratransit market plan as a part of the overall area market plan, DOT/PF will respond to the capital requirements of the local area, including the paratransit capital requirements. But the market plan does more than simply provide a basis for allocating capital resources; the plan also demonstrates who is doing what, where, and when. With the information from the market plan in hand, local decision makers are better able to formulate action plans for coordination and consolidation, and turf fights may be less likely to arise. But again, with few exceptions, DOT/PF does not offer assistance directly to private, nonprofit entities but rather only to local incorporated political bodies.

NATIONAL SCENE

The following discussion of transit at the national level has four main points: (a) an overview, (b) a discussion of categories, (c) a discussion of funding levels within each category, and (d) a discussion of eligible uses of funding.

Alaskans support President Reagan's proposal to scale back the growth in the UMTA program. With the overall budget for the program established, other issues such as categories, funding, and eligible uses of funds within categories come to the forefront.

On the question of categories and the related question of formulas for categories, several existing and emerging interest groups or coalitions have developed identities. Among these groups are the fixed-guideway transit providers (and within this group a split may be emerging between heavy rail providers and other fixed-guideway providers such as light rail interests and electric trolley bus operators). Another broad interest group is the general-service bus operators (and within this group are the subgroups of major urbanized areas, small urbanized areas, and nonurbanized areas). Still another interest group is the paratransit community. On the formula side of the category question, coalitions have developed around service-based apportionment factors, population/population density apportionment factors, and other formula devices such as minimum apportionments and area factors.

Last year, a significant dispute erupted over different proposals to amend the apportionment formula for Sections 5 and 18. This dispute, in addition to a lingering question on the status of paratransit services within the public transit community, precluded passage of legislation.

The time is now right for a uniform, rational, and effective method of apportioning federal transit dollars, and to this end the following categorical formula approach to apportioning transit assistance is presented:

1. Separate transit services into three broad categories: (a) fixed guideway, (b) general-service bus, and (c) restricted-service bus or paratransit.
2. Within each of the first two categories, it is recommended that assistance be apportioned on the basis of revenue miles. As was argued correctly last year, apportionment on the basis of revenue miles would make the UMTA program more rational by giving assistance to transit providers who operate effective transit systems rather than on the basis of how many people happen to live in a certain place. In addition, the separation of fixed-guideway from general-service bus operations would help to avoid repeating the dispute that erupted between these interests last year.
3. It is recommended that the former Section 147 Program (rural demonstrations) be reactivated and made a demonstration program for both urbanized and nonurbanized areas. The recommended two-category program apportioned on the basis of (the previous year's) revenue miles would mean that new systems would face a "dry year" during startup. Although this is particularly true among potential nonurbanized systems, many new urbanized areas that do not currently have transit systems may also face a dry year (this urbanized factor was discussed at some length last year, as I understand the history of developments). A comprehensive demonstration program would help solve the dry-year problem.
4. Operators that provide services to restricted client groups should be kept separate from the two broad categories discussed earlier. Further, the federal government should conduct an assessment of all programs of assistance currently available to restricted client operators to determine what programs currently exist, the funding levels for those programs, and the relative benefit in terms of program effectiveness and savings to be derived from a partial or complete consolidation of those programs within an agency of the federal government.

The final categorical recommendation addresses a problem that is perhaps well-known to practitioners in the field of rural transportation. I refer to the facts presented by the Carter Administration at the White House Conference on Rural Transportation in 1979. There it was stated by high Administration officials that the federal government provided more than $1 billion annually in capital and operating assistance to nonurbanized paratransit providers through some 60 separate programs spread throughout nearly every department within the government. These figures are for nonurbanized areas only and represent only the federal portion of such assistance. Three conclusions can be drawn from these figures: (a) that federal assistance to paratransit operations for urbanized areas is as complex and as significant as it is for nonurbanized areas, (b) that local and state contributions perhaps equal or exceed the federal contribution, and (c) that these figures have grown significantly since 1979. The point to be drawn here is quite simple--namely, that with this major level of federal involvement in support of paratransit operations already in place, it is unclear why additional funds should be drawn away from general-service operations to further support paratransit activities. As recommended above, it is strongly urged that the federal government assess these many existing programs to show clearly just what programs are currently at work, at what level they are funded, whom they impact, and what the po-

tential is for consolidation of federal paratransit activities, either through the U.S. Department of Transportation or through some other agency.

The next major point here has to do with funding levels for each of the recommended categories and for the overall program. APTA has developed a staff position in some respects similar to the categorical approach just outlined. Although it is unclear whether the APTA constituency has been fully polled with regard to this position, it is understood that what the APTA proposal would do in terms of funding is to take certain portions of the Section 5 and Section 3 programs and allocate those portions to a fixed-guideway category and a bus-service category, respectively. It is my further understanding that (in very rough terms) this allocation would result in more or less equal amounts being appropriated to each of the two broad categories. My recommendation is that $1.5 billion be appropriated to a fixed-guideway category and $1.5 billion be appropriated to a general-service bus category. Given a $4 billion program, this would leave about $1 billion to be put to three uses: (a) to fund the demonstration program entailed by this proposal, (b) to fund a reduced discretionary program, and (c) the remainder to be used for the purpose of budget cuts.

My final point concerns eligible uses for funding. In this regard, I would like to stress that those who provide resources to transit operations, be they federal interests, state or local governments, private industry, taxpayers, or riders, are concerned first and foremost with effective and efficient services and other concerns are secondary. To this end, it is unclear why federal assistance should be limited to "capital" or "operating" or "maintenance" uses. Rather, the federal share could and, I feel, should be a block grant, which, in conjunction with state and local funds and farebox receipts, would provide a composite financial package for local transit operations. The allocation of the individual component pieces of the transit funding package to operations or maintenance or capital improvements would be a direct and necessary function of the local process of transit program prioritization.

CONCLUSIONS

By way of summary, I would state that ups and downs in the supply and price of fuel should not have a significant impact on the development of transit services, in either rural or urban settings. The key is to know what the market wants and to respond to that demand. There are "fiddlers in the crowd," as the saying goes, but, if industry professionals make a good-faith effort, then mutual problem solving and hard work among local property managers will together bring about more efficient operations. With effective knowledge of the market and with efficient management practices, I think the transit future is bright.

Part 2
Finance Management

Billing and Accounting by Use of a Computerized Data Reporting System: The Iowa Experience

FRANKLIN E. SHERKOW

The allocation of costs and establishment of billing rates have become complex and time-consuming for transportation providers due to the variation of funding agency requirements and limitations of transit administrative processes. Many transit systems are developing management information systems to aid them in these efforts. A computer-based, comprehensive transit information system has been developed, tested, and implemented in 23 of Iowa's 33 transit properties. This system, known as the Uniform Data Management System (UDMS), is completely consistent with the Section 15 process established by the Urban Mass Transportation Act of 1964. UDMS is an integrated financial and nonfinancial system that is an accounting and management process first and a reporting system second. It is flexible enough to accommodate social service and local conditions. Due to the extent and variety of information available from UDMS, a wide range of cost-allocation and billing-rate variables are available. The selection and use of this information constitute a valuable, locally determined tool. UDMS information can play a vitally important role in the negotiation of service contracts. Transit managers need reliable service and financial data before, during, and after entering into contractual arrangements. Good information is the key to sound decision making and, ultimately, a better transportation system.

How does a transit manager know if he or she is fulfilling the mission of the transit system? How does the director of a transit funding agency know if the program objectives or contract conditions are being met? The answer to both questions is information.

Greater emphasis is now being placed on sound management and increased productivity. Arthur E. Teele, Jr., Urban Mass Transportation Administrator, recently said, "We think a hard-nosed business standard should be applied to transit management." It is essential that accurate and appropriate information be the basis for the decisions facing public transportation in the next five years. Equally important is the need to have the same information used by all parties involved. Common solutions can only be derived from a common recognition of conditions and trends.

However, in an attempt to gain various pieces of information from transit operators and planners, it became evident that several problems existed:

1. Wide variation in accounting systems and/or lack of various accounting practices,
2. Various definitions for the same terms,
3. Lack of a central source of data on any given operation,
4. Inability of decision makers to establish rational policies due to lack of information,
5. Difficulty in monitoring the progress of various operations, and
6. Inability to compare or tabulate transit data among various systems and operations with confidence.

To overcome the shortcomings resulting from inadequate information and use existing programs and resources to the maximum, several major concepts needed to be formulated. Foremost among these concepts was the overall structure. Fine-tuning small elements of the existing process would not cure the infirmity but only treat the symptoms.

The concept of Iowa's Uniform Data Management System (UDMS) is that single administrative transit agencies (in regional and urban areas), with the assistance and cooperation of transit providers and other appropriate sources, will compile the necessary data. These data would serve as a common basis used by all parties for all purposes: planning, programming, project development, grant application, bookkeeping, cost allocation, billing, fiscal accountability, program and service accountability, and system monitoring.

UDMS has several characteristics that, taken in combination, make the system unique.

1. Computer-based--A single, central computer is being used initially to minimize costs, allow for small computer advances and cost stabilization, and ensure uniformity of processing.
2. Section 15 (Urban Mass Transportation Act of 1964, as amended)--The process is being completely based on, and made compatible in all ways with, the national Section 15 definitions, procedures, and formats (1).
3. Expandable system--Iowa's system has been designed to accommodate and give detail for non-U.S. Department of Transportation (DOT) funding agencies and programs.
4. Flexible approaches--The system allows for the specific tailoring of UDMS to local structures and relationships. The basic chart of accounts and nonfinancial features are detailed for local conditions.
5. Low paper-handling process--Computer input can be keypunched directly from local source documentation (e.g., check copies and driver trip sheets).
6. Local management information system--UDMS is, first, a local accounting and management system, and, second, a reporting system.

AVAILABLE INFORMATION IN UDMS

The Iowa UDMS is basically three interrelated elements: (a) data items (financial and nonfinancial), (b) transit mode, and (c) geographic subarea or units (departments). These elements can be thought of as the length, height, and width of a "cube" (see Figure 1). Each side of the cube is broken down into small segments. Influencing this cube are the following: (a) accounting practices, (b) procedures and definitions, (c) the size and characteristics of the transit system, and (d) special information needs. Individual, small blocks of the cube can represent data as simple as one number or as complex as an extensive matrix.

In summary, UDMS output is the detailing of each of the small blocks of the cube. Thus, all combinations of the following are possible output:

1. Data items--Financial (assets, liabilities, capital, and expenses) and nonfinancial (facilities and equipment, employees, maintenance and fuel, safety, service, passengers, and time);
2. Mode--Motor bus, demand-responsive service (other modes are available but not used in Iowa); and
3. Department--Locally determined set of areas, subcontractors, or operations (when summed, they represent the entire system).

Figure 2 shows the maximum array of small information units (blocks) used in Iowa. Iowa City Transit has an elderly and handicapped service component as well as its regular fixed-route service (one department and two modes). Note the differ-

Figure 1. UDMS conceptual elements.

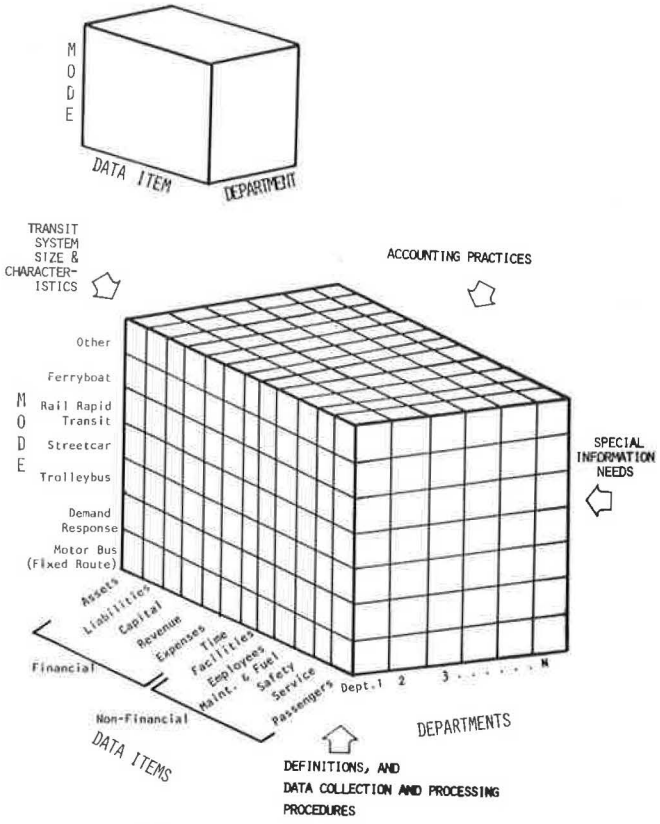
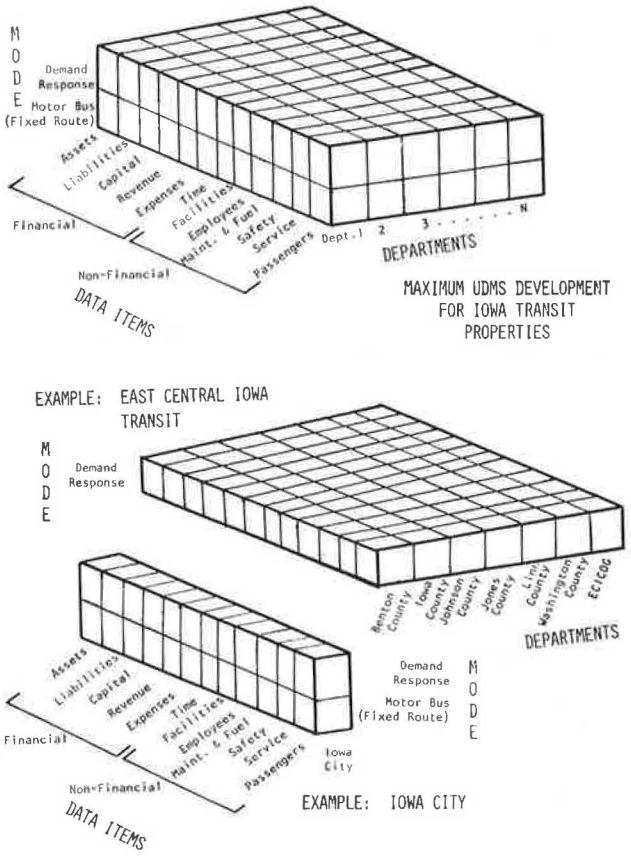


Figure 2. UDMS elements in Iowa.



ences of the regional transit property, the East Central Iowa Transit System, with its one mode and seven departments (six counties and the central administrative function).

Financial Data Items

While department and mode designation is simple, the detailing of data items is complex. The financial items make up the chart of accounts (see Figure 3). In this case, the Section 15 definitions (1) are used. These can be summarized as follows:

Section 15 Object Class (chart of accounts)	Series Numbering
Assets	100s
Liabilities	200s
Capital	300s

Section 15 Object Class (chart of accounts)	Series Numbering
Assets	100s
Revenues (all operating income)	400s
Expenses (all operating expenses)	500s

Each individual item under the five basic object classes (shown above) is detailed down to two places to the right of the decimal point (e.g., revenue, 400s; passenger fares for transit service, 401; full adult fares, 401.01).

In this example, "full adult fares" (401.01) is just one part of "passenger fares" (401), which is similarly part of "revenue" (400s). In this system, great detail is available in each object class. Full reporting of detail, however, is usually reserved for "revenue" and "expense" object classes only. As a matter of fact, even more detail is required for the "expense" object class by the overlaying of function categories. The use of functions (only for the "expense" object class) merely sorts the total expenses in a different way. Therefore, if the object classes were displayed vertically and the functions horizontally, an expense matrix would form. This is, in fact, what happens. In Iowa, only four basic function categories are used (see Figure 4):

Section 15 Basic Function Category	Series Numbering
Vehicle operations	010
Vehicle maintenance	041
Nonvehicle maintenance	042
General administration	160

For very large transit systems, a greater expansion of the function categories is required by the Urban Mass Transportation Administration (UMTA). This produces an extensive matrix, which is too cumbersome for most small or rural operations.

In Iowa's UDMS chart of accounts, the following alterations have been made in order to accomplish two tasks--minimize coding and keypunching and enhancing data flow within UDMS by computer--while staying within the original Section 15 parameters:

1. Information needs to flow from subsidiary schedules (output) to the balance sheet, revenue detail, and expense schedule. To avoid inputting the same data two or more times, data are coded only once into subsidiary accounts for select accounts. The computer is programmed to then carry subsidiary account data into other schedules and records (parent accounts).

Figure 3. Section 15/UDMS general summary of chart of accounts.

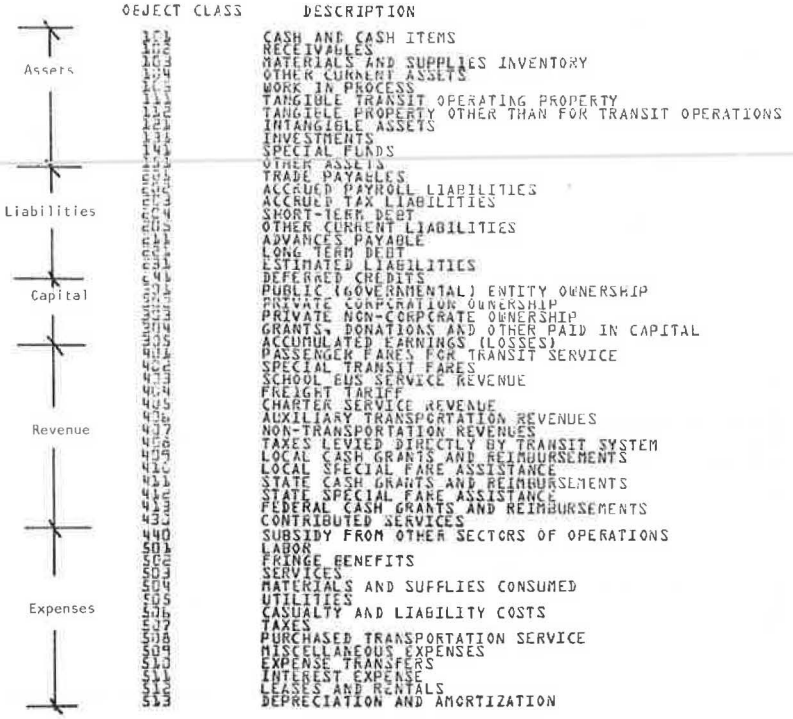


Figure 4. Section 15/UDMS expense matrix.

Object Classes	Functional Categories: Vehicle Operations 010	Vehicle Maintenance 041	Non-Vehicle Maintenance 042	General Administration 150	Total Expense for the Period
501. Labor					
01. Operator's salaries & wages					
02. Other salaries & wages					
502. Fringe benefits					
503. Services					
504. Materials and supplies consumed					
01. Fuel and lubricants					
02. Tires and tubes					
99. Other materials and supplies					
505. Utilities					
506. Casualty and liability costs					
507. Taxes					
508. Purchased transportation service					
509. Miscellaneous expense					
510. Expense transfers					
511. Interest expense					
512. Leases and rentals					
513. Depreciation and amortization					

2. Within the present Section 15 chart of accounts, unassigned numbers (accounts) exist. A variety of new accounts have been established to provide more specific and regular detail concerning a revenue source or common expense. For reporting purposes, these accounts are usually aggregated by the computer into "catch-all" accounts already established in Section 15 definitions (e.g., 504.99, other materials and supplies).

Figure 5 shows the linear distribution of account ranges across the entire chart of accounts. It also shows the flow of information from subsidiary schedules to primary schedules (i.e., from subsidiary accounts to parent accounts).

UDMS financial output (2) is as shown below:

1. Complete chart of accounts;
2. Balance sheet (Section 15 format);
3. Capital subsidiary schedule (Section 15 format);
4. Revenue detail schedule (Section 15 format);
5. Revenue subsidiary schedule (Section 15 format);
6. Expenses classified by function, single-mode system (Section 15 format);
7. Expense summary by function, multimode system (Section 15 format);
8. Expense summary by object class, multimode system (Section 15 format);
9. Direct, joint, and total expenses by object class and mode, by function, multimode system (Section 15 format);
10. Operators' wages subsidiary schedule (Section 15 format);
11. Fringe benefits subsidiary schedule (Section 15 format); and
12. General ledger.

The chart of accounts accomplishes the following:

1. Details each account that is available to the particular transit system, by number and description;
2. Identifies the account type: (a) balance sheet (asset, liability, or equity), (b) revenue, (c) expense, (d) capital assistance, (e) operating assistance, (f) operators' wages, or (g) fringe benefits; and

Figure 5. UDMS chart of accounts and financial data flow.

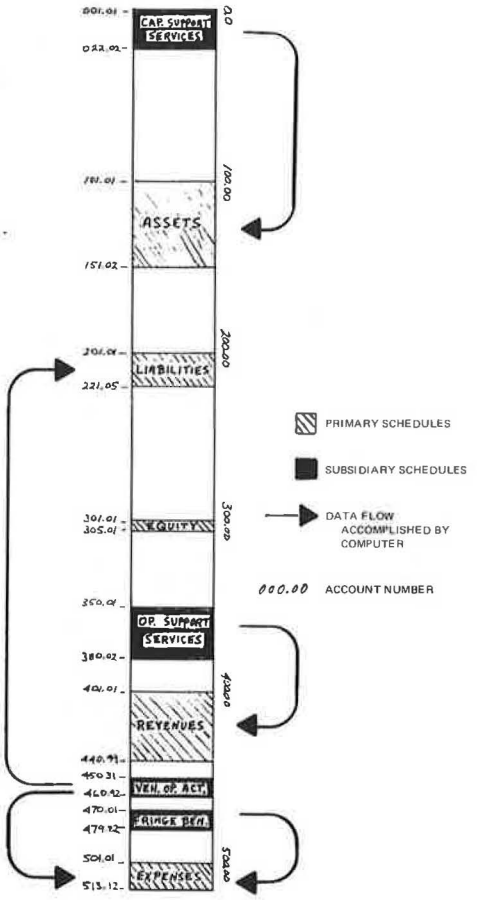
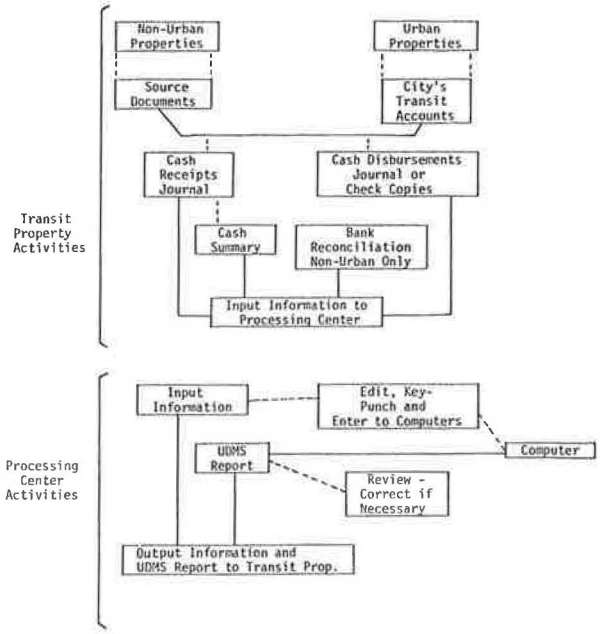


Figure 6. UDMS information input process.



3. Identifies the parent account associated with accounts reflected on the subsidiary schedule.

In addition, the chart of accounts is flexible in that it can be expanded when necessary for additional accounts and deletions can be made when accounts are no longer needed.

Each financial transaction is "coded" with six items: mode, department, function category, object class, dollar-and-cents amount, and description. For example, the coding for a gasoline purchase for revenue service vehicles (2) would be as follows:

Item	Coding
Mode	5
Department	1
Function	010
Object	504.01
Amount	$879.63
Description	Ajax Gas Company, July, gasoline

The methods and procedures of inputting data are not discussed in this paper due to space limitations but are shown in Figure 6.

Nonfinancial Data Items

On the nonfinancial side of the data items, one level of detail is usually all that is available, regardless of system size or complexity. However, variations are possible. But, as in the financial program, every attempt has been made to retain the integrity of the Section 15 forms and approach (3). The nonfinancial data available from the Section 15/UDMS process (4) are listed below:

1. Time periods;
2. Facilities and equipment--(a) Miles of roadway or track, (b) railway classifications, (c) bus roadway classifications, (d) revenue vehicle inventory classifications, and (e) number of passenger stations;
3. Employees--(a) Transit operating personnel classifications and (b) employee count classifications;
4. Maintenance performance and fuel consumption--(a) Road calls for mechanical failure and other reasons, (b) labor hours for inspection and maintenance of revenue vehicles, (c) fuel power consumption, and (d) number of light maintenance facilities;
5. Safety--(a) Collision and noncollision accident classifications and (b) injury and damage classifications;
6. Service supplied and vehicle utilization--(a) Average and total vehicles operated; (b) miles of revenue service, total service, and charter and school bus service; and (c) hours of revenue service, total service, and charter and school bus service; and
7. Passenger utilization--(a) Unlinked passenger trips, (b) passenger miles, and (c) average time per unlinked trip.

One of the most important and unique features of UDMS and Section 15 is that certain passenger and trip data are collected by sampling instead of universal counts (4). Sampling procedures generated by UMTA for fixed-route operation and for demand-responsive services are used. By increasing the minimum sampling frequency recommended for the entire system, route data for fixed routes and client data for demand-responsive operations can be gathered.

DATA UTILIZATION

A key question that has been asked throughout the development of the UDMS program is, How much infor-

mation should be gathered? The UDMS program was designed to strike a balance between the type of information desired and the amount of and difficulty of gathering that information required to ensure validity. Certainly some of the best information is the hardest to gather and the most time-consuming. But what information should be gathered and at what cost in time and labor?

At each turn of the UDMS program, attempts have been made to justify data collection with data utilization. If a specific, demonstrable use for information could not be justified, it was not included. Alternatively, if some additional subdivision of information was seen as valuable and not excessively difficult to achieve, it was included. Section 15 requirements were contracted or expanded in light of maintaining that balance.

UDMS was not designed as a "jump-through-the-hoop," passive, external reporting system. It was principally designed as a dynamic internal management tool; therefore, the information gathered must be gathered seriously and used seriously. This requirement places an additional burden on transit operators, transit planners, and Iowa DOT district managers. The information generated must be used. The rewards of collecting and reporting the data elements are more efficient transit operations, better transit contracts, and better and more detailed information with which to articulate the needs of transit to policymakers.

Some of the uses of UDMS information will be revealed in the development of a performance audit system. However, the internal use of the information should start with the system implementation. To initiate this process of data utilization, internal uses of system data were developed on a system-by-system basis. For fixed-route, small urban systems, data utilization may be chiefly concerned with evaluation of routing and scheduling. For regional systems, depending on the amount of sampling available, a cost-allocation and billing procedure may be among the principal concerns.

As a prelude to discussing cost allocation and billing, a summary of the nonfinancial data set is given below. With the initiation of UDMS, a more detailed, consistently defined, uniformly gathered set of ridership information is generated. Iowa's UDMS reporting system contains the following elements:

1. A highly detailed uniform set of transit definitions (1);
2. Uniform, detailed procedures for acquiring and recording transit information (5,6);
3. Actual monthly passenger counts by client group;
4. Actual passenger-mile tabulations by month; and
5. Sample information that will render the following annually valid information: for demand-responsive systems, (a) total passenger minutes (by client group), (b) total capacity miles (by client group), (c) total seat miles (by client group), (d) average passenger trip distance (by client group), and (e) average passenger trip time (by client group); for fixed-route systems (by morning peak, midday, evening peak, night, and Saturday-Sunday service), (a) passengers boarded, (b) passengers on board, (c) bus trip distance, (d) passenger miles, (e) bus trip time, (f) passenger minutes, (g) capacity miles, (h) seat miles, (i) trips in sample, (j) total number of bus trips, (k) unlinked passengers per trip, (l) passenger miles per trip, (m) unlinked passenger trip time, and (n) unlinked passenger trips.

COST-ALLOCATION AND BILLING RATES

Obviously, the basis of a cost-allocation plan can be as different as the data and the combinations of data available. The more variables or subdivisions of variables (e.g., the same data variables such as passenger miles for two or more geographic areas or client groups), the more choices there will be to generate a cost-allocation plan and/or billing rate. The selection of variables or combinations of variables should be (a) developed based on appropriate measures for the service(s), (b) derived from available data, (c) based on definitions that are understood and agreed on, and (d) made part of the written contract between the parties involved.

The purpose of this paper is not to develop cost-allocation or billing-rate models. There are many others in the transit community who are working in this area. Table 1 summarizes some of this work

Table 1. Cost- allocation plan and billing-rate variables used by selected studies and agencies.

Agency or Study	Indirect Cost Determination	Allowed/ Unallowed Cost Sharing	Service Type	Population	Property Valuation	Clients	Vehicle Miles	Vehicle Hours	Passenger Trips	Passenger Miles	Trip Length (zonal system)	Person Hours
U.S. Department of Health, Education, and Welfare (Health and Human Services) Publication OASC-10 (7)	X											
Ecosometrics, Inc. (8)	X	X	X				X	X	X			
LIFTS, Linn County, Iowa	X						X					X
Eastern Task Force on Aging (9)										X		
Mount Grace Regional Transportation Program Corporation (9)							X					
Regional Transportation Program, Inc. (9)										X		
DAST (9)											X	
Cape Cod Regional Transit Authority (9)									X	X		
University of Massachusetts[a] (9,10)			X	X	X	X	X	X	X	X		
Santee Wateree Regional Transportation Authority, South Carolina			X				X			X	X	
Gobel (11)	X	X								X		

[a]Study uses different applications of variables for different situations.

and key features of the cost-allocation methods.

With regard to one of these models, Iowa has examined concepts laid out in a report by Knapp of Ecosometrics, Inc., on coordinated transportation systems (8). Ecosometrics procedures are based on disaggregating passenger trips by client groups. UDMS goes one step further by providing sample data on trip efficiencies by client group. Ecosometrics did not go to this length because it argued that it is too "difficult to keep passenger hours of service (and miles of service) when a system mixes clients." Although this is certainly true when one records such information on a daily basis, this level of detail can be provided by using a sampling technique. Because use of the sampling approach is infrequent and random, it is not perceived as an excessive responsibility for a transit operation.

The key feature lost in the Ecosometrics method (8) is the relative system impact of each trip. Different client groups and different passenger types generate different trip times and miles. For example, within most coordinated systems, demand-responsive trips for the elderly are longer and take more time than Head Start trips. Only sampling can determine that approximate impact at a reasonable cost.

In the UDMS program, sample information is designed to identify transportation utilization characteristics by client group. It is expected that client groups will be defined by the transit property as preidentified client categories (e.g., elderly and handicapped). But it is also designed to use contract categories (e.g., sheltered workshops and congregate meal sites).

By gathering ridership information by client group, specific unit costs can be developed. These unit costs can be translated into cost-allocation or billing plans.

The basis for Iowa's system is that, with extensive, consistently defined, uniformly gathered information across a number of variables (as detailed previously), a wide variety of cost-allocation and billing-rate procedures are possible. The data gathered by using the sampling process are as good as, and sometimes better than, "universally counted" records (i.e., every data element in the set is counted). This is done at relatively low cost, with fewer personnel, and often results in higher driver morale than other methods (due to a lighter data-gathering burden).

The Iowa DOT has not mandated and will not mandate a single-process allocation plan or billing method because this is believed to be a locally determined prerogative of the client funding agency. However, the Iowa DOT is working toward getting client funding agencies to accept UDMS methods as being sufficiently accurate, documentable, and accountable. An effort is also being made to get local, state, and federal funding agencies to select billing and cost-allocation variables currently available through UDMS as the basis for contractual arrangements with transit agencies. This will result in a more stable, long-lived management information system (i.e., UDMS). Thus, the Iowa UDMS is attempting to balance the structure of a single information system with the data needs and desires of various agencies. The flexibility of UDMS enables one to make select changes while maintaining the system integrity.

In summary, UDMS offers a wide combination of variables in establishing cost-allocation plans and/or billing rates. The Iowa DOT will encourage local agencies to determine the variables to be used. In addition, work with state and federal funding agencies will stabilize the information system used by all while minimizing costs within accountability parameters.

UDMS AND CONTRACT NEGOTIATIONS

The reimbursement rate or funding level made part of a transit service agreement should not be a foregone conclusion based on management information. Transit systems need to negotiate the highest rates possible for services provided. The total transit system service and financial capabilities must also be continually reexamined.

Negotiating the highest possible rate for transit service is a concept that is significantly different from the general consensus nationally. However, transit agencies should no more give away service than physical assets.

There are funding or client agencies that are bound to purchase services based on their cost. In these cases, the total, true cost of service provision should be used. If the purchasing agency claims that it can supply its own service at a lower rate, a comparison should be made between the transit system rate and the purchasing agency rate. It is extremely important that comparison be made on the basis of "apples to apples". In other words, the total, true costs for both agencies must be used for identical service. If the purchasing agency claims that its personnel are available for transportation purposes "already paid for", those costs still must be made part of the comparison.

The rate, then, is not a question of the actual cost to the transit system but rather what the rate would be if the funding or client agency supplied the service themselves or purchased the transit service elsewhere. If this rate (based on a true, total cost comparison) is lower than the total cost rate of the transit system, then the transit system needs to analyze its own operations and finances. The institution of a cost containment program or service analysis may be in order.

The data from UDMS play an important part in the entire negotiation process. Definitions and billing-rate components are clearly laid out. Indisputable data from the transit system are readily available. The transit system knows the limits of its negotiation levels: cost and service.

Negotiating the highest possible rates should enable the transit system to establish flexible service levels, initiate true general public operation, and generate a capital sinking fund. A healthier transit system means higher levels of service and better economies of scale for everyone.

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Use of Unrestricted Federal Funds of the Section 18 Program

DONALD N. TUDOR

South Carolina's use of the Federal Highway Administration Section 18 program provision that allows the use of unrestricted federal funds as local match is analyzed. Answers are provided to the following three questions: Can a definition of unrestricted federal funds or a list of preapproved federal funding sources be provided? What are the mechanics of using the unrestricted federal funds for matching purposes? How can the match maximums be calculated? Two case studies that include a complete range of use of unrestricted federal funds are discussed.

In the past decades, many separate federal programs have been established to meet the transportation needs of social service programs and programs that serve the general public. Such programs either required local funds as match against the federal contribution or, in a few cases, required no local match. Match requirements were usually established to ensure local commitments for the program and to help share the program cost between the federal and local governments.

With Congress' approval of the Small Urban and Rural Public Transportation Program (Title III, Section 18, of the Surface Transportation Assistance Act of 1978), a new approach was legislated. This approach allowed the use of other federal funds to partly account for the local match requirements. This new flexibility in developing the local match for federal grants, known as the unrestricted federal share provision, recognized the limited matching resources at the small urban and rural level and has greatly aided one of the program's main goals: coordination of human service and general public transportation delivery at the local level.

The extent to which other federal funds are used to match the Section 18 funding is left in great degree to the state administering agency. Many states have interpreted the unrestricted federal share provisions rigidly whereas others have allowed great latitude. This difference among states is principally due to the nature of each state's existing program in small urban and rural areas. If a state has a tradition of public transportation services in nonurbanized areas, local financial resources are most probably available to match the Section 18 funds and there is not quite the urgency to start a large number of new programs. The initiation of new programs requires a large initial investment and therefore more local match. In 1978, states like South Carolina had very few public transportation systems in nonurban areas and were therefore looking for the greatest flexibility possible to produce the local match for federal funds. Another major factor is the availability of state funds to assist counties, municipalities, or authorities in developing local match. Consequently, some states with a state public transportation subsidy program found it unnecessary to look for unique approaches to use the unrestricted federal funds provision.

This paper examines efforts in South Carolina to make the most efficient use of the Federal Highway Administration (FHWA) Section 18 program provision (Chapter I, 23 CFR §825.9b) that allows the use of unrestricted federal funds. The provision reads, "Half of the local share for both capital and operating expenses must be provided in cash, from sources other than federal funds or revenues from the other operation of the system. The other half of the local share may be made up of unrestricted funds from other Federal programs." In practice, this provision has been applied to administrative expenses as well.

The above reference to "efficient use", when viewed from the local perspective, means minimizing local cash need or stretching available local cash as far as possible. Ironically, and contrary to popular belief, making efficient use of local cash resources also makes efficient use of federal funds; therefore, all parties are benefiting.

To reduce any possible confusion that may have resulted from reading other related federal publications, the terms "soft match" and "nonrestricted federal funds" are synonymous with "unrestricted federal funds".

The three major questions that had to be answered

prior to South Carolina's use of the unrestricted federal funds provision were the following:

1. Can a definition or list of these funds be provided?
2. What are the mechanics of using these funds for matching purposes?
3. How can the match maximums be calculated?

DEFINITION

In April 1981, FHWA issued a memorandum (1) for the purpose of aiding grantees in certifying sources of unrestricted federal funds. South Carolina has since updated this chart to reflect recent changes in federal legislation. South Carolina and its grantees have also dealt with federal funds not referenced in this memorandum on a case-by-case basis. A clarification of the use of some such federal sources is presented in the case studies included in this paper.

MECHANISM

The state of South Carolina has designed a budgeting system for its Section 18 application process that uses standardized forms and procedures. These forms are the same as those presented in the case studies later in this paper. These tables recognize the expenditure budget and the revenue or grant calculation budget. The first table (see Tables 1 and 5) is designed to aid applicants in itemizing their projected expenditures into appropriate categories for Section 18 funding (operations, capital, and administration). The second table (see Tables 2 and 7) is designed to deal with the funding categories or revenue sources for the Section 18 program. This table takes information from the first table and, through the aid of the third and fourth tables (see Tables 3, 4, 8, and 9) a mechanism is provided for the calculation of match and system revenue.

MATCH CALCULATION

In 1980, a formula was derived by FHWA and revised by South Carolina that provided a systematic method to account for the correct use of unrestricted federal funds in the grantee's budget. This method can be used by all states. The procedure adheres to the basic requirement that unrestricted federal funds must be shown as expenditures if they are to be shown as revenues. This balancing of expenditures and revenues also holds true for in-kind values. This formula, which is presented below, is to be used in cases where the unrestricted federal funds are in excess of one-half of the local match. It will also work when local resources exceed match requirements. Cases in which both unrestricted federal funds and local resources exceed match requirements are addressed in the following paragraphs.

In the formula,

X = unrestricted federal funds match,
A = gross expenditures,
B = farebox revenues,
C = total unrestricted federal funds available,
Z = unrestricted federal fund revenues,
Y = net expenditures, and
X = unrestricted federal funds as local share match.

$$X = (A - B - C)/9 \quad (1)$$

where 9 is the denominator used for capital and administrative expenditures. A denominator of 3 is used for operations expenditures.

$$Z = C - X \quad (2)$$

$$Y = A - B - Z \quad (3)$$

For example,

A = $100 000 (gross administrative expenses).
B = 0 (farebox attributed to administrative cost).
C = $25 000 [Comprehensive Employment and Training Act (CETA) Training grant].
X = ($100 000 - 0 - $25 000)/9 = $75 000/9 = $8333 (federal Section 18 share = $66 666).
Z = $25 000 - $8333 = $16 667.
Y = $100 000 - 0 - $16 667 = $83 333.

Note that in dealing with capital and administrative budgets X should always be one-tenth of Y.

To test the formula, simply multiply Y ($83 333) by the required local match (administrative expenses 20 percent) and check to see whether half of the local match is equal to X: $83 333 • 20 percent = $16 667 and $16 667/2 = $8333.

Note that sometimes the local share and/or the total local match must be rounded upward to accommodate the formula. It should be remembered that this formula only works when the unrestricted federal funds are in excess of one-half the required local match. When using the formula for operation expenditures, the formula must be X = (A - B - C)/3.

There are cases where other values are also in excess of the allowed match. This can occur when in-kind values and local contracts are used and they exceed the required local share. That portion that cannot be used as match appears as operating revenues. Under the Section 18 program, farebox revenues must be counted as operating revenues. In addition, federal funds must be used to cover op-

Table 1. Case 1 proposed transportation budget expenditures: July 1, 1981-June 30, 1982.

Line No.	Category	Proposed Budget Section 18 Project Request ($)	Total Program This Year ($)
	Operation charges		
	Personnel	405 750	405 705
	Fringe benefits	60 863	60 863
	Contractual services	0	
	Licenses		
	Maintenance	75 000	75 000
	Fuel and oil	175 000	175 000
	Indirect charges (utilities, etc)		
	Other	10 000	10 000
1	Total	726 613	726 613
	Capital charges		
	Construction	444 236	444 236
	Equipment	363 995	363 995
	Other (lease)	28 800	28 800
2	Total	837 031	837 031
	Administrative charges		
	Personnel	61 600	61 600
	Fringe benefits	12 320	12 320
	Office supplies and equipment	-[a]	
	Contractual services	25 000	25 000
	Travel	5 000	5 000
	Training	2 500	2 500
	Public relations	500	500
	Printing and publications	1 250	1 250
	Dues and subscription	500	500
	Insurance	30 000	30 000
	Indirect charges (utilities, rent, etc.)	100 430	100 430
	Other	9 600	9 600
3	Total	248 700	248 700
4	Total expenses	1 812 344	1 812 344

[a]Indirect.

Table 2. Case 1 proposed transportation budget revenues: July 1, 1981-June 30, 1982.

Line No.	Category	Proposed Budget for Section 18 Project ($)			Total Project Request ($)	Total Program This Year ($)
		Capital	Administrative	Operations[a]		
	Operating revenues					
	Farebox			37 000	37 000	37 000
	Other (contracts)			620 653	620 653	620 653
1	Total			657 653	657 653	657 653
2	Total expenditures	837 031	248 700	726 613	1 812 344	1 812 344
3	Net operating loss (line 1 minus line 2)			68 960	68 960	68 960
	Local share					
	Local subsidy	91 322	14 715	17 240	123 277	123 277
	In-kind services	36 000	9 600		45 600	45 600
	Donations (cash)					
	Advertisement					
	Charter profits					
	State funds	16 084	555		16 639	16 639
4	Total	143 406	24 870	17 240	185 516	185 516
5	Unrestricted federal funds	24 000	24 870	17 240	66 110	66 110
6	Other federal funds					
7	Total local match (add lines 4, 5, and 6)	167 406	49 740	34 480	251 626	251 626
8	Federal Section 18 funds	669 625	198 960	34 480	903 065	903 065
9	Total revenue (add lines 1, 7, and 8)	837 031	248 700	726 613	1 812 344	1 812 344

[a]July 1, 1981 to June 30, 1982.

Table 3. Case 1 itemized available revenues.

Source	Available Funds ($)
Farebox	37 000
Local subsidy	
State	16 639
City X	
Building fund	52 847
Section 147[a]	4 000
Lease van deposits	225
Advertising	0
Charter	0
Total	93 711
In-kind	
Land donated	36 000
Building leases	6 000
Utilities	3 600
Total	45 600
Contracts	
Regional Planning Council	109 000
Career awareness	2 500
County School District	
No. 2	3 000
No. 4	2 250
No. 1	2 500
Concerned parents	3 600
City X vocational rehabilitation	5 400
Munford Fuller	17 500
Mental health	5 400
Vocational rehabilitation	1 500
Case coordination	4 000
City X Department of Social Services	2 000
City X adult development	6 000
Regional center	9 000
Total	173 650
Unrestricted federal funds	
Title XX	402 920
Department of Labor (CETA)	124 139
State Department of Social Services	7 500
Senior Citizens Employment Program employees	8 400
Retired Senior Volunteer Program	750
CETA (leased vans)	24 000
Total	585 709
Total	935 670

[a]Sale of junk vehicles originally purchased with Section 147 funds (Federal-Aid Highway Act of 1973).

erating costs if they are shown as operating expenses of the Section 18 project. This holds true equally for funds budgeted to cover administrative or capital expenses. With this restriction (the balancing of revenues and expenditures) and the fact that there may not be enough Section 18 funds to go around, the use of this formula to minimuze the use of Section 18 funds makes a lot of sense. The formula used in the event that more than one resource exceeds the required match is presented below (this formula will work for capital or administrative expenses; operation expenses would use a denominator of 0.5):

$$Y = (A - B - C - D)/0.8 \quad (4)$$

where D is the total available local share and V is the local share match. In the following example, D = $20 000; all other values remain as shown in the previous example.

Y = ($100 000 - 0 - $25 000 - $20 000)/0.8 = $55 000/0.8 = $68 750.
X = (68 750 • 20 percent)/2 = $6875 (or one-tenth of Y in administrative and capital budgets).
Federal Section 18 share = $55 000.
V = X = $6875.
Z = (c - X) + (D - V) = ($25 000 - $6875) + ($20 000 - $6875) = $31 250.

The formula can be tested by subtracting Z and B from A to equal Y: If Y = A - Z - B, then Y = $100 000 - $31 250 - 0 = $68 750.

These formulas are of assistance only after a prospective grantee has determined what funds can be designated contracts and/or unrestricted federal funds, in-kind values, local subsidy, etc.

CASE STUDIES

The case studies that follow provide detailed examples of how unrestricted federal funds and other resources are used and the procedures required by South Carolina.

Case A

Case A is a regional system that delivers services under a family-of-services arrangement by using formula X = (A + B + C)/3 and a special transit fare provision. The property has used Section 18 funds for two years. Transportation service is provided in the family-of-services arrangement to a six-county service area. In this case, the family-of-services arrangement includes fixed-route subscription, demand response, and charter services to the general public and to 19 separate client groups.

Table 4. Case 1 use of revenue and match funds.

Source	Capital ($)			Administration ($)			Operations ($)			Total ($)
	Total	Match	Revenue	Total	Match	Revenue	Total	Match	Revenue	
Fares							32 000	0	32 000	
State	16 084	16 084	0	555	555	0				
Local subsidy	77 072	77 072	0							
In-kind	36 000	36 000	0	9 600	9 600	0				
Advertising										
Charter										
Contract	14 250	14 250	0	14 715	14 715	0	118 294	17 240	101 054	
Unrestricted federal funds	24 000[a]	24 000	0	24 870	24 870	0	536 839	17 240	519 599	
Total local match		167 406			49 740			34 480		251 626
Total revenue			0			0			657 653	657 653
Total funds	167 406			49 740			692 133			909 279

Note: Total funds available = $935 670. Excess local subsidy = $26 391 (excess is in contract revenue).

[a]Value obtained from the use of CETA vans purchased with federal funds.

Table 5. Case 2 proposed transportation budget expenditures: July 1, 1981-June 30, 1982.

Line No.	Category	Proposed Budget Section 18 Project Request ($)	Total Program This Year ($)
	Operation charges		
	Personnel	322 600	322 600
	Fringe benefits	52 000	52 000
	Contractual services	0	0
	Licenses	100	100
	Maintenance	156 600	156 600
	Fuel and oil	253 000	253 000
	Indirect charges (utilities, etc.)	0	0
	Other	0	0
1	Total	784 300	784 300
	Capital charges		
	Construction	0	
	Equipment	21 000	21 000
	Other (lease)	34 890	34 890
2	Total	55 890	55 890
	Administrative charges		
	Personnel	85 700	85 700
	Fringe benefits	12 500	12 500
	Office supplies and equipment	6 000	6 000
	Contractual services	6 800	6 800
	Travel	3 000	3 000
	Training	0	0
	Public relations	15 000	15 000
	Printing and publications	0	0
	Dues and subscription	1 400	1 400
	Insurance	18 000	18 000
	Indirect charges (utilities, rent, etc.)	40 000	40 000
	Other	4 000	4 000
3	Total	192 400	192 400
4	Total expenses	1 032 590	1 032 590

Table 6. Detail of case 2 proposed transportation budget expenditures.

Category	Expenditure ($)
Operation charges	
Personnel	
Drivers' salaries	265 100
Overtime	30 000
Dispatchers' salaries	27 500
Total	233 600
Maintenance	
Wages	61 200
Fringe benefits	10 400
Tires and tubes	27 000
Maintenance materials	50 000
Contract maintenance	8 000
Total	156 600
Administrative charges	
Contractual services	
Professional service	4 000
Computer maintenance	2 800
Total	6 800
Indirect	
Utilities	26 000
Rent	6 000
Total	32 000
Other	
Unclassified supplies	3 000
Miscellaneous repairs	1 000
Total	4 000
Capital	
Equipment	
Fifteen radios at $1400 each[a]	21 000
Other (lease of eight CETA vans)[b]	34 890
Total	55 890

[a]Installed with first year's warranty.

[b]$363.44/month x 8 vans x 12 months (same cost and methodology as used for previous year).

The expenditure budget for 1981-1982 is provided in Table 1. Table 2 presents the revenue budget for 1981-1982, and the appropriate support information is given in Tables 3 and 4. These last two tables delineate in detail the revenue sources of the applicant and how they are to be used. Due to the complexity and interrelatedness of Tables 2-4, the closest attention is required.

The itemization of unrestricted federal funds in Table 3 includes Titles XIX and XX of the Social Security Act, the Older Americans Act, and CETA Title II.

The revenue budgets for capital, administration, and operations (Table 2) are analyzed below in relation to the use of unrestricted federal funds and other contract resources.

Capital Budget

The capital budget is considered self-explanatory due to its relative simplicity. It should be noted, however, that the $24 000 of unrestricted federal funds represents (as given in Table 4) the value of leased vehicles. Since the vehicles are those purchased with federal funds, the rental or lease value equivalents cannot be used as in-kind but are used rather as unrestricted federal funds. This $24 000, as well as the $36 000 in-kind value, is included in the $837 031 total capital expenditure.

Administrative Budget

The applicant has multiplied administrative expenses by 10 percent to determine exactly the maximum amount of unrestricted federal funds that can be used as match. All other unrestricted federal funds are left for use in the operations budget. Tables 3

Table 7. Case 2 proposed transportation budget revenues: July 1, 1981-June 30, 1982.

Line No.	Category	Proposed Budget for Section 18 Project ($)			Total Project Request ($)	Total Program This Year ($)
		Capital	Administrative	Operations[a]		
	Operating revenues					
	Farebox			88 000	88 000	88 000
	Other (contracts)	32 557	90 650	531 000	654 307	654 307
1	Total	32 557	90 650	619 100	742 307	742 307
2	Total expenditures	55 890	192 400	784 300	1 032 590	1 032 590
3	Net operating loss (line 1 minus line 2)	23 333	101 750	165 200	290 283	290 283
	Local share					
	Local subsidy		5 000	30 000	35 000	35 000
	Local contracts		5 175	11 300	16 475	16 475
	Donations (cash)					
	Advertisement					
	Charter profits					
	State funds	2 334		0	2 334	2 334
4	Total local share	2 334	10 175	41 300	53 809	53 809
5	Unrestricted federal funds	2 334	10 175	41 300	53 809	53 809
6	Other federal funds	0	0	0	0	0
7	Total local match (add lines 4, 5, and 6)	4 667	20 350	82 600	107 617	107 617
8	Federal Section 18 funds	18 666	81 400	82 600	182 666	182 666
9	Total revenue (add lines 1, 7, and 8)	55 890	192 400	784 300	1 032 590	1 032 590

[a]July 1, 1981, to June 30, 1982.

Table 8. Case 2 itemized available revenues.

Source	Available Funds ($)
Farebox	88 000
Local subsidy	
State pilot project	200 000
City W	35 000
Advertising	0
Charter	0
Total	235 000
In-kind	0
Contracts	
X county development center	26 400
Y county comprehensive services	30 000
Z county activity center	19 700
W developmental learning center	43 700
Z council on aging	13 800
Total	133 600
Unrestricted federal funds	
X county day care (Title XX)	18 200
Private day care (Title XX)	24 000
Y council on aging (Title XX)	14 000
W council on aging (Title XX)	33 400
Vocational rehabilitation	20 700
Department of Social Services (Title XIX)	170 000
CETA	
Title II	30 800
Title VI	50 000
Title II	34 890
Total	395 990
Total	852 590

and 4 will produce the exact source of the $24 870 value of unrestricted federal funds. Based on the nature of federal grants or contracts that can be designated unrestricted federal funds, it is usually difficult to determine how much of the grant or contract must be applied to administrative expenses and how much to operating expenses. Therefore, in the absence of a clear direction specified in the grant or contract, the grantee is free to allocate any reasonable portion of the grant or contract funded to either the administrative or operating budget. However, it is clear that match derived from lease or rental value must be applied to capital expenses. Once again, this $24 870 value, as well as the $9600 in-kind match value, is a component of the $248 700 total administrative expenditures.

Operations Budget

The applicant has used formula X = (A - B - C)/3 to determine how much unrestricted value can be used for match and how much must be shown as operating revenues. As is clearly evident, this applicant makes major use of unrestricted federal funds to support operations costs. The volume of unrestricted or contract funds indicates a highly coordinated transportation system that makes excellent use of the provisions of the Section 18 program.

In looking at the proposed transportation budget revenue (Table 2), it should be noted that through the use of unrestricted federal funds the applicant is proposing a $1 812 344 program that requires only $123 277 in local subsidy. Much of this $123 277 is generated from contracts that purchase client use of the existing fixed-route bus system. Such contracts can be viewed as reimbursements of special transit fares, as specified in Urban Mass Transportation Administration Circular C 9050.1 of June 10, 1977.

Case B

Case B is a regional system that delivers services under the family-of-services arrangement by using formulas X = (A - B - C)/9, Y = (A - B - C - D)/0.8, and Y = (A - B - C - D)/0.5. This applicant has received funding under the Section 18 program since November 6, 1978. Transportation services are provided to four counties by use of a consolidated system of general public and human service resources. This consolidation includes both services and funding.

Tables 5-9 are provided to give a detailed picture of the applicant's budgeting process. Table 5 provides an itemized budget of proposed expenditures, and Table 6 provides more detail on certain expenditure items. The revenue budget is provided in Table 7 and is supported by information provided in Tables 8 and 9. As given in Table 8, the applicant has designated the use of Social Security Act Titles XIX and XX and CETA Title II resources for unrestricted federal funds.

The revenue budgets for capital, administration, and operations (Table 7) are analyzed below in relation to the use of unrestricted federal funds and other contract resources.

Table 9. Case 2 use of revenue and match funds.

Source	Capital ($)			Administration ($)			Operations ($)			Total ($)
	Total	Match	Revenue	Total	Match	Revenue	Total	Match	Revenue	
Fares							88 000	0	88 000	
State	2 334	2 334	0	52 725	0	52 725	142 275	0	142 275	
Local subsidy	30 000	30 000	0	5 000	5 000	0				
In-kind	0			0			0			
Advertising	0			0			0			
Charter	0			0			0			
Contract	0			5 175	5 175	0	128 425	11 300	177 125	
Unrestricted federal funds	34 890[a]	2 333	32 557	48 100	10 175	37 925	313 000	41 300	271 700	
Total local match		34 667			20 350			52 600		107 617
Total revenue			32 557			90 650			619 100	742 307
Total funds	67 224			111 000			671 700			849 924

Note: Total funds available = $852 590. Excess local subsidy = $2666 (excess is in state pilot funds).

[a]Lease value of CETA vehicles.

Capital Budget

As Table 9 indicates, $34 890 of unrestricted federal funds is available to the applicant as a revenue source. As indicated at the bottom of Table 6, these funds were derived from the equivalent lease value of eight vans purchased with CETA federal dollars. These vans are shared among the total fleet resources of the applicant. Due to the proposed small capital outlay (the limited amount of equipment actually to be purchased), the use of the formula X = (A - B - C)/9 only allows the use of $2333 in unrestricted federal funds match and the remaining available unrestricted federal funds appear as $32 557 in other revenues.

Administrative Budget

Table 9 indicates the availability of $48 100 in unrestricted federal funds. As the fourth column of Table 7 indicates, $10 175 of this total sum is used for matching purposes and the remaining $37 925 is shown in the "other revenue" category. The distribution requires the use of the formula Y = (A - B - C - D)/0.8 due to the availability of local funds in excess of the required local subsidy. The applicant also receives $52 725 in administration expenses from the state of South Carolina for demonstration purposes. This amount is used as "other revenue" and brings the total to $90 650.

Operations Budget

Table 9 shows that the total range of resources available to the applicant is used to assist in meeting operation expenses. Of the total $313 000 available in unrestricted federal funds, the formula Y = (A - B - C - D)/0.5 places $41 300 as match and $271 700 as "other revenue". In this case, D in the formula equals the total of local contracts and state demonstration funds. Both of these sources are in excess of the required local subsidy. In this case, contracted revenues are used as local share, since they are viewed as reimbursements of special transit fares, and operation revenues could be overmatched due to the calculation of the formula. Table 8 presents an itemization of local contract sources. Table 9 gives the subdivision of available local contract funds. After all available local government subsidies are used for match, the remaining shortfall ($11 300) is determined and local contract funds are used. Once this shortfall is drawn from the available local contracts, the remaining $117 125 is shown as "other revenue".

CONCLUSIONS

In conclusion, the first two years of dealing with the Section 18 unrestricted share provision has yielded the following:

1. The process for using the provision is not simple.
2. The process requires a well-designed system to account for the use of federal funds and a well-trained state staff to provide technical assistance.
3. The complexity required to account for the use of unrestricted federal share places a burden on applicants during the application phase, the grant phase (invoicing and bookkeeping), and the post-grant phase (auditing).
4. The concept makes efficient use of available funds and allows for the initiation of projects that otherwise would most likely never have begun.
5. The concept supports and justifies the coordination and/or consolidation of public transportation programs at the local level.

To summarize, South Carolina feels that its position of allowing total flexibility in the use of the unrestricted federal funds provision has been and still is well justified and that this provision has had major impact on the initiation of new systems and the coordination of existing systems in South Carolina. It is speculated that, with the advent of reduced federal funding, this provision will take on even greater importance.

ACKNOWLEDGMENT

This paper was prepared through a grant provided by the U.S. Department of Transportation to the Transportation Accounting Consortium. The opinions, findings, and conclusions expressed are those of the South Carolina Division of Transportation and not necessarily those of the sponsoring agencies.

REFERENCE

1. The List of Federal Funds That Can Be Used for Local Match for Section 18 Projects. FHWA, memorandum, April 23, 1981.

Part 3
Planning

Planning Rural Systems: How and Why Should You Start?

WILLIAM C. UNDERWOOD

A general overview of major factors that should be taken into consideration when local officials and interest groups begin planning for rural transit systems is presented. Before planning is initiated, a number of key issues must be addressed; these are included in a table titled "the preliminary rural transit survival test". After the test has been taken, a score can be calculated to assess the chances of successfully planning for and implementing a rural transit system. Certain steps that should be taken before planning commences are suggested, and the need to focus attention on establishing procedures for evaluating transit operating and financial performance is emphasized.

Since the federal Section 18 operating assistance program (Urban Mass Transportation Act of 1964, as amended) is scheduled to terminate September 30, 1982, the discussion of the question how and why you should start planning for rural public transit could, for some persons, be ended here. This paper presents some thoughts and observations for others who do not view the federal funding cutbacks as insurmountable obstacles to developing rural transit systems and in general are more optimistic about the future of public transportation.

As in any other type of investment, whether it be time or money, careful consideration must be given to determining whether the right conditions and circumstances exist to pursue rural public transit. Any one of a number of factors could mean the difference between spinning your wheels and getting a good start and, ultimately, the success or failure of the transit system.

In my opinion, seven basic questions must be addressed prior to initiating rural transit planning:

1. Is there a clearly defined transportation problem or need that can only be solved through government intervention? Or is the need for rural transit action elusive, ill-defined, or subject to change, depending on what agency or individual is contacted? It is challenging enough to promote and develop public transit even with clearly defined problems and objectives. Careful attention must be given to initially presenting the case for transit in a convincing and logical manner.
2. Is there good public understanding and broad-based support for the need to improve transit services in the rural area? Or is the interest limited to a few private taxi operators or a single, relatively small senior citizens' organization? Unless a good cross section of the population and diverse interest groups condone public transit, the chances of a successful effort are diminished.
3. Do the community leaders have realistic expectations of what can be achieved within reasonable financial limits? It is important not to oversell the merits of public transit or to suggest that high quality and large quantity can be offered at bargain basement prices. Consider, if you will, the consequences of not performing as promised!
4. Are the real motives for transit action in the spirit of improving rural transit or is the effort directed toward achieving some other end result? For instance, is promoting the need for public transit a means by which some human service agency can reduce its transportation budget? And would this new or modified "public" transit service truly serve the general public?
5. Are there good working relations among the parties involved in the rural transit issues? If intergovernmental relations are strained, if strong political differences exist, or if similar types of cooperative agreements have failed to materialize in the past, it is likely that public transit developments would be doomed from the start. One factor that might counter these problems would be a strong and concerted call for action by the general public.
6. Have key local elected officials taken an objective interest in public transit and are they willing to consider political and direct funding support? Without this endorsement and commitment, progress will be slow and difficult, if not impossible. Absence of support in this area is an almost certain guarantee of failure.
7. Is the timing right to pursue transit issues? For example, it would be very bad judgment to press for transit support decisions when (a) other controversial issues dominate the local area (especially those dealing with local tax revenues or expenditures), (b) there exist serious funding issues between the local and state governments (if state aid is sought), or (c) cutbacks in transit assistance are being considered at the federal level.

For those interested in assessing what the chances are for surviving the initial challenge for rural transit in their area, this paper includes a "preliminary rural transit survival test" (see Table 1). If the test is passed, the next step in the development of rural transit can commence. Typically, this phase involves planning at two levels: (a) general and (b) operations.

GENERAL PLANNING

The general planning phase provides the basic demographic and economic information necessary to better assess the need for rural transit services and inventories existing transportation demand and services. After this information is obtained, detailed operating and financial plans can be formulated.

The specific procedures and techniques used in these planning activities are not discussed in this paper. However, I suggest that there are three basic steps that should be taken by planners and transit advocates before the actual planning phase is initiated.

Table 1. Preliminary rural transit survival test.

Question	Circle One: Yes	Circle One: No	Total Points
Is the transportation problem or need clearly defined?	+10	-5	
Does the public understand and support transit issues?	+12	-4	
Are transit promoters creating realistic expectations?	+10	-2	
Are the transit motives genuine?	+6	-2	
Do good working relations exist among agencies involved?	+10	-3	
Are local elected officials willing to provide local funding support?	+16	-8	
Is the timing right?	+11	-6	
Total	+75	-30	

Note:

Rating	Total Points
Excellent	60-75
Good	40-59
Fair	25-39
Poor	0-24
Impossible	Minus points

DEFINITION OF PURPOSE

The purpose of the planning activity must be clearly defined. Too often, rural transit plans are conceived and implemented with little consideration of the specific needs, problems, and constraints of a given area. Regardless of these conditions, the classical approach to planning is implemented and the main issues are ignored.

But what are the known issues and important questions that need to be addressed? Is the study to identify more clearly the present and potential demand for such services? Who would particularly benefit from rural public transit services: the elderly? employees of certain companies? persons who either do not own or do not have access to automobiles?

As part of this effort, three things should be done:

1. Outline the financial requirements of the rural service. In some cases, local officials are more concerned about the costs that might affect the local tax base than what service might actually be rendered.
2. Explore the feasibility of merging human service transportation with the common-carrier type of public transit services. Depending on the importance of this issue, the entire planning effort could be devoted to this subject. However, one should be leery of suggestions that broad-based public transit services can be developed by expanding the transportation services of a single large human service agency. The result may be human service transportation with a broader funding base that includes public transit funding sources.
3. Develop operating plans to adjust existing services, and prepare alternative schemes for new or expanded operations. Unless the purpose of the planning is clearly defined and work programs carefully drawn to reflect these priorities, the results will likely prove to be worthless.

Input

The design and conduct of the planning cannot be performed in a vacuum. Turning over the planning responsibility to a county planning agency or a private consultant with only vague, general direction is a sure way to waste time and effort.

All affected groups, organizations, and local governments should be made directly part of the planning process. Their concerns and requests, whenever practical, should be incorporated in the work program. Citizen and rider input must also be sought.

Results

Finally, the end product should clearly reflect the basic objectives of the study and input from all interested parties. If the final report does not contain concise findings and conclusions and recommendations that address the key issues previously defined, then the best case for rural transit service cannot be made.

PERFORMANCE EVALUATION

I would urge transit planners and managers to focus more attention on the evaluation of transit system performance. Because public subsidies for rural transit are not unlimited and the demand for subsidies will continue to grow, rural transit systems must develop the capability to adjust service levels and fares so that budgets can be balanced.

In Pennsylvania, we have established laws and procedures to distribute transit operating assistance grants on the basis of constrained financial need and system performance. Constrained financial need is calculated by limiting the increase of operating expenses from one year to the next by some predetermined percentage, referred to as the maximum expense factor. To this constrained expense a statewide cost recovery factor for a particular fiscal year is applied.

In rural and urbanized areas of Pennsylvania, basic state grants to transit systems are determined by using this method and the state then funds two-thirds of the nonfederal share of the constrained deficit. For urbanized transit systems, state aid may be increased to three-fourths of the nonfederal share of operating deficits if the transit system shows annual positive improvement according to the following measures: (a) revenue per hour, (b) ridership per hour, (c) expense per hour, and (d) revenue/expense ratio (declining at no more than 2 percent/year). By using this funding method, transit systems are encouraged to develop their own procedures for evaluating operating and financial performance.

One approach to this type of evaluation has been developed for Pennsylvania by Simpson and Curtin transportation consultants. As called for in our request for proposals, Simpson and Curtin has prepared a Transit System Performance Evaluation and Service Change Manual. The essential steps in this evaluation procedure can be briefly described as follows:

1. Formulate system objectives. System objectives are basic to the entire evaluation process. Anytime a performance measure is used, it should be related to a clearly stated objective. Vague, overly general goals and objectives fail to provide a basis for sound, effective decision making. On the other hand, overly specific and rigid goals and objectives can be unrealistic and unresponsive to changing conditions. In order for the objectives to be useful, some means should be used to measure system effectiveness in meeting the objectives.
2. Set criteria and performance level guidelines to measure progress toward meeting the objectives. The approach toward quantifying and measuring how well a system meets its objectives might consist of three steps: (a) identification of criteria that address each objective, (b) determination of transit system practices and/or operating statistics that relate to the criteria, and (c) development of performance level guidelines based on the results of step b. Through this process, rural transit system priorities can be established and then one can attempt to quantify or measure progress toward the objectives.
3. Establish an evaluation methodology. After the establishment of desired performance levels that meet system objectives, a methodology must be established to check system performance. Essential in this evaluation is having the necessary data and analytical tools. Transit managers need to become more skilled in this difficult area of identifying situations where changes or corrective actions are needed and determining what kinds of actions would be most effective. Translating these actions into service and fare changes is then undertaken as well as estimating the costs and benefits of each specific action.

Although the procedure outlined above can become somewhat complex and time consuming, sometime during the planning, development, and operation phases of a rural transit system the framework for performing

such evaluations should be established.

The principles, procedures, and ideas contained in this manual could--and, in my opinion, should--be adopted for rural and small urban transit services. I would encourage federal and state agencies to seriously consider such an effort. If professional transit planners and operations consultants are called on to assist in the development of rural transit systems, consideration should be given to developing a performance evaluation procedure at that time.

Planning for planning's sake will not contribute to the development of rural transit. However, when the real needs of an area are considered and incorporated in the planning process, progress can be made. More important, the planning effort can serve as a means of establishing a framework for the measurement and evaluation of operating and financial performance.

The results can yield major benefits to transit riders, funding agencies, and transit system managers. It is hoped that, through these efforts, rural transit services will be established and operated long after federal transit aid is terminated.

Organizational Planning for Contracted Rural Public Transit Services

ROBERT A. ROBLIN

A framework for organizing a transit authority to contract with the private sector for service delivery is presented. It is based on a case study of the Franklin County, Massachusetts, Regional Transit Authority. Public pressure is mounting for a reduction in the size of government and the return of many functions to the private sector. Transit authorities in rural and small urban communities can meet this challenge by contracting with private-sector organizations for the delivery of transit services. Use of contracted services will change the focus of the authority's management. Based on a clear division of functional responsibilities between the authority and the contractor, planners must construct an organizational framework to reflect the authority's functions and to provide the managerial skills required to direct the contractor and evaluate performance. Overemphasizing any single area of skill will diminish the effectiveness of the authority in meeting local transportation needs.

Organizers of new rural and small urban transit systems have as major tasks in the planning process the evaluation and selection of a service-delivery mechanism and the definition of an organization to manage the service. Since the enactment of the Urban Mass Transportation Act of 1964, transit service has increasingly been delivered by public transportation authorities. These authorities, under the direction of appointed governing bodies, have not only established overall operating policies and service goals and objectives but have also assumed responsibility for the operation of the transit system. Consequently, private operators have been reduced in number and now primarily provide intercity and highly specialized transportation services.

A large number of rural communities have extended this precedent to their service areas, where they have assumed the responsibility for delivering transit service under the aegis of an existing unit of government (e.g., municipality or county) or a special-purpose agency such as a regional transit authority (RTA). As a result, the number of privately owned and/or operated rural transit systems is limited. For example, a 1981 directory of the U.S. Department of Transportation (1) reports 91 private operators, which represents only 26.8 percent of all transit operators.

However, implementing transit service by using private operators under contract to a transit authority should not be discounted as a viable option by organizers and planners of new systems since it affords a number of benefits:

1. The size of the organization responsible for transit within the governmental structure of the service area is minimized.
2. Private operators may already be providing service, and their experiences can be tapped to improve the quality of transit.
3. Private operators may be more sensitive to the need for efficient and reliable service since the health of their business rests on providing a quality product.
4. A major source of funding for rural systems, the Section 18 funding program (Urban Mass Transportation Act of 1964, as amended), encourages the use of private operators in rural and small urban areas.

The use of private operators under contract to an RTA, however, affects many of the functions performed by the authority's staff. These changes in the functional organization of the authority should be addressed in the planning stage to enhance the likelihood of meeting the system's goals and objectives. Specifically, the transit authority must be organized and staffed to monitor and manage the contract(s) with the private operator(s). The authority must also be capable of translating transit needs into specific contractual terms. Finally, the transit authority must ensure that the private operator's organizational structure is responsive to the authority and transit users.

The purpose of this paper is to define some of the issues inherent in the organizational planning of a public transit authority that desires to provide service via contracts with private operators. Its contents are based on a case study of the Franklin County, Massachusetts, RTA (FRTA). Under the laws of the Commonwealth of Massachusetts, RTAs, with the exception of the Massachusetts Bay Transportation Authority, are prohibited from operating transit service. Therefore, each RTA must contract with a private operator to deliver transportation to

members of the service community. The experience of FRTA provides a base of knowledge from which organizers of new systems can benefit.

Prior to defining the organizational impacts of private operators on transit authorities, this paper reviews the characteristics of the FRTA organization. This is followed by a set of organizational planning guidelines for communities planning new systems to be operated by private contractors.

BACKGROUND

Franklin County, located in northwest Massachusetts, had a total population in 1970 of 59 210. The major activity center of the county, Greenfield, is centrally located. In 1976, the county received the first Section 147 grant (Federal-Aid Highway Act of 1973), which established the "LINKS" transit system. Under the grant, fixed-route transit service was established from Greenfield to major destinations in the east, west, north, and south regions of the county. Demand-responsive service was also implemented to serve the elderly and the handicapped. The service was funded locally by appropriations from the county Human Services Agency and the Department of Public Welfare [Title XIX (Social Security Act) funds]. After the expiration of the grant, service was continued with funding from the Commonwealth of Massachusetts, Title XIX, an appropriation from the county budget, and some remaining Section 147 funds that were available to support transportation services for the handicapped. Concurrently, efforts were initiated to organize and implement an RTA to ensure the long-term presence of transit services in the county. As a result, FRTA was formed in November 1978. The governing board of FRTA held its first official meeting in May 1979, and contracting for transit services commenced two months later.

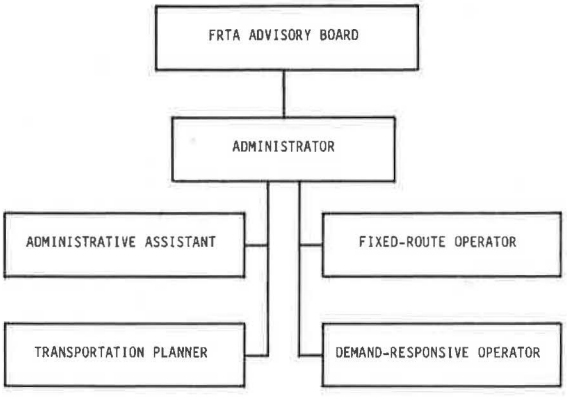
In compliance with the laws of the Commonwealth, FRTA contracts for all transit services. It is therefore organized and staffed to manage private operators. FRTA currently has the following staff positions: an administrator, an assistant to the administrator, and a transportation planner. This organization, shown in Figure 1, manages the day-to-day functions of the transit authority, which includes two private operators under contract to FRTA.

The administrator and the assistant to the administrator are full-time employees of FRTA. They coordinate the transportation requirements of the service area with private operators and develop and implement annual budgets, service levels, and contracts with social service agencies purchasing transportation. Moreover, the administrator collects and evaluates performance measures and prepares system performance reports for funding sources, the governing board, and the general public. The administrator is also responsible for procurement of vehicles for subsequent lease to operators.

The transportation planner, a member of the County Planning Department, supports the administrator in service evaluation and planning. Since service contracts with operators are restricted to one year in duration, FRTA regularly evaluates use of the existing system and plans system improvements for subsequent inclusion in annual contracts with operators.

Two private operators provide transit service under contract to FRTA. One operator provides the majority of all fixed-route service available in the county in addition to demand-responsive service in the towns of Greenfield and Montague. The remaining demand-responsive service and subscription service are provided by another corporation.

Figure 1. FRTA organizational structure.



ORGANIZING THE TRANSIT AUTHORITY FOR CONTRACTED OPERATIONS

One of the basic benefits of contracting for transit service is the reduced size of management and labor required by the transit authority to conduct operations. The reduction in physical staff requirements, however, is not accompanied by a reduction in functions performed by the authority. Rather, the basic functions of RTA management are retained but emphasis shifts from operational issues such as labor management to management of fiscal resources and contract performance monitoring. In addition, the RTA staff must promote the goals and objectives of the RTA within the service community as well as have an appreciation for the environment and the organization in which private operators function.

At the outset of the organizational planning process, the functional responsibilities to be assumed by the RTA and the private contractor must be delineated. This process should stem from a definition of the major functions inherent in the operation of a transit system irrespective of the service-delivery mechanism. Three general categories of functions that represent system planning, operations, and administration are suggested as points of departure for this process. Within each of these areas, subfunctions can be defined to produce a matrix similar to the example given below (□ = prime responsibility, + = joint responsibility, and 0 = input):

Function	Transit Authority	Private Contractor
System planning	□	
Demand estimation	□	
Analysis of service options	□	0
Community involvement	□	
Operations		□
Scheduling	□	0
Route structure	□	0
Dispatching		□
Fare collection	+	+
Vehicle maintenance		□
Plant maintenance		□
Safety and security		□
Insurance	+	+
Labor relations	+	+
Service evaluation	+	+
Administration	□	
Bookkeeping	+	+
Accounting	+	+
Purchasing	□	0

Function	Transit Authority	Private Contractor
Financing	□	
Fare structure	□	
Legal counsel	+	+
Marketing	□	
Community relations	+	+
Institutional coordination	□	

By using this matrix, the planner can work with the community organizers of transit to assign responsibilities to the private contractor and the transit authority.

The above matrix identifies two types of responsibility as well as provision for formal input. Prime responsibility implies that control over the implementation of the item rests within one organization through either the terms of a contract or the charter of the transit authority. Joint responsibility implies that both organizations have responsibility for a subfunction within the confines of their own organization or responsibility is shared between the two entities. Finally, formal input requires one organization to develop and submit recommendations on the implementation of the subfunction to the entity that has prime responsibility. The delegation of authority in the matrix shown above illustrates a typical division of functions for a rural transit authority that contracts for service delivery. The rationale for the assignments is explained below.

System planning is the sole responsibility of the transit authority. This assignment is recommended since the authority itself is typically charged with this function as a precondition for the receipt of funding from a number of sources. Moreover, the products of these efforts directly affect policy decisions and fiscal actions made by the RTA governing body. Once operations have commenced, however, the contractor should provide input to the analysis and selection of service options. The contractor will be sensitive to the benefits and shortfalls of each option as a consequence of meeting demand with the initial package of options.

Responsibility for operations, with the exception of the route structure and the schedule for fixed-route service, rests with the contractor. Routes will be defined within the planning process and, given their propensity to be affected by political considerations, should remain the responsibility of the transit authority. Similarly, service scheduled along fixed routes should remain within the purview of the RTA.

Four subfunctions are shared between the organizations. Fare collection includes both revenues from the farebox and payment for transportation service by groups that purchase transportation, such as social service agencies. In most situations, the contractor will be vested with the responsibility for the collection and accounting of cash from the farebox while the RTA will collect funds from groups that purchase services and disburse them to the contractor under the terms of the contract.

Insurance is a joint responsibility, and each organization is responsible for specific insurance packages. For example, the contractor may be required to carry coverage for collision and liability under the terms of its contract while the RTA will require insurance to cover the actions taken by the members of its board. Contractors should be advised of the specific coverage limits required under the contract in the bid request package to obviate any uncertainty in the type and extent of coverage necessary.

Under provisions of Section 13c of the Urban Mass Transportation Act of 1964 (as amended), transit authorities must meet several requirements in order to be certified by the U.S. Department of Labor. Although the RTA should not involve itself with the management of labor in the contractor's organization, both parties should understand the intent of Section 13c and implement labor policies consistent with the regulation. Toward this end, the RTA and the contractor should share the burden of compliance.

Service evaluation will be the most important function performed by an RTA that contracts for services. The evaluation process will identify to what degree goals and objectives of the system are being met and to what degree the contractor is fulfilling his or her contractual obligations. The process must be a joint venture, however, since the contractor will have to collect and forward service data to the RTA to enable the analysis to be performed. Furthermore, contract reporting on cost, labor, and use of equipment will have to be integrated with service data to develop a comprehensive evaluation. Under all contracting agreements, the contractor should be required to support the service evaluation process and view it not as a necessary evil but as a constructive tool for improving service availability.

Many administrative functions will be conducted concurrently in both organizations. Routine bookkeeping and accounting must be performed by each entity in a manner consistent with standard accounting principles. Both organizations will also require legal counsel. Community relations, however, should be a shared responsibility. The operator and the RTA must both remember that they are providing a service to the community and must be responsive to complaints, suggestions, and compliments from this group. Private operators should remember that they are representing their firm and the RTA to each patron and should be courteous and attentive to each patron's needs.

Purchasing of equipment can be vested with either organization. Within the case study RTA, vehicles are procured by the RTA and leased to operators. However, it is conceivable that the contractor could be required to furnish all vehicles under the terms of the contract. Policies on the use of capital assistance funds vary by state, and consequently an RTA may be required to purchase vehicles for lease to private operators. Similarly, policies and procedures at the state level may affect the ability of private operators to use the equipment for transporting other client groups. The costs and benefits of both approaches are beyond the scope of this study but should be carefully analyzed by the planner before a decision is made.

Financing and institutional coordination will be major work items to be accomplished by the RTA. Both combined could conceivably command a majority of the administrator's time. Both functions must remain within the RTA to avoid any conflict of interest. Marketing is also recommended as an RTA responsibility. Again, vesting this subfunction with the RTA avoids any conflicts of interest and also promotes the development of a long-term marketing strategy.

The next step of the organizational planning process for a new system that intends to use private operators should be the development of verifiable objectives that the management staff is to accomplish. This process should be approached by the functional areas developed in the aforementioned discussion.

Within each functional category, objectives consistent with the overall goals and objectives of the system should be developed. For example, the following objectives may be developed for the plant and equipment maintenance functions:

1. The system's average fleet age shall not exceed 4 years.
2. Vehicle downtime shall not exceed 72 h/vehicle/year.

Both objectives have measurable outputs yet provide the authority's staff with flexibility in attaining their intent through a contract with a private operator.

After basic objectives have been established, they must be rank ordered to correspond with the following factors:

1. Importance to the general goals and objectives of the RTA,
2. Level and degree of skill required to accomplish the objective, and
3. Frequency and total amount of time required to address the objective.

Organizing the objectives according to the above criteria will result in a hierarchy of objectives and functions similar to the example shown in Figure 2. In this example, the key function of the authority, contract management, would be decomposed into subfunctions such as financial management and performance management. Furthermore, each of these subfunctions would have a number of associated objectives to provide a more comprehensive portrait of the organization's mission. The relative importance of each function will be contingent on the goals and objectives of transit within the local area.

Once the functions and objectives have been defined and organized, the next stage of the planning process is the grouping of functions into clearly defined staff positions. This stage will be among the most important, and individuals with appropriate academic and experiential backgrounds for each position must be sought. Therefore, functions should be combined into positions for which there are likely to be qualified applicants. An important overriding consideration is the responsibility to be vested in the private operator. Many of these responsibilities should not be duplicated in the transit authority organization since they represent an unnecessary redundancy of roles.

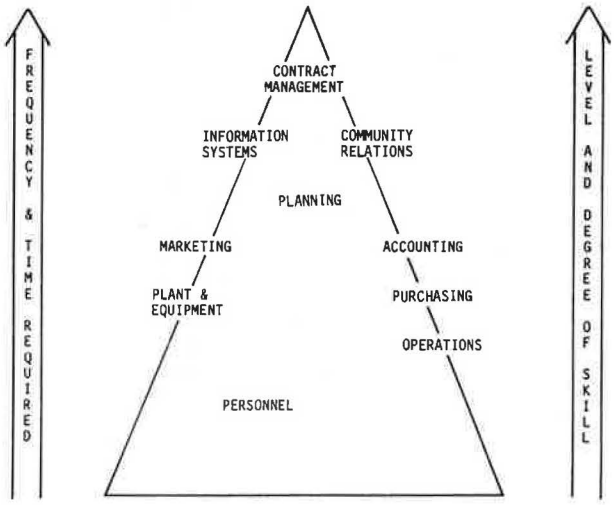
SELECTING AN ADMINISTRATOR

Undoubtedly, the key position on the authority staff will be the administrator/executive director. The individual who fills this position will be vested with the authority to manage and direct the contract(s) with the private operator. Moreover, he or she will represent the transit authority to the citizens in the service area. In light of this important and highly visible role, the following guidelines are offered in developing the job description for the administrator/executive director:

1. The administrator should have an academic and/or experiential background in management. Emphasis should be placed on financial management, including budget development, cost estimating, cash-flow analysis, and basic accounting.
2. Whenever possible, the administrator should be familiar with the process of contracting for services (as opposed to equipment). Specific experience in the preparation of bid requests and/or requests for proposals and contract negotiating skills is recommended.
3. A familiarity with public transit policy at the state and federal level is recommended since it will enhance the authority's ability to use the resources available to the system.
4. The administrator should be required to have proven written and oral communications skills. Both skills will be required to conduct the affairs of the authority.
5. The help-wanted sections of transit trade publications should be reviewed, and the attributes and skills required for managing transit systems of similar size should be inventoried. It should be recognized that the authority will be competing for applicants with other transit systems.
6. The need for a broad-based understanding of public transit operations and planning should be emphasized. Overemphasizing one area may result in a manager who is too narrowly focused.
7. There should be no attempt to acquire a "transit expert". Many small systems are well-managed by individuals who have a strong managerial background gained from experience in such organizations as social service agencies, local government, and small businesses. Specific transit expertise can be enhanced through enrollment in training programs such as the Small Urban and Rural Transit Manager's Workshop of the National Highway Institute.

These guidelines, in conjunction with the hierarchy of functional objectives, can be used as a measuring rod against which applicants called for an interview can be evaluated.

Figure 2. Hierarchy of functional objectives.



SUPPORT STAFF

Often, administrators become overburdened with the recordkeeping inherent in the operation of an RTA, especially an authority that contracts for transit services. Financial records, meeting minutes, progress reports, and other related items of data may cause an administrator to focus on data organization and storage rather than on the impacts of the information on the transit system. These data management functions can be efficiently and effectively carried out by an administrative assistant.

In addition to performing information management functions, the administrative assistant should be capable of temporarily assuming the administrator's job. Rather than leaving a void during the administrator's annual leave or unexpected illness, the administrative assistant should be trained to perform the administrator's basic functions under the guidance of the administrator. A key benefit of having an administrative assistant familiar with the administrator's duties will be realized when the

administrator resigns his or her position. The assistant will be able to temporarily assume responsibility for the operation of the RTA and enable the RTA board to conduct a comprehensive and systematic search for a replacement while the RTA remains fully operational. It should be noted, however, that the administrative assistant should be given equal opportunity to compete for the administrator's position when a vacancy occurs.

A variety of other functions will have to be performed by the RTA. Perhaps one of the most noteworthy is planning for future transit needs. However, budgets and the need to minimize the number of staff positions in contracting for service delivery often prohibit the acquisition of a full-time planner. Organizers of new transit systems can overcome these problems by imaginatively tapping the pool of resources already available in the community. For example, most counties support a planning department that typically performs transportation planning functions. Transit organizers should strive to construct an agreement whereby the RTA has access to a certain percentage of a planner's time. The agreement may call for specific annual projects to be conducted, such as an annual transit development plan that includes ridership projections. The value of these services could be applied against the county government's contribution to the RTA budget, or a formal contractual agreement could be consummated in which the costs of such services would be reimbursed by the RTA.

Similarly, organizers of new systems should identify the range and extent of support services offered by their state departments of transportation. Current federal assistance programs allow states to retain up to 15 percent of their Section 18 appropriation for program management. Many states have provided RTAs with planning assistance, vehicle procurement guidelines, and other selected functions that the RTA cannot support on its own. Tapping this resource during the early stages of new system planning will enhance the system's quality of operations.

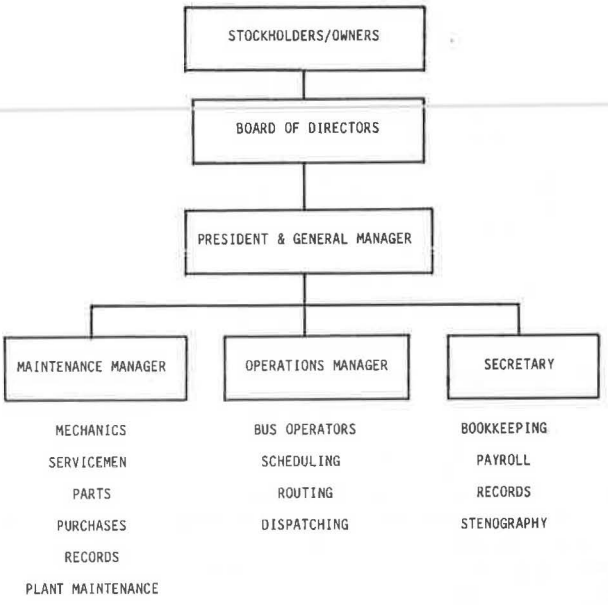
Finally, the RTA board itself can be a valuable source of specific expertise in a number of functional areas. Appointing individuals who have backgrounds in some of the skill areas required by the RTA will foster better policies and provide a ready source of advice. For example, an accountant on the board could provide the administrator with assistance in establishing contractual cost-reporting requirements. Although it is unlikely that a "panel of experts" will be selected as board members, the backgrounds and talents of those chosen should be applied whenever possible.

ORGANIZATIONAL INTERACTIONS

The effective and timely completion of the functions of the RTA depends on the establishment and perpetuation of clear lines of communication between the transit authority and the contractor. The administrator must be given the authority to deal directly with the contractor. Without this control, the administrator will be handicapped in attempting to respond to problems that occur between regularly scheduled meetings of the governing board. Specifically, the administrator should be capable of directing (a) financial matters within the scope of the contract; (b) contract reporting requirements, including service evaluation; (c) conflicts in resource allocation (scheduling); and (d) resolution of patron complaints.

Any issue beyond the scope of the contract, however, should be directed to a committee of the governing board or the board itself for resolution.

Figure 3. Organizational structure of private, for-profit transportation firm.



Although an RTA should avoid imposing an organizational structure on a private contractor, it is important that the communication link between the RTA and the contractor be formalized. The RTA administrator should have a counterpart within the contractor's organization through which all contract direction is channeled. Ideally, this individual should be the general manager or president of the contractor's organization [see Figure 3 (2)]. Communications with individuals below this level can result in misinterpretation and potential conflicts between management and operating departments. In light of this, requests for bids and/or proposals should clearly indicate that the contractor will be required to appoint a contract manager who is capable of acting on behalf of the corporation in all matters relating to the contract.

CONCLUSIONS

Continued pressure to slow the growth in public-sector employment while continuing to provide essential services will cause many rural communities to seek alternative methods of delivering transit service. Private contractors will be increasingly turned to for the actual operation of the transit system while the public sector focuses on the establishment of overall policies. Public transit authorities will therefore have to be organized and staffed to develop policy recommendations and evaluate contract performance.

The shift from operational issues to contract management must be reflected in the organizational planning process when new systems are conceived. Planners must clearly define the roles of the RTA and the contractor prior to developing specific position descriptions for the RTA staff. Generally, the critical skill area will be management. Overemphasizing specific skills, such as vehicle maintenance programming or even planning, may be disastrous. The administration must be capable of interpreting performance measures and taking action to correct problems before they affect the health of the transit system. Although specific transit experience may be beneficial, demonstrated management ability should remain the dominant force shaping the staff.

Finally, the key staff position, the administrator, must be given the authority and the flexibility to direct the contractor within the bounds of the contract. Without this flexibility, problems will go unsolved and overburden the RTA governing board. More important, members of the service community will not perceive the transit system to be responsive to their needs and consistent with the cost of service.

ACKNOWLEDGMENT

The assistance of FRTA administrator Cynthia Dewey and her staff was invaluable in the preparation of this paper. The opinions expressed are mine and not necessarily those of FRTA.

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Planning for Transit Development in an Era of Fiscal Scarcity

DAVID J. FORKENBROCK

An approach to transit development planning is presented that grew out of a research effort to formulate planning guidelines for the Iowa Department of Transportation for application to small urban and rural areas. A critique of the transit planning process is presented. It is concluded that planners must act not only as technical experts but also as facilitators who strive to ensure that local preferences and needs are reflected in the service ultimately provided. A "budget-constraint" approach to transit development planning is then laid out. Through surveys of transit users, the general public, business leaders, and political officials, views regarding goals and objectives are obtained. The results of the survey are discussed in a public meeting, where those in attendance may express their views. Out of these contacts with the public, the planner formulates and ranks a series of social objectives for transit in the area. The objectives constitute a basis for generating developmental alternatives. Each of the several alternatives is aimed at attaining the same objectives, but they vary in scale and, hence, in cost. Decision makers are thus able to perceive the incremental benefits and costs of moving from the smallest to larger alternatives. The approach allows citizen views to become the basis for the transit plan, and decision makers are enabled to make informed choices rather than merely respond to a finalized plan.

During the past decade, public transportation in small urban and rural areas has made major strides forward. As we enter the 1980s, however, the future of transit assistance programs at the federal level is not favorable. The impetus for starting new systems as well as for continued transit development, then, will increasingly have to come from the local and state levels of government.

This paper presents an approach to planning that aims at maximizing the ability of transit to respond to local needs, preferences, and desires. In the simplest terms, the rationale for this approach is that, since transit is a public service, it must be accountable to public choice. Taxpayers are more likely to support local expenditures on a transit system when they (a) have participated in the planning process from the beginning and (b) ultimately receive the level and nature of service they desire.

The approach to transit development presented in this paper grew out of a research effort to formulate planning guidelines for the Iowa Department of Transportation (1). Because the service environment and federal requirements for larger urban systems (those that serve cities of 50 000 population or more) are very different from systems found in small urban and rural areas, the planning needs differ as well. The approach suggested here is geared toward the latter types of services, both for new systems and those already in operation.

In the first section of the paper, common deficiencies of the transit planning process are considered. Transit development plans (TDPs) for numerous localities across the United States were reviewed as part of this evaluation. In the second section, a participatory approach to preparing transit plans for small urban and rural areas is suggested. This method, called the "budget-constraint" approach, is offered as a means of facilitating greater involvement in the planning process by citizens and decision makers.

CRITIQUE OF TRANSIT DEVELOPMENT PLANNING

A review of documents on transit development planning indicates several common shortcomings. These deficiencies include (a) overemphasis on descriptive presentations, (b) failure to arrive at a real statement of purpose for transit, (c) limited involvement by citizens, and (d) lack of clear choices for decision makers. Each of these difficulties is discussed in turn, and then an approach to transit development planning that seeks to avoid them is presented.

Overemphasis on Descriptive Presentations

Most TDPs place heavy emphasis on a comprehensive description of the area: its population, geography, economic base, and the various forms of transportation available. There is no question that existing conditions must be understood before meaningful plans can be formulated; unfortunately, many TDPs amount to little more than a regional description. This description implicitly becomes the basis for requests to the state for transit assistance, as much as to say, "Because of the conditions existing within our region, we request...."

The point is that careful analysis of the region is often lacking in terms of transportation needs

(2), the extent to which existing transportation facilities meet these needs, and how additional funds will help. Could the requested funds be deployed so as to better meet local needs and preferences? Are local willingness and ability to pay for transit such that a fairly high level of service could be offered, given some amount of state (or federal) assistance? For these essential questions to be answered, a thorough analysis is required. Descriptive presentations simply are not sufficient.

No Real Statement of Purpose

A document that sets out to chart a developmental course for transit within a small urban or rural area must contain a clear-cut statement of the ends for which transit is to be provided: What is its purpose? Particularly in the current era of fiscal scarcity, it is not enough to assume that transit is a "good thing" and therefore should receive the requested local, state, and federal funds. The TDP should specify the social objectives each system is intended to achieve. (Within a given planning region, a rural demand-responsive system may well be geared toward achieving quite different purposes than a fixed-route system operating in an urban area.) It is worth stressing that the emphasis here should be on social objectives rather than service standards. For example, a transit system that serves a small urban area might have as its key purpose providing a ride to work for those who do not have an alternative mode (i.e., those with the greatest need). On the other hand, arriving at all bus stops within 5 min of the schedule, though laudable, is not a social objective; it is a service standard. Maintaining service standards, in and of itself, is not the ultimate purpose for which transit is provided. Again, transit must be viewed as a public service if it is to claim taxpayers' dollars.

Limited Involvement by Citizens

Transportation planning frequently suffers from the same "technically rational" orientation as traditional comprehensive planning. Specifically, the planner is assumed to have (a) an overall sense of the public interest and (b) an all-encompassing knowledge of possible actions that enables him or her to gauge the approximate net effect of each action on this public interest (3, p. 186). In its most technical version, this orientation leads to a substitution of the planner's intuition for a more participatory process. An increasing number of writers recognize the severe limitations of the planner as a technician, an analyst, isolated from the members of society he or she serves (4).

In an attempt to promote citizen participation in the transportation planning process, regulations issued jointly by the Federal Highway Administration (FHWA) and the Urban Mass Transportation Administration in 1975 mandate provisions "to ensure involvement by the public" (5). To comply with this directive, many areas have formed citizens' advisory committees. Although such committees have functioned effectively on certain occasions, this approach to citizen involvement has several important limitations:

1. Some client groups go unrepresented, since the committee members are unlikely to be representative of every segment of the region's population.
2. Group dynamics may work against those with limited bargaining or negotiating skills.
3. Compared with approaches that do not involve a continuing participation by the same person, members will be self-selected on the basis of their sustained interest.
4. Local support for transit is not stimulated, since few citizens are directly involved in the planning process.

A fuller discussion of advisory committees is given by Wellman (6, pp. 649-650).

If transit development plans are to reflect adequately the preferences, needs, and desires of the population served, direct interaction between the planner and those being planned for is indispensable. Friedmann (7, pp. 172-173) has pointed to the need for "transactive" planning, whereby the technical knowledge of the planner and the experience of the citizenry are brought together. Among the techniques for bringing about public input are surveys and public meetings.

Lack of Clear Choices for Decision Makers

One of the most common deficiencies in transit development planning is a failure to present decision makers with clear choices. One of two conditions prevails: (a) The planner surrounds his or her preferred course of action with several "straw" alternatives, which are clearly inferior to the preferred one; or (b) the planner selects an alternative and its implementation is discussed in the more or less completed TDP, which is presented to decision makers for their endorsement. Davidoff and Reiner (8, p. 108) note, "If an ultimate objective of planning is to widen choice, and the opportunity to choose, then the planner has the obligation not to limit the choices arbitrarily."

This is not to say that the planner must remain value free. The planner should seek out the values of different groups of potential users and taxpayers (e.g., the elderly or those in business) and transform these values into recommendations to decision makers. As Simon (9, p. 80) emphasizes, it is quite impossible for decision makers to possess complete knowledge of all possible alternative developmental strategies as well as the attendant costs and benefits. The planner can greatly facilitate enlightened decision making by providing the necessary facts and revealing a hierarchy of values derived through close contact with client groups.

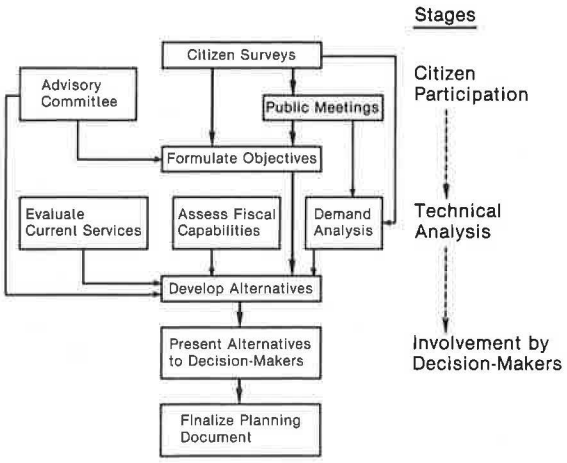
BUDGET-CONSTRAINT APPROACH TO TRANSIT DEVELOPMENT PLANNING

The chief conclusion from the foregoing evaluation is that transit development planning needs to be opened up to citizens and decision makers. The planner must act both as a technical expert and as a facilitator who strives to ensure that local preferences, needs, and desires are reflected in the service ultimately provided. Especially during the current period of fiscal scarcity, the planner has to be capable of providing decision makers with clear choices: What are the incremental benefits and costs of moving from some baseline service to higher levels?

The guidelines developed for the state of Iowa are an attempt to make the transit planning process more participatory. The approach called for in these guidelines is depicted by the flow chart shown in Figure 1. The process begins with a survey of area citizens. Results of the survey are presented at a public meeting, where those in attendance are encouraged to express their views. Out of these contacts with the public and the inputs from the advisory committee, if one exists, the planner formulates and ranks objectives to which transit should contribute.

The objectives constitute a basis for a technical analysis to generate alternative developmental paths

Figure 1. Steps in the planning process.



for the system. In formulating these alternatives, demand for service, current transportation options, and the fiscal position of the area are considered. A key feature of this approach is that the alternatives are all geared toward attaining the same objectives but they vary in scale and, hence, in cost. Decision makers are thus able to assess the incremental net benefits of moving from the smallest to larger, more costly alternatives. Only after a choice, and thus a commitment, has been made is the planning document finalized. Each of these steps is discussed in greater detail below.

Citizen Surveys

The initial mechanism for obtaining citizen views about which social objectives transit should pursue is a short survey. Transportation planners have used surveys for many years to obtain data on people's attitudes, life situations, and actual behavior. It is generally recognized that surveys used to estimate user demand for new or reconfigured services are of limited value because respondents have difficulty evaluating hypothetical circumstances (10, p. 57). For this reason, surveys are likely to be more effective in measuring societal demand--the desired level of transit service and its purpose--than in estimating private demand that relates to expected personal use.

For the purpose of establishing objectives for transit, a mail-back format is preferable because (a) it is relatively inexpensive, (b) respondents need not be in close proximity (they are likely to be scattered in rural areas), (c) it is easy to administer so that no interviewers need be trained, and (d) sample division, or stratification, is not difficult. The last point is important because the planner should elicit responses from several subsamples, including the general population, business leaders, and local politicians. Manheim and others (11, p. 9) maintain that completely similar views across different population groups are unlikely on anything more specific than the most abstract objectives.

The survey instrument itself should be short and simple. Very limited personal data are needed, which should contribute toward higher response rates (field tests of this procedure have yielded variable return rates, occasionally as high as 60-75 percent). In terms of substance, the form may have several major sections. One section contains questions that pertain to the sufficiency and quality of the transportation services currently available to the individual. Another section is intended to measure the importance of social objectives that could be pursued through providing transit service. Because the list of possible purposes is limited to those included on the form, care must be taken to be comprehensive but precise. A third section amplifies the second; here the respondent identifies the types of individuals and trip purposes that should be served in order of priority.

Public Meetings

Once the survey results have been tabulated, the findings are presented to the public at a general meeting. Those who were not included in the sample are thus given an opportunity to express their views. In the context of each objective, specific service deficiencies and suggestions for improvements are discussed. Because the planner is acting as moderator, explaining how survey respondents felt and noting comments, he or she need not assume the defensive. Trial applications of the survey-meeting sequence have been positive experiences for planners, who previously had suffered through nervous defenses of completed plans that had been prepared with little public input.

A significant by-product of the meetings is a substantially greater public awareness of the issues present in planning for transit development. Understanding the criteria for federal matching funds, the extent of state assistance and how it is distributed, and the approximate cost of alternative service levels can serve to increase the willingness to contribute local tax dollars for transit.

Objective Formation

Increasingly, researchers are stressing the importance of public input in the formation and ranking of objectives for transportation services. A variety of techniques, often quite complicated, has been devised, including a rating scheme that uses a judging panel composed of advisory committee members (12) and a dollar-scaled mechanism used to assess the value ascribed to a series of transportation characteristics (13).

To avoid unduly complicating the transit planning process in small urban and rural areas, an easy-to-implement approach was selected. The tabulated responses from the section of the citizen survey that pertains to social objectives for transit are rank-ordered by subsample. To combine subsamples that represent unequal fractions of their respective population segments, the responses in each subsample are assigned a weight that serves to equalize the emphasis placed on each person's response within the entire sample (14, pp. 102-105). This relatively simple approach provides the planner with an overall ranking of local objectives for transit on which development plans can be based.

Development of Alternatives

The most significant innovation of the transit development planning process devised in this research is the budget-constraint approach to alternative generation and selection. Given a set of ordered transit objectives, service elements are designed to pursue each of these objectives. For example, if an objective were to "enable those who do not have an automobile available to have access to employment opportunities," a rural commuter route leading to various employment centers might constitute one service element. The cost (net of revenues or contract payments) of providing each service element is estimated.

Instead of formal demand modeling techniques, which can be quite data intensive and often have limited applicability in small urban and rural areas, a simpler analysis is suggested. In its most basic form, this analysis consists of identifying major activity centers (e.g., hospitals, employment concentrations, and retail facilities) and the residential locations of those who are most likely to use the services being planned. The origins and destinations of probable users can then be considered in establishing new or expanded services. Experience has shown that, once a system is operational, articulated demand is the best method for refining the spatial configuration of transit in small urban and rural areas.

Especially in the case of new regional transit operations, the planner should work closely with directors of the various human service agencies within the area. Rural transit operations are often partly financed by contract revenues from these agencies. To the extent that this is the situation, the specific mission and approximate ability to pay of the region's service agencies will delimit the general types of services that can be provided. In general, significantly more planning flexibility exists when services are financed by various levels of government rather than by contracting agencies.

By reconciling this potential supply of transit service with the anticipated demand (its level and spatial pattern), individual service elements can be delineated. A successful planning effort is one that combines the resources available from a variety of sources to meet the needs of each funding organization while contributing to the objectives the people of the region deem important.

Several alternatives can now be developed, each of which contains a series of service elements. In the lowest-cost alternative, only those elements that pertain to the highest-ranked objectives are included. Another more costly alternative can then be generated that involves the same services as the first plus service elements for one or more lower-ranked objectives. The budget for each alternative, then, constrains the number of service elements that can be included and, hence, the objectives that can be pursued. [It is worth noting that Dyckman (15) suggested this sort of approach to planning 15 years ago, but I know of no previous applications to transit development planning.] The guidelines for Iowa encourage planners to devise a minimum of three alternatives: (a) a low-cost, minimum-service-level alternative; (b) an alternative with moderate service levels and expenditures; and (c) an alternative predicated on a higher service level, though not of the "pie-in-the-sky" variety.

For each alternative, a complete budget is formulated. On the expenditure side, the budget includes (a) the running costs associated with the service elements to be provided; (b) support functions, including administration, maintenance, and marketing; (c) special activities such as demonstrations; and (d) capital projects needed to provide the contemplated services. Expected revenues from contracts and the amount of funds to be requested from state and federal sources are shown as well.

A five-year development path is laid out for each of the alternatives. Detailed budgets are provided for the first two years, and sketch plans are prepared for the remaining three years. The sketch plans highlight developmental benchmarks and provide a capital improvement timetable. This timetable assists the state in programming its capital assistance and alerts local decision makers to forthcoming needs.

Presentation of Alternatives

Unlike most of the TDPs reviewed, the suggested approach does not call for the planner to select an alternative and then complete the document before submitting it to decision makers. Rather, the planner presents the several alternatives--their budgets, the services to be provided, and the objectives to be pursued. Starting with the lowest-cost alternative and proceeding to the more ambitious alternative, the incremental costs to the local government, the additional benefits, and their incidence are laid out.

With this approach, decision makers are faced with several alternatives of different scale and must reconcile the incremental benefits with costs. An interesting possibility grows out of this more participatory approach to transit development planning: When decision makers know what the public really wants, their valuations of the benefits of transit service may increase. Even though decision makers rarely think in terms of net benefits per se, they are interested in allocating scarce fiscal resources to services that are needed and preferred by their constituents. The budget-constraint approach affords them a means by which to make more enlightened decisions.

Completion and Use of TDP

Only after decision makers have selected an alternative is the TDP finalized. In Iowa, subsequent grant applications for state and federal pass-through assistance [primarily FHWA Section 18 (Surface Transportation Assistance Act of 1978)] must conform directly to the budget of the alternative selected by the applicable policy board and published in the TDP.

A practical function of the completed TDP is to serve as a management aid to the transit operator. A clear statement is made in the document as to which services are to be offered and why. Then, if local economic conditions change so that added or reduced transit service becomes possible or necessary, guidance is provided as to which service elements should be retained, added, or deleted.

CONCLUSIONS

The approach to transit development planning formulated in this research is designed to involve citizens and decision makers in the planning process. The objectives the plan is oriented toward achieving are achieved through direct contacts with the public. Decision makers are afforded the opportunity to examine incremental service benefits and their costs and to make an informed choice. Greater local support for transit is a likely by-product as citizens and their leaders acquire a better understanding of the issues and options related to transit service in their community.

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Replanning Existing Rural Public Transportation Systems

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A commitment to provide accountable, effective, and responsive transportation services can best be supported by hard factual data concerning effectiveness and efficiency measures. Based on an analysis of system goals versus current performance, a transit system manager can preserve, enhance, alter, or terminate system operations. Methods of improving effectiveness and efficiency are discussed along with methods of handling six common problems: lower ridership than expected, low vehicle use, low revenues, basic changes required, cash flow, and use of incorrect or inappropriate types of vehicles.

As a relatively new field, rural transportation lacks the historical data bases used by other elements of the transportation industry to consider alternative scenarios [although a number of relatively new training references (1-4) provide important guidance]. So it should surprise no one that even the best-laid plans for rural public transportation will, of necessity, be subject to review, evaluation, and probable changes. After looking at the benefits of changing ongoing systems, this paper discusses some of the initial decisions that are frequently valuable candidates for reexamination once the system and its personnel have some experience against which to test their initial plans, including ridership, system design, cash flow, and vehicle specifications.

BASIC INGREDIENT: A COMMITMENT TO IMPROVE

The evaluation of the Section 147 (Federal-Aid Highway Act of 1973) demonstration project (5) showed that projects that experimented with their operations with the idea of making continual improvements were very successful. Of course, the willingness to change had to be implemented in such a fashion as to maintain public confidence in the availability of service. Projects that took a long time to change unproductive routes and practices generally showed very poor statistics (6-10).

The basis for making such changes must be an evaluation of how well things are going at the present time. That question must be answered by hard factual data concerning factors such as ridership and costs, potential costs of service changes, effectiveness measures, and attitudes of community leaders and others. The need for factual data can only be satisfied by a serious data-collection effort by the system's managers.

The major reasons for evaluating system operations are

1. To better meet the needs of the people and the objectives of the system,
2. To control the costs of service,
3. To support and justify charges to social service agencies and other agencies that have contracts for service,
4. To obtain factual information for purposes of public relations with the local community and government sponsors, and
5. To provide an example for other projects about successful operations.

Whereas some systems do not have a definite procedure for assessing when system changes are required, others have experimented with routes and schedules in a formal way. This means that problems were observed, solutions were designed and implemented, and tests were conducted to monitor the experiment. All stages of the process were written down. In contrast, another system observed noted that it had a real problem knowing when to change routes. It was suggested by the Federal Highway Administration (FHWA) regional office that the system experiment with different times for relatively

unproductive routes or even consider demand-responsive services in some places. In other places, problems were more obvious: After six months, a project decided to drop several routes that "were not generating much traffic at all" (i.e., two or three passengers per trip). (One wonders why it took that long to decide to change; it was probably because approval by the public utilities commission was necessary.) A project in the Northeast had to substantially reduce the scale of its operations in order to survive. The service area was cut by two-thirds and the population served was cut by almost 30 percent; as a result, the system is now one of the most productive and cost-effective. One of the most successful projects continually experimented with new services but also left changes in place long enough for an adequate test to occur. This is a crucial point.

EVALUATION MEASURES

In addition to cost, the performance characteristics of a rural system should be measured by their effectiveness and efficiency (11). Effectiveness measures, which tell how well a system is meeting its goals and objectives, include (a) ridership, (b) accessibility and population served, (c) quality of service, and (d) social, environmental, and energy considerations. Efficiency measures, which tell how well a system uses its available labor and capital resources, include (a) cost efficiency, (b) labor productivity, and (c) vehicle use. A "shopping list" of evaluation measures for the categories of efficiency and effectiveness is given below. For efficiency, the evaluation measures are

1. Cost per trip, hour, mile, rider, employee, passenger mile, and vehicle;
2. Vehicle use, including (a) load factor (percentage of seats used), (b) hours of service per vehicle, (c) deadhead factor (revenue miles/total miles), and (d) passenger miles per vehicle mile; and
3. Labor productivity, including (a) vehicle miles per employee, (b) premium pay/total pay, and (c) passengers/labor hours.

For effectiveness, the measures are

1. Ridership by vehicle mile, vehicle hour, and employee and per capita;
2. Quality of service, including (a) percentage of population served, (b) frequencies, (c) waiting time, (d) reliability, (e) safety (accident rate), (f) comfort, (g) convenience, and (h) speed;
3. Comparative attractiveness, including (a) relative travel time and (b) relative cost; and
4. Level of subsidy, including (a) subsidy costs per trip, hour, mile, rider, passenger mile, and employee and (b) the subsidy ratio (subtract the ratio of total system revenues divided by total system costs from one to determine what proportion of the system's operations is subsidized).

Some sources of information for making reasoned judgments concerning the evaluation of rural transportation systems are as follows:

Major Unit of Measurement	Source
Dollars	Accounting functions
Miles	Drivers or maintenance shop
Hours	Supervisors, drivers, or dispatchers
Passengers	Drivers, dispatchers, or survey
User attitudes	Survey, complaint center, or public relations

GENERAL ACTIONS OR RESPONSES RESULTING FROM EVALUATION

What a program does with the results of the efficiency and effectiveness measurements collected in its evaluation process depends on many factors. The amount of funds available to make changes, the level of funds already invested, and community political support all affect the manager's decision about what action to take. There are four general categories of possible action that can be taken concerning the local project's current service: (a) preserve, (b) enhance, (c) alter, or (d) terminate. Program administrators can use various methods to help project managers successfully take those actions. The specific strategies for making changes are discussed in the next section of this paper. This section describes general responses of project managers to the evaluation results.

Preserve

For systems that have high efficiency and effectiveness values, the general response would be to preserve the current service (i.e., to keep the project going in the same direction). Efforts should be made to hold costs constant where possible, to continue current routing and scheduling within the established service area, and to maintain fares and other service elements at their current level.

Enhance

For systems that have relatively high efficiency values but relatively low effectiveness values, the general response would be to enhance the current service (i.e., expand service in the same direction). Special effort should be provided to maintain the service efficiency in terms of costs and revenues, vehicle use, and labor productivity or whatever other variables represent the high efficiency values. Maintaining those values will ensure that, as service is enhanced to increase effectiveness, the system will continue its efficient use of the available resources. Thus, even though efficiency is high, careful attention should be paid to maintaining those efficiency values during the process of improving service quality.

Increasing effectiveness values will involve maintaining the ratio of resources to units of service while improving the quality of service. Enhancing the quality of service may include (a) increasing accessibility to the system, (b) improving reliability, (c) increasing passenger safety, (d) improving passenger assistance, or (e) increasing attention to meeting community needs.

Alter

For systems that have relatively high effectiveness values but relatively low efficiency values, the general response would be to alter the current service (i.e., change the activity or direction of the service). Efforts should be continued to maintain effectiveness in terms of service area, schedules, routes, fares, or whatever other variables represent the high effectiveness values found. Maintaining the effectiveness values will ensure that, as service is altered to increase efficiency, the quality of service will be preserved. Thus, even though effectiveness is high, careful attention should be paid to maintaining those effectiveness values while the operation is being adjusted to increase the efficiency values.

Increasing efficiency values will involve either maintaining the amount of service while reducing the

resources required or increasing the amount of service while maintaining the level of resources used. Improving the use of resources may include (a) lowering costs, (b) improving labor productivity, (c) improving vehicle use, (d) improving accounting and record keeping, (e) establishing a more stable cash flow, or (f) securing longer-term, more stable funding.

Terminate

In those rare cases where efficiency and effectiveness values are both low, mismanagement is suspected and, if previous efforts at improving those values have failed, funding to that project for its current service may be terminated.

METHODS OF MAKING CHANGES INDICATED BY THE EVALUATION PROCESS

Improving Effectiveness

When the evaluation results indicate enhancing the current service as the general response, the project manager will be attempting to improve effectiveness while maintaining efficiency. Specific strategies include the following methods.

Increasing Service Productivity

Changes in scheduling, dispatching, and deadhead time may be necessary. Some discussion between project managers and community leaders may suggest the opportunity for scheduling in some subscription trips. The ideal situation would be a group of passengers going from one origin to one destination on a regularly scheduled basis. One popular example is subscription service each week from an apartment complex to a grocery store.

In addition, careful examination of drivers' logs might show a pattern of deadhead time that suggests the opportunity for better use of vehicle time for specialized runs (e.g., an abbreviated downtown corridor route during idle time). Better coordination of both the subscription service and efforts to reduce deadhead time can be aided by adding those activities to possible uses of the dispatching system.

Increasing Accessibility

Redesigning routes and schedules can direct the service to areas where there is the greatest unmet need. Again, community and business leaders, officials, and agency and organization personnel might well work with the project manager in the redesign. Creative routing and scheduling techniques, including point deviation, might better serve unmet needs in terms of geography as well as time of day.

Improving Reliability, Passenger Safety, and Passenger Assistance

A number of operational details should be examined to explore the possibility of change in order to improve the quality of service. Such an examination may show that the following alternatives are in order:

1. Establishment of a preventive maintenance program,
2. Encouragement of more professional management and supervisory techniques,
3. The use of a higher spare ratio,
4. Development of a driver training program,
5. Purchase or lease of better supplies and equipment (or perhaps even sharing with other projects), or
6. More responsive use of the results of periodic on-board passenger surveys.

Improving Efficiency

When the evaluation results indicate altering the current service as the general response, the project manager will be attempting to improve efficiency while maintaining effectiveness. Specific strategies include the following methods.

Lowering Costs

Some specific expenses, both operational and administrative, might be suitable for some minor adjustments that could lower overall system costs. Some particular services (to particular origins, destinations, or service areas or at specific times) might be purchased by the project from another provider for less than it cost the project to provide that service. Vehicles might be leased rather than purchased (this particularly applies to specialized vehicles for a new service that might be only temporary). Coordination of maintenance with other providers in the area and bulk purchases of fuel are examples of popular joint ventures. In some cases, combining job functions (such as scheduling or dispatching) is appropriate, particularly during certain time periods. Other direct costs might be lowered by (a) hiring fewer drivers and using more part-time drivers, (b) obtaining tax exemptions (e.g., gasoline, tires, sales, and excise), (c) making pay-only-as-needed maintenance arrangements with a local garage, or (d) obtaining the fleet price for insurance where possible (careful attention must be paid to the insurance "classification" criteria used).

Improving Labor Productivity and Vehicle Use

By examining drivers' logs and calculating driver hours per day, vehicle miles per driver hour, and passengers per driver hour, certain strategies may emerge. Changes to consider include (a) increasing average working hours, (b) setting objectives for daily mileage and passengers, (c) better supervision, (d) advance scheduling, or (e) time or ride-sharing with other providers.

Improving Management

More funding sources; a more flexible package of funding sources; longer-term, more stable funding; better accounting and record keeping; and a more stable cash flow represent the common flaws in managing a small transit service. Assistance could be needed both in the planning process and in setting up a uniform, simple set of accounts. Encouraging the preparation of bills on time, insisting on prompt payment, or billing in advance may also be useful.

REPROGRAMMING FOR SPECIFIC PROBLEMS

The plans that set up a rural transportation system might not be achieved for a large variety of reasons. Among the headaches that are often unanticipated in the planning stages are the following:

1. Anticipated ridership does not materialize,
2. Basic design or service changes are necessary,
3. Cash flow is a serious problem, or
4. Vehicle requirements are misspecified.

These are probably the most serious issues often

faced, but there may also be adverse consequences from staff turnover, salary issues, or the sudden loss of political support due to electoral changes. These and numerous other circumstances often require reworking what would have been fine plans without the intervention of real-world problems.

Failure of Anticipated Ridership to Materialize

Most of the rural transportation systems started to date have based their ridership projections on intuition and guesswork instead of any formalized, documented procedure of demand estimation. Therefore, it is no real surprise that a number of these systems have not attracted the number of riders on which their projections of patronage, revenue, and vehicle requirements were based.

The problems that immediately arise are the embarrassment and then the financial absurdity (if not impossibility) of operating nearly empty vehicles. Systems that have been willing and able to make prompt changes in nonproductive routes and services have generally been able to survive the effects of their planning mistakes (or lack of planning).

The lack of riders could be due to a large number of factors, and it requires intimate knowledge of the locality to determine the strategies that can best increase low ridership. For example, it is impossible that the demand is just not there: (a) that there are not enough people to support the services, (b) that most people in the area have access to automobiles, or (c) that the types of trips do not match the services being provided. If the first two possibilities are accurate, services should be cut back. If the third case holds, the services should be redesigned. Another major possibility is that not enough people know about the service. An intelligent marketing program--one that reaches the intended target audience and delivers a message to which they will be receptive--is obviously needed. Such a program need not be expensive, but it does have to be effective. A third major possibility (although less frequent) is that service levels are too low. All available information suggests that ridership on rural public transportation systems is extraordinarily sensitive to the amount of service provided (the number of bus miles of service provided by the system per month is a good proxy measure of service). Thus, the more service that is provided, the more riders will be attracted to the system. Perhaps the level of service should be increased.

Low ridership can lead to a number of other important problems, including low vehicle use and lack of sufficient revenues. These problems may occur whether or not ridership is low, but if ridership is low they will probably occur. It is important to determine whether or not they result from low ridership or from some other factors.

Vehicle Use

Driver salaries and wages are the most significant component of a rural transit system. Therefore, it is important to take all possible steps to ensure the maximum productivity of each driver. A bus carrying only one passenger is just like a taxi system--an expensive one at that--and few rural residents or rural governments can afford taxi service. Steps should be taken to ensure as nearly as possible full loads of passengers for each vehicle trip. For some systems, this has meant cutting the overall frequency of service or not providing service on days when too few riders are scheduled (there are some obvious problems with the second strategy). Other ways to increase vehicle use include the following:

1. Start small. Do not run a tremendous amount of service until the demand for it is there.
2. Schedule in advance (for demand-responsive systems). Make people call in ahead of time so that you can arrange to pick up many persons on the same trip. At least 24-h advance notice is recommended; some systems require as much as one to two weeks.
3. Minimize frequencies (for fixed-route systems). Do not operate 10 runs a day if no one is riding. Of course, it may be more convenient for someone to ride at 2:08 p.m. than at 1:00 p.m., but much of the service to be provided is really a matter of necessity, not convenience.
4. Minimize deadhead time (the time the vehicle operates with no riders). Do you always start each day with the vehicles being driven empty from town to outlying areas to pick up passengers and bring them back to town? If so, then the vehicle is always empty at least half of the time. Consider letting the drivers take the vehicles home for the night (this requires some administrative controls) and thus cut down two deadhead trips (and the commuting time of the driver).

Low Passenger Revenues

If revenue projections are based on an anticipated number of passengers times a certain fare, and the actual number of passengers is only half what was expected, the revenues will be only half what was expected unless the fare is increased. Passenger revenues often play a small but significant role in financing rural transit systems (and may well play a larger role in the future), so it is important that revenues from fares be accurately projected. Assuming that a system can determine fairly accurately how many passengers will ride, what sorts of fare strategies are available?

The first strategy begins by recognizing that the true total costs of a particular trip differ according to the different types of services provided. The next step is to realize that different services can command different fares; in fact, it is probably more equitable to all concerned if different services have different fares. For example, in a system that has one flat fare, people who take the longest trips are being subsidized by those who take the shortest trips (since many transit system costs are mileage related). A second important fare strategy begins with the recognition that some classes of riders are willing and able to pay more for their trips than others. For example, off-peak riders have higher fare elasticities than peak-period riders (12), which means that, if all services are subjected to the same percentage fare increases, more off-peak than peak-period riders will refuse to ride under the increased fares.

A third significant fare strategy is to take transportation organizations out of the business of income redistribution. Except for the possible kinds of cross subsidies discussed above, passengers should pay (or have paid for them) the full cost of the ride they take. Part of the payment may well be a general subsidy from the local government so that each individual directly pays only a portion of his or her cost. But the point is that the total cost for that individual has been paid. Similarly, some individuals may benefit from user-side subsidy programs or social service programs and might conceivably not make any direct payment to the system. However, their trip is still paid for in full by the program that sponsors them. This is an important point: Some social service agencies have felt that

it is the "duty" of the transit operation to carry their clients at less than the cost of their rides. Some transit agencies have been willing to accept less than full-cost payments in order to inflate their ridership figures. Current budgetary constraints indicate that such situations are no longer acceptable.

Necessity of Basic Design or Service Changes

Many service plans have not been well thought out. For example, the problems of implementing a completely fixed-route system in a low-density rural area are probably as great as the problems of implementing a purely demand-responsive service for the same area. A good deal of creativity and experimentation may be necessary to come up with a productive and efficient system.

Some kinds of mistakes should be obvious in certain plans as soon as they are committed to paper. For example, plans to serve a very large area with only a handful of vehicles are immediately suspect. Unclear or contradictory schedules for fare structures will drive away patrons and reduce revenues. Systems that exclude particular kinds of trips--for example, work trips--will perform more poorly than those that include work trips. Systems should not exclude certain kinds of riders (e.g., the general public) without considering the revenue and ridership consequences of such actions.

Cash-Flow Problems

Cash flow was the most severe problem for many projects in the rural transit demonstration program, especially those that were unfamiliar with standard FHWA reimbursement procedures. In fact, some of these projects had no cash at all and so to operate on any form of reimbursement was a hardship for them. Some projects were quite surprised to find what more experienced operators already know: that expenditures often substantially exceed revenues.

A number of projects compounded their own cash-flow problems by the lateness of their reports and vouchers. The importance of timely submissions was recognized by other projects that received authorization to be reimbursed for certain expenses incurred but not yet paid. This occurred most often with respect to vehicle requisition: The projects billed the states when they had signed the contract for the vehicles, but the manufacturer did not need to be paid until after the delivery of the equipment. The projects then used this cash on hand to pay for immediate expenses.

Resolving cash-flow problems requires cooperation at several levels of government. Several states imposed unreasonably long delays on the projects. In one project, payment was not made until five months after the first expenses were incurred. For many of the very small private operations under contract, this time lapse was critical.

Projects that operate under the brokerage concept can also experience the familiar cash-flow problems of cost reimbursement. The providers submit invoices on a monthly basis. The turnaround time is approximately one month for the project to verify the invoice, bill the agencies, receive payment, and transmit payment to the operators. From the perspective of the private carriers, the maximum period between the time when they incur costs and the final payment is two months.

The reimbursement procedures of the Section 147 demonstration program caused many problems. Some of the better solutions to this problem included the following:

1. Having the state set up an account with a month's advance against which the project could draw;
2. Allowing semimonthly submittal of invoices to the state;
3. Obtaining multiple sources of funding;
4. Obtaining, if possible, at least one funding source that provides some flexibility as to payment dates and allowable expenditures;
5. Using funding sources that are not tied to a reimbursement procedure but able to put in money "up front";
6. Establishing a month's advance on all billing;
7. Submitting vouchers for expenses (such as vehicles) when the commitment to purchase is made rather than when delivery actually occurs;
8. Obtaining a source for emergency borrowing (this occasionally ran afoul of local opinion that public agencies should not incur large debts),
9. Submitting vouchers on time, and
10. Insisting on payments at least as frequently as once per month.

Misspecification of Vehicle Requirements

Actual vehicle requirements have often turned out to be different from those originally anticipated. One Section 147 project in the Southwest could not be persuaded, despite some heated discussions, to change its plans to use 45-passenger buses to provide service in an area that had a population density of three persons per square mile. Now the system operators wonder why their trips always take so long and their vehicle use is so low. Had these changes been made (as suggested) in the planning stages before operational costs were incurred, the project would now be much more successful.

Other kinds of equipment changes that have been necessary include (a) more heavy-duty vehicles than anticipated, (b) more need for one or two larger vehicles for those systems that had a number of vans or small buses, and (c) more spare or backup vehicles (many systems have not ordered backup vehicles and have been forced to curtail services when major repairs were being performed).

SUMMARY

The process of replanning an ongoing rural transportation system requires a serious commitment of time and energy. A highly formalized planning structure is not necessary, nor are glossy documents, but some organized collection and analysis of data are required to reflect a serious commitment.

Replanning is what some people think of as management and what others think of as evaluation. Whatever name is used, a serious commitment to making changes can greatly improve decisions made in the initial planning stage that affect system efficiency and effectiveness.

ACKNOWLEDGMENT

I would like to acknowledge the assistance of Sue F. Knapp in the preparation of materials used in this paper. Peter M. Schauer also contributed to some of the ideas expressed here.

This paper summarizes materials prepared by Ecosometrics, Inc., under numerous contracts with FHWA, the Urban Mass Transportation Administration, and the Wisconsin Department of Transportation. The contents of the paper reflect my views and not necessarily those of any other organization or individual.

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Part 4
Vehicles

Lightweight Accessible Buses: Selection, Maintenance, and General Care

JAMES D. BROGAN AND FRANCIS X. McKELVEY

Guidelines have been developed to assist private nonprofit agencies that have little experience in providing transportation services in selecting vehicles and related equipment appropriate to their service needs. Emphasis is on lightweight accessible vehicles—that is, lift-equipped vans, modified vans, and small buses. Operating and maintenance experiences of agencies currently using such vehicles are summarized. The information may be used to assist existing or potential operators to understand the applications and limitations of the current state of the art in vehicles and equipment.

In recent years, many public and private agencies have sponsored programs to make transportation available to passengers who are unable to use fixed-route transit service or who live in areas where there is no fixed-route service. These special transportation services usually use vehicles that are smaller and lighter than standard transit vehicles and can thus be referred to as lightweight transit vehicles or lightweight accessible bus equipment.

In order to provide a better understanding of the basic operating characteristics of these types of vehicles, Michigan State University and the Michigan Department of Transportation, under a contract with the Transportation Systems Center and Urban Mass Transportation Administration (UMTA), have developed material that explains the selection, maintenance, and general care of vehicles for lightweight accessible bus operations (1). Resource material for the project was collected from many sources, including manufacturers of vehicles and equipment, system operators and maintenance personnel, and state and federal research reports (2-8).

The most important consideration in lightweight accessible bus operations is that lightly constructed vehicles have to do heavy work. Those in charge of a lightweight accessible bus service should realize that their operation will benefit from attention to three significant areas:

1. Vehicles should be ordered that are as closely tailored as possible to the kind of service the operation desires to provide.
2. Advance preparations for regular preventive maintenance and repairs must be made whether the service will be operating an entire fleet or only a single vehicle.
3. Vehicles must be driven with extreme care, since expensive damage is so easy to inflict on this type of vehicle and since breakdowns are so disruptive to service.

Careful selection, preventive maintenance, and good driving--these are the keys to keeping a lightweight accessible bus operation running reliably.

VEHICLE SELECTION

Lightweight accessible bus operations usually use three types of vehicles: standard vans, modified vans, and small buses. Standard passenger vans range from a 5-passenger van with a 110-in wheelbase to a 15-passenger van with a 138-in wheelbase. Typical dimensions of the type of vehicle are given in Table 1. The seating arrangement typically installed on standard vans is shown in Figure 1. Note that the clearances between the seats, and between the seats and the side of the vehicle, may be extremely difficult for elderly or handicapped passengers to negotiate. In addition, the low ceiling can be uncomfortable and possibly hazardous for elderly or handicapped passengers, and the door height and ceiling clearance of these vehicles may not allow sufficient clearance for a wheelchair user to board comfortably, especially if assistance is required.

Passenger vans may be ordered fitted with modifications to allow for more interior space and larger door dimensions. These vehicles are called modified vans and are ordered from the manufacturers who perform the modifications. The raised roof on a

Table 1. Exterior dimensions for standard vans.

	Chevrolet and General Motors				Dodge			Ford	
Measurement	G20	G20	G30	B200	B300	B300 Maxivan	E150	E250	E350 Supervan
Gross vehicle weight (lb)	6600	6600	8600	6050	7200	8550	NA	NA	NA
Wheelbase (in)	110	125	125	109.6	127.6	127.6	124	138	138
Overall length (in)	178.2	202.2	202.2	178.9	196.9	222.9	186.8	206.8	226.8
Overall width (in)	79.5	79.5	79.5	79.8	79.8	79.8	79.8	79.8	79.8
Overall height (in)	80.2	80.2	81.2	79.6	80.9	80.6	80.5	82.0	83.7
Rear overhang (in)	48.0	48.0	48.0	40.0	40.0	61.0	37.8	43.8	63.8
Rear track (in)	68.0	68.0	68.0	65.2	65.2	65.2	67.0	66.0	66.0
Step height (in)	20	20	20	20	20	20	20	20	20
Side door									
Hinged									
Width (in)	NA	NA	NA	49.3	49.3	49.3	NA	NA	NA
Height (in)	NA	NA	NA	47.2	47.2	47.2	NA	NA	NA
Sliding									
Width (in)	44.2	44.2	44.2	39.8	39.8	39.8	48.0	48.0	48.0
Height (in)	49.2	49.2	49.2	47.2	47.2	47.2	48.0	48.0	48.0
Rear door									
Width (in)	54.4	54.4	54.4	49.3	49.3	49.3	54.0	54.0	54.0
Height (in)	48.8	48.8	48.8	47.2	47.2	47.2	47.9	47.9	47.9
Turning diameter at front bumper (ft)	43.57	48.48	46.62	NA	NA	NA	44.3	49.7	55.3

Figure 1. Seating arrangements for standard vans.

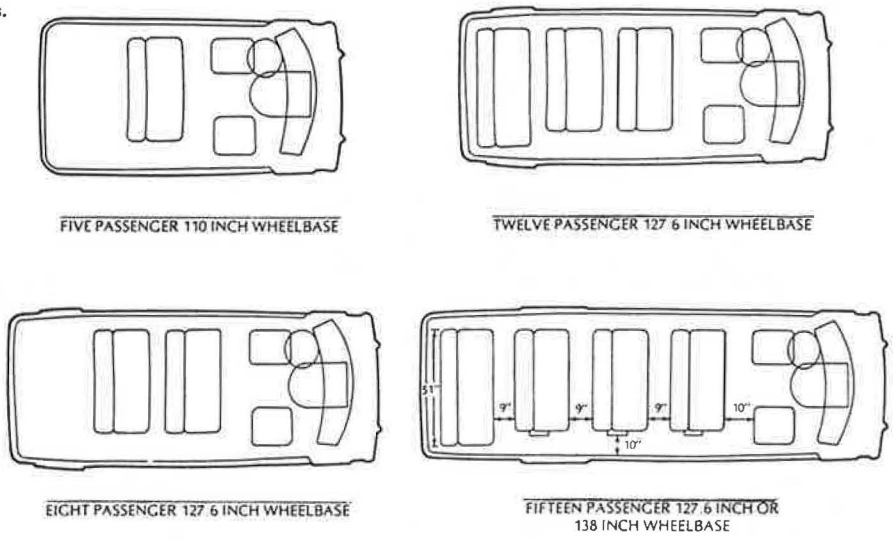
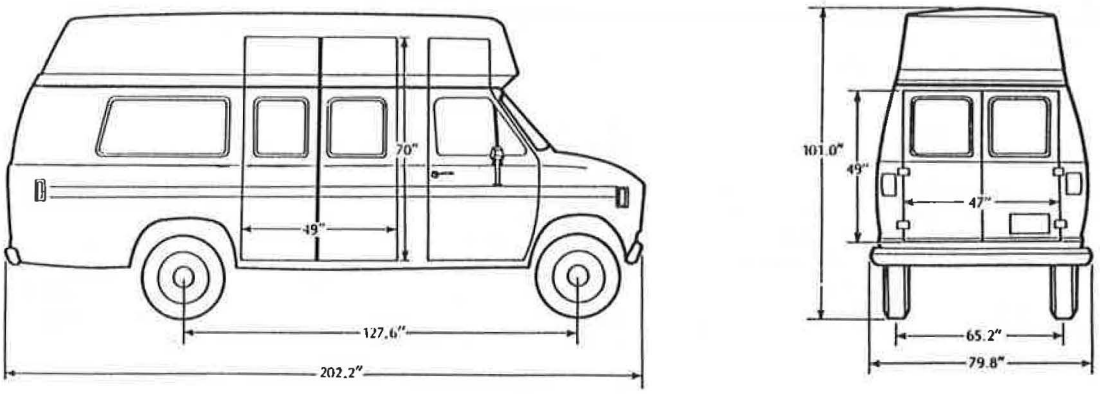


Figure 2. Typical exterior dimensions for modified van.



modified van increases the interior clearance to about 74 in at the center aisle and allows a maximum vehicle doorway height of 70 in. Modified vans are typically built from production-model passenger vans that range in wheelbase from about 128 to about 138 in. The finished vehicle is usually about 80 in wide and stands about 100 in high. Typical dimensions are shown in Figure 2.

The raised roof on a modified van may be constructed of fiberglass, aluminum, or steel. Any vehicle in passenger service should have its roof reinforced with a steel framework to prevent crushing in the event of a rollover.

Some services require a heavier vehicle than a modified van. Small buses are thus built onto light truck chassis, with dual wheels on the rear axle. Like modified vans, these vehicles are ordered from the firms that build the bodies. Small buses range in wheelbase between about 125 and 167 in. There are two general size categories for small buses: 12- to 16-passenger vehicles and 16- to 22-passenger vehicles. Typical exterior dimensions for a 12-passenger small bus are shown in Figure 3. Vehicles of this type are generally about 94 in wide, stand about 107 in high, and have a wheelchair entrance door about 50 in wide and 70 in high. Like modified vans, these vehicles usually allow about 74 in of clearance between floor and ceiling at the center aisle.

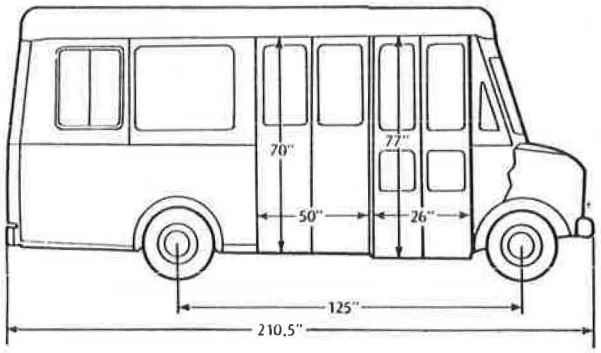
The added interior space in a small bus makes it easier to secure wheelchairs; ambulatory passengers also find it easier to get into and out of their seats. The average 20-passenger small bus has a wheelbase of about 163 in, an overall length of about 262 in, a width of about 90 in, and a height of about 107 in.

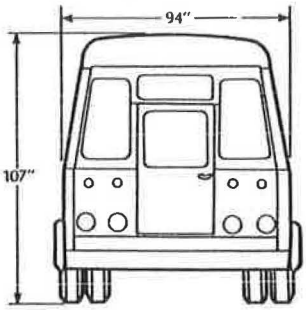
Interior arrangements on modified vans and small buses allow passengers a great deal more room than standard vans. Modified vans can usually seat from 9 to 12 ambulatory passengers. These vehicles can seat from two to four wheelchair-using passengers, depending on the physical size of these passengers and the dimensions of their wheelchairs. Each wheelchair station requires as much space as two seats for ambulatory passengers. In addition, wheelchair lift machinery will take at least as much room as two pedestrian passenger seats.

Passenger space needs should be realistically estimated, especially for wheelchair users who require the assistance of an attendant to board the vehicle. On many lightweight accessible bus vehicles, there is not enough room to move a wheelchair past another wheelchair that is already secured in place.

Before a vehicle is ordered, a careful assessment should be made of the actual amount of interior space passengers will need. Perimeter seating arrangements may save space and make it easier to seat passengers who have trouble negotiating tight spaces. Wheelchair users must sometimes be secured facing the aisle. It should be remembered, however, that many passengers find it uncomfortable to ride

Figure 3. Typical exterior dimensions for 12-passenger small bus.





facing sideways. Thus, as a general rule, as many seats as possible should face forward.

Modified vans and small buses may be equipped with a variety of options for comfort and safety. Transit-type seating arrangements allow for aisle space down the center of the vehicle. Vertical handholds can be installed and hard surfaces can be padded. Extra insulation, heating, and ventilation as well as air conditioning can be installed. Interior lighting can be brightened, and color schemes may be contrasted to help passengers negotiate seats, aisles, and steps.

One of the most important options for lightweight accessible bus vehicles involves the equipment needed to accommodate wheelchair-using passengers. The most commonly used lift equipment consists of an electric or electrohydraulic elevator that stows aboard the vehicle and lowers to the ground to receive or discharge passengers. These lifts may be mounted either to the side or to the rear of the vehicle. On another type of lift, the pedestrian entrance also serves as the lift door, since the steps of the vehicle rearrange themselves to serve as a wheelchair lift.

Some type of device is also necessary to secure the chair in place aboard the vehicle. Some of these devices grip the rear wheels of the chair by means of pins or clamps, and other devices grip the frame of the chair with metal braces or nylon webbing. Other devices can be combined with a folding "flip" seat, and some restraints can secure several wheelchairs.

The technology for carrying wheelchair users on transit vehicles is in a relatively early stage of development. No existing system is completely ideal. Certain types of wheelchairs cannot be secured with either wheelor frame-locking devices. To protect passengers as well as possible, it is necessary to determine the actual dimensions of the wheelchairs the vehicles will have to carry and to use separate safety belts for the passenger (attached either to the frame of the vehicle or to the frame of the passenger seat) in addition to the restraints for the wheelchair.

Every lift should have as a minimum several features: sufficient lifting capacity, a large enough platform, a nonskid surface, anti-roll-off barriers, and manual backup controls. Additional desirable features include a handrail, protection for moving parts, controls for either driver or user, safety shutoff switches, and stowage inside the vehicle for cold climates.

For lightweight accessible bus service, good communications are essential. A mobile radio aboard each bus and a base station radio at the dispatch office will add safety and efficiency to a system.

SYSTEM PLANNING

Operational characteristics will influence the selection of each vehicle: Is maneuverability or capacity needed? How much room will passengers need? Will passengers or conditions require some extra-tough equipment? What is needed in wheelchair-carrying capacity?

A comparison of 1980 costs for modified vans and small buses is given below:

Vehicle Type	Cost Range ($)
Modified van	16 000 to 29 000
Small bus	14 000 to 35 000

For vehicles with similar furnishings and passenger capacity, the difference in price may be due to the general heavier construction of the small bus. Specifications, however, must be exact. Since every modification affects the structural integrity of the vehicle, someone familiar with passenger vehicles should draft all specifications.

MAINTENANCE

In lightweight accessible bus operations, preventive maintenance is as important as the purchase of the vehicles. Preventive maintenance means maintaining a vehicle to prevent breakdowns rather than waiting until something goes wrong and then fixing it.

The first preventive maintenance measure is to plan some reserve capacity into a bus fleet. One bus in reserve for every seven or fewer on the road is a good rule of thumb. A small fleet, however, may have to reserve time in the schedule of each vehicle rather than have extra vehicles for preventive maintenance.

Maintenance arrangements should be made before operations begin. If possible, a garage should be set up and a mechanic hired. One alternative is to have a driver double as a mechanic so that vehicles will get the attention they need. It is also important to keep a supply of parts on hand. Operators with very small fleets may have to take their repair work to commercial garages, or it may be possible to contract with another agency, such as the local school district, to do maintenance.

It is critically important to have a maintenance budget worked out in advance. It is difficult to be in the position of having to look for repair money after the vehicle breaks down.

A comprehensive maintenance schedule for each vehicle should be devised. Certain maintenance items must be performed either after a certain period of time or at a specific mileage. For example, front-end lubrication should be performed at least once a month.

The most important maintenance items are the most routine: motor-oil level, all fluid levels, the pollution control equipment, air and fuel filters, and all belts and hoses. Oil and filters should be changed at least once a month. Brakes should be watched constantly for leaks or other signs of trouble and should be checked at least once every 8000 miles. Tires should be kept at the correct level of inflation, and the pattern of wear on the tread should be watched for signs of misalignment or faulty wheel balance. Tires should be rotated from wheel to wheel at least once every 10 000 miles, and the engine should be tuned at least once every 12 000 miles.

Transmissions should be serviced at least once every 15 000 miles. The level and color of the fluid on the dipstick must be checked, and drivers must know how to avoid transmission damage.

Several other preventive maintenance measures should be kept in mind:

1. Every time the vehicle is hoisted, check the driveline for wear. Replace loose universal joints before they break.
2. Check the differential gear lubrication every month and watch for leaks in differential and rear-axle seals. Change the lubricant in the differential every 15 000 miles.
3. Be sure the exhaust system is kept tight and in good condition. Replace worn pipes and mufflers immediately to prevent fumes from entering the vehicle.
4. Be sure the belt to the alternator is kept tight enough to prevent slippage but not so tight that the bearings in the alternator are damaged.
5. Fix body damage quickly, inside and out. Once a week, go over the vehicle and tighten screws, nuts, and bolts. Seal any leaks.
6. Wheelchair lifts are light machinery that receives heavy wear. Because it is so critical to keep the lift in good working order, keep the machinery clean and properly lubricated at all times. Show drivers how to operate lift equipment, and instruct them to run each lift through a complete cycle at the beginning of each day to check for trouble.
7. Keep restraint devices clean, tight, and correctly lubricated and adjusted.
8. Keep the vehicle clean, inside and out.
9. Teach drivers to keep a constant check on all of the gauges on the dashboard and not to ignore a reading that indicates trouble.
10. Drivers should be sure safety equipment is present and tightly secured. A loose fire extinguisher can fill the bus with choking chemical powder.
11. Every driver should check at the beginning of a shift to make sure the emergency door is unlocked.
12. The first and last driver of the day should fill out a complete inspection sheet on each vehicle; drivers should promptly report anything that requires attention.
13. Keep a complete set of maintenance records for every vehicle in order to keep track of expenditures and spot recurring difficulties.

DRIVER SELECTION

It is important to select the right vehicle and to plan for good preventive maintenance. It is also very important to see to it that vehicles are driven with a conscious effort to keep them in good condition.

To be sure that vehicles are driven in such a way as to prolong service life, drivers should be hired carefully; this is not an ordinary driving job. Anyone operating a lightweight accessible bus service should make every effort to hire top-quality personnel by (a) interviewing every applicant; (b) giving a brief written test on traffic laws, general knowledge, and judgment; and (c) giving each applicant a road test to check vehicle-handling ability and driving habits.

New drivers should be instructed thoroughly so that they understand the following points about driving a lightweight accessible bus:

1. Watch overhead clearance at all times. Misjudging clearance is a common cause of expensive damage to the vehicles. Turning maneuvers may take some practice with a vehicle larger than an automobile.
2. Go easy on the accelerator and the brakes.
3. If the vehicle gets stuck, call for a tow. Do not spin the wheels; it may ruin the transmission.
4. Drivers should know all local road hazards. Report any new hazards to the dispatcher immediately.
5. Drivers should be shown the correct techniques for operating wheelchair lift and restraint equipment and for assisting wheelchair-using passengers.
6. If a local school district, sheriff's department, or other agency offers driver training courses for fleet drivers, take advantage. Money may be saved in maintenance, repair, and insurance costs.
7. Finally, be patient and willing to learn. Experienced operators are an excellent source of advice and can make a new operator's work a great deal easier.

SUMMARY

The field of lightweight accessible bus transportation is relatively new, and there is room for considerable research and development in vehicles and operating techniques. However, with wise vehicle selection, good preventive maintenance, and careful driving, the vehicles now available can be made to give reliable service. The results are worth the effort.

ACKNOWLEDGMENT

The work reported in this paper was performed for UMTA, the Transportation Systems Center, and the Bureau of Urban and Public Transportation of the Michigan Department of Transportation. We wish to acknowledge the assistance of the many manufacturers, agencies, and individuals who provided data. Special thanks are due to Mark Dublin and James Witkowski at Michigan State University and Wolfgang Mueller of the Michigan Department of Transportation.

The contents of this paper reflect our views, and we are responsible for the facts and the accuracy of the data presented. The contents do not necessarily reflect the official views or policies of the U.S. and Michigan Departments of Transportation.

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Note: The Transportation Research Board does not endorse products or manufacturers. Trade and manufacturers' names appear in this paper because they are considered essential to its object.

Procurement of Small Transit Vehicles

MARC CUTLER

Two aspects of the procurement process for small transit vehicles are described: financing and the bid process. The following financing sources are discussed: (a) federal transportation programs, (b) the Farmers Home Administration, (c) leasing, (d) private financing, (e) non-transportation-specific federal programs, and (f) coordination of vehicles secured from different sources. Although all potential sources of federal funds are generally becoming increasingly limited, there are a number of alternatives to federal transportation programs. In addition, new, creative financing methods are being developed in the private sector. Given today's funding realities, coordination of existing programs and vehicles is essential. Federal procurement requirements are described, and the bid process is followed through from advertisement, preparation of bid documents, and prebid conference to evaluation of bids. Suggestions for contract provisions in such areas as warranty, delivery, inspection, life-cycle costing, and the timing of the process are provided.

The traditional sources of financing for transit vehicles are federal transportation capital assistance programs, which pay 80 percent of vehicle cost. The three principal programs are Sections 3, 16b2, and 18 of the Urban Mass Transportation Act of 1964, as amended.

Sections 3 and 16b2 are administered by the Urban Mass Transportation Administration (UMTA). Section 3 is oriented primarily toward urban public transit systems but, depending on the availability of funding, is an option for any region. Section 16b2 provides handicapped-accessible vehicles to private, nonprofit organizations (PNPs) for the provision of transportation services to the elderly and the handicapped. Section 3 grants may be applied for directly by transit authorities; Section 16b2 is administered by the states.

Section 18 is administered by the Federal Highway Administration (FHWA). It provides capital, operating, and administrative assistance to transportation services in federal-aid nonurbanized areas. Services may be geared toward the provision of transportation for the elderly and the handicapped but must contain a "public transportation" component. Section 18 provides 80 percent reimbursement for capital and administrative projects and 50 percent reimbursement for operating projects.

Section 18 is administered through a state agency. The state may make grants to public or private transportation providers and establish criteria for the distribution of funds within the state. Unlike the UMTA programs, Section 18 is a combined capital, operating, and administrative program. It is the responsibility of the state agency that administers the program to determine the proper mix among the three types of projects.

In all three programs, the 20 percent "matching" share must be provided in hard cash through a combination of state, local, or private funds. Funds to operate vehicles granted through Sections 3 and 18 may be obtained through Section 5 for urban areas and Section 18 for rural areas. There is no provision for federal operating funds for Section 16b2 vehicles.

The Reagan Administration has indicated a commitment to the continued provision of capital assistance (particularly buses). The Administration has proposed gradually phasing out operating assistance to urban areas between FY 1983 and FY 1985 and making Section 18 a "capital-only" program in FY 1983. This could pose a serious problem for many rural areas that have met their capital needs in recent years but require continued operating assistance for the provision of service in low-density, high-mileage areas.

FARMERS HOME ADMINISTRATION

The Farmers Home Administration (FMHA) provides low-interest capital loans to public agencies or nonprofit corporations in rural areas. Its current interest rate is 5 percent, although this is likely to increase in FY 1982. Vehicle loans are generally made for a term of 15 years on buses and a shorter term on smaller vehicles. Agencies may use FMHA loans to finance an entire project, thereby foregoing the use of a federal grant, or to raise the 20 percent "local match". There is no minimum down payment requirement, but obviously a larger down payment increases the chances of receiving the loan.

FMHA operates on a cost-reimbursement basis. The agency or corporation must first purchase the vehicle with its own funds. FMHA requires the collateral of a general-obligation bond from a public agency, and the following collateral from a nonprofit corporation: (a) a promissory note, (b) assignment of income (accounts receivable), and (c) a lien on the vehicle.

The lien requirement can pose a problem where the U.S. Department of Transportation (DOT) also requires a lien, as in the Section 16b2 program. This

problem was resolved in Massachusetts, although the project did not ultimately come to fruition for other reasons. Mount Grace Transportation Corporation, a private, nonprofit transportation provider, was the recipient of seven Section 16b2 vehicles. The local match was to be raised through FMHA. Initially, both FMHA and UMTA insisted on being the first lien holder on each of the seven vehicles. A compromise was reached whereby UMTA agreed to permit FMHA to be the first lien holder on two of the seven vehicles. This satisfied FMHA's interest in protecting its 20 percent contribution to the overall project.

These funds are available through the Community Facilities Loan Program, which is administered by FMHA district offices located in rural areas of the states. Eligibility for a loan can usually be determined within 45 days of the receipt of a preapplication. Funding approval can be obtained within one week of the determination of eligibility, depending on the availability of funding.

The budget for the Community Facilities Loan Program is slated for a 50 percent reduction in FY 1982. Priority is generally given to rescue and public safety vehicles (such as fire trucks) and to public agencies over nonprofit corporations. However, given the anticipated budgetary constraints, preference will in the future be given to smaller-scale projects, such as vehicles, to avoid using up a district's entire allocation for one large project, such as a community center. FMHA prefers to provide loans for vehicles with a relatively long life and thus would give priority to buses over vans, for example. Applicants for FMHA loans must meet the usual federal assurances regarding nondiscrimination and equal employment opportunity.

LEASING

There are a number of reasons why a transportation provider may prefer to lease rather than purchase a vehicle. Leasing increases operating costs and decreases capital costs. If a system cannot raise sufficient capital funds to purchase a vehicle, leasing is a viable option. Leasing may be appropriate for a system that is unsure of its permanence or unsure of its future design. Leasing permits the system to maintain flexibility and avoid a heavy investment in capital equipment that may not be needed in another year. Leasing can also be used as a stopgap measure if vehicles must be obtained quickly or while a system is proceeding through the federal grant process, which can often take several years.

The principal disadvantage of leasing is that it costs more over the long run. For example, the lease of seven vehicles at $6000 each would cost a system $42 000/year for 10 years (assuming the lease cost remains constant). The purchase of the same vehicles would cost $39 434/year, assuming 10 percent annual finance charge and a $1000 salvage value (1).

Another disadvantage of leasing is that leases are typically short term (5 years or less) and will require renegotiation whereas payment costs for a purchased vehicle are constant over the life of the vehicle. However, the short-term nature of a lease can be used to a system's advantage if it is able to trade in the vehicle for a newer model at the termination of each lease period. Thus, although a short-term lease permits a more rapid fleet turnover, it also results in more frequent cost increases. A short-term lease may in general cost more than a long-term lease due to the need of the leasing company to charge off depreciation in a shorter time period.

Most leases are set on a fixed-mileage basis beyond which the system must pay additional per-mile charges. The fixed mileage can be surprisingly low (1500 miles/month, for example), and a system should thoroughly investigate these terms and its anticipated vehicle mileage.

Systems that lease should take advantage of full-service contracts in which the leasing company handles maintenance, insurance, licensing, and other administrative chores. A prime advantage of leasing is this ability to "export" administrative burdens. However, the system should carefully analyze the contracts regarding these services, particularly insurance, to ascertain that the contracts are adequate for the system's needs.

Ultimately, for standardization, continuity, and cost, the core of a system's fleet should be owned. Leasing is useful for the marginal portions of a fleet and as a stopgap measure. A new system, in order to get under way, may have no alternative but to lease a large portion of its fleet. An established system, however, should plan its vehicle acquisitions in a systematic fashion to enable it to gradually replace portions of the fleet and to anticipate the time constraints of the federal grant process.

PRIVATE FINANCING

The traditional method of private financing is, of course, through banks. Although loans for automobiles are financed well below the prime interest rate, loans for commercial vehicles typically exceed the prime. For example, most private intercity bus companies in Massachusetts, as well as Caravan, the state's third-party vanpooling corporation, pay from 1 to 3 percent in excess of prime for their vehicles.

There are, of course, a number of factors that go into determining a loan rate. A public authority, particularly one with secure federal grants, can probably borrow at a considerably lower rate than a private entity. If a public authority has the power to bond with the "full faith and credit" of the state behind it, it traditionally could borrow at a rate far below that available in the private sector. In recent months, this gap has narrowed considerably due to lack of investor confidence in the bond market. The state of Massachusetts, for example, has seen bonding rates increase from 8 to 14 percent in a little more than a year.

For private entities, the rate will depend on the size, viability, and solvency of the company and perhaps whether it operates under contract to a public authority. It may be possible to obtain lower rates from a local bank that has a sense of community pride and an interest in assisting in the provision of essential community services.

A relatively new method of private financing has developed in recent years that involves the use of investment brokers. The purchase of a relatively "long-lived" vehicle can serve as a tax shelter for wealthy individuals, who, operating through a broker, then lease the vehicle to a transportation provider. Because of the tax break received by these individuals, through an initial 10 percent investment tax credit and the annual depreciation of the vehicle, they are able to charge a lease rate substantially below either the standard lease rate or the monthly payments on a purchased vehicle. At the end of the lease term, the vehicle can be rolled over into another lease or sold outright. By using this method, one Massachusetts intercity bus carrier was able to reduce its effective interest rate by 8 percent in comparison with what the carrier would have been paying if the vehicle had been purchased and financed through a bank loan.

The Economic Recovery Tax Act of 1981 has created a potentially dramatic new method of vehicle financing for public transportation authorities. This Act establishes a tax-sheltered "safe harbor" for the lease of "mass commuting vehicles", defined as "any bus, subway car, rail car, or similar equipment... which is leased to a mass transit system wholly owned by one or more governmental units...which is used by such system in providing mass commuting services." In order to obtain the tax advantages that these lease arrangements will create, profitable corporations are likely to be eager to enter into agreements with transit authorities for the purchase of equipment.

OTHER FEDERAL AID PROGRAMS

There are 114 programs within 11 federal departments that provide transportation operating or capital assistance. Most of these programs are operated by the U.S. Department of Health and Human Services (1, Figures 13-22). In reality, many of these programs are facing funding constraints themselves and in recent years have turned over many of their transportation functions to Section 18 recipients. Reversing this process may prove difficult. Most of these programs concentrate on the provision of operating assistance through client reimbursement.

In addition to "social service" programs, it is also possible to finance vehicles outright through Community Development Block Grants (CDBGs). The CDBG program is administered by the U.S. Department of Housing and Urban Development and is funded through municipalities. In a recent development, the administration of CDBG grants for communities with less than 50 000 people has been shifted to the states.

COORDINATION

In the past few years, a number of federal programs have often poured funds and vehicles into an area with little coordination. In the coming era of fiscal constraint, more effective coordination of existing services can replace outright expansion as a means of providing more services or, at the least, maintaining what exists.

Prior to the initiation of Section 18, the Section 16b2 program was a principal source of vehicles for the provision of demand-responsive services for the elderly and the handicapped in rural areas. Section 18 funds have flowed primarily to public authorities, and in many instances these authorities have come to view the Section 16b2 PNPs as unwanted competitors rather than as an additional source of vehicles and services. This type of attitude will be unaffordable in the next few years, and coordination among recipients of federal assistance will be essential.

Many social service agencies still provide transportation reimbursement to clients. Through the use of vendor codes and service contracts, transportation providers can tap into this source of funding and obtain reimbursement for services provided. This type of funding will not flow naturally to transportation providers but must be aggressively pursued.

VEHICLE PROCUREMENT

Requesting Bids

Federal regulations regarding bid solicitation for federally subsidized purchases are fairly general and rely heavily on local and state procedures. These requirements are detailed in Office of Management and Budget (OMB) circulars A-102, A-104, and A-110. For Section 3 grants only, UMTA has more extensive regulations, which are contained in its External Operating Manual Section III-C. For all contracts in excess of $2500, UMTA will make a prebid analysis and review. No additional requirements beyond standard federal procedure and local laws and regulations are imposed on the Sections 16b2 and 18 programs.

Basically, federal regulations require that "all procurement transactions...shall be conducted in a manner that provides maximum open and free competition" (2). Bids must be awarded on the basis of a "firm fixed-price contract" to the "responsible bidder whose bid, conforming to the invitation for bids, is lowest" (2). Factors in determining whether a bidder is "responsible" include integrity, compliance with public policy, record of past performances, and financial and technical resources. "Any or all bids may be rejected when there are sound documented business reasons in the best interest of the program" (2).

All grantees must have written selection procedures that provide, at a minimum, the following components (2): (a) procedures for solicitation of offers, (b) technical specifications, and (c) a description of all contract requirements. Under the third requirement, the following standard UMTA assurance should be included in all bid documents:

1. Advertisement and/or invitation to bid--(a) Equal employment opportunity, (b) statement of financial assistance, and (c) ineligible bidders;
2. Standard contract clauses--(a) Contract changes, (b) interest of members of Congress, (c) prohibited interests, (d) equal employment opportunity, (e) air pollution, (f) motor-vehicle safety and pollution, (g) cost of living, and (h) minority business enterprises; and
3. Required contract provisions--(a) Contract period, (b) termination of contract, (c) nonrestrictive clauses, and (d) maximum compensation.

In addition, the "buy American" requirement (discussed later in this paper) should be included.

If a contract is in excess of $10 000, bid solicitation must take place in one of the following three ways: (a) competitive sealed bids, (b) competitive negotiation (if order is not suitable for formal advertisement), or (c) noncompetitive negotiation (typically if there is only one supplier) (2). Since most vehicle procurement will take place under the competitive sealed bid method, the remainder of this paper concentrates on this process.

Federal regulations require that, for competitive sealed bids, formal advertisements be posted. Such advertisements must allow sufficient time for potential bidders to respond. As the outline of bid requirements given above indicates, advertisements must specify the following three points: (a) Suppliers will be required to certify that they are not on the U.S. Comptroller General's list of ineligible contractors, (b) suppliers must comply with all equal employment opportunity laws and regulations, and (c) the contract is subject to a financial assistance agreement between the project sponsor and DOT (2).

In general, advertisements may be mailed directly to suppliers and printed in newspapers and/or trade journals. Generally, a much better response will be obtained by mailing bids and specifications directly to suppliers. To that end, agencies should maintain updated lists of suppliers.

After the receipt of statements of interest from bidders, technical specifications and other contract provisions (called "front-end documents") should be

mailed to bidders. This can be done in conjunction with an invitation to attend a prebid conference, as explained below.

Technical specifications can take the form of drawings and/or phrases. If there are several recipients for a single order, it is helpful to have a committee of recipients participate with the lead agency in developing specifications. Specifications can take the form of specific design standards or desired performance levels. It is generally preferable to use performance levels because this permits potential bidders more flexibility in design and thus increases the number of bidders. When design specifications are used, they should be written as minimum standards or as a range. Nevertheless, they should not be drawn too loosely.

Front-end documents should contain the following: (a) instructions to bidders, (b) general provisions, (c) bond forms, and (d) bidders' proposals. Instructions to bidders should contain details of the bid process, qualifications of bidders, data required, and procedures for requesting clarifications.

General provisions include information on factors that the agency desires to use in the evaluation of the contract and the determination of "responsive" bids. In addition to the basic federal requirements detailed earlier, this section should also include general state requirements and specific items that are of concern to the agency, which typically include payment, delivery, inspection, and warranty. These are often items of contention, and the agency should clearly specify in the bid documents what will be required. The evaluation of those items is discussed later.

Other useful provisions for inclusion are the following (3):

1. The recipient will be held blameless for any liability that results from the manufacture of the vehicle.
2. The best engineering design and material must be used to ensure maximum vehicle strength and reliability for the maximum possible operational life.
3. The availability of parts should be guaranteed for a predetermined number of years.
4. Optional items (radio, air conditioning, etc.) to be included in the bid price for the determination of the lowest bid should be made explicit.
5. All vehicles to be delivered to specific recipients should be identical.

There are three types of bonds that may be required of a bidder. A bid bond (around $5000) guarantees that a bidder will sign a contract if he or she wins the award. A performance bond guarantees that the bidder will complete the project. A payment bond, somewhat less common, guarantees that a bidder will supply all labor and materials to be used in the project.

The final portion of the bid contract should contain forms for the bidder's proposal. Figure 1 (3) shows a checklist format for the bidder's proposal. The bidder should not, however, simply check each item but describe them specifically. It is also a good idea to include a form for the calculation of life-cycle costs (explained further later in this paper).

A key element in the bid process is the prebid conference. If an agency permits about 45 days from mailing of the bid documents to the bid opening, the prebid conference should take place about 24 days prior to opening. It should be clearly stated that the intent of the conference is informational and for clarification purposes only and that no specification changes will be agreed to at the conference.

The agency should grant bidders one week following the conference to submit formal requests for changes, clarifications, and "approval equals" in the specifications. Several days later (and two weeks prior to bid opening), the agency should send one addendum to the specifications to all bidders. Avoiding several addenda helps to simplify the process.

Upon receipt of the addendum, bidders have one week to appeal. It is a good idea to have an agency that is one step superior to the recipient agency review appeals (i.e., regional recipient to state, state to UMTA). In the case of DOT, this is not required unless a violation of federal law or agency procedures is alleged. The bid process should be closed seven days before the bid opening. This time sequence is summarized below:

Days to Bid Opening	Action
45	Mail bid documents to interested parties
24	Preaward conference
17	Deadline for change requests
14	Mail addendum
7	Deadline for appeal, process closes

Figure 1. Sample checklist for bidder's proposal.

NOTE: This sheet lists in the same order items described in the Specifications. Please check if what is offered is in exact compliance with the Specifications. Where possible, give exact dimensions and/or description.

General Dimensions____
Suspension____
Steering____
Brakes____
Wheels____
Tires____
Fuel Capacity____
Engine____
Air Pollution____
Transmission____
Drive Shaft____
Electrical System____
Body____
Passenger Door and Stepwell____
Floor____
Emergency Exits____
Gauges____
Destination Sign(s)____
Bumpers____
Mirrors____
Exterior Lighting____
Interior____
Grab Rails/Stanchions____
Interior Lighting____
Heating____
Ventilators____
Windshield____
Windows____
Hardware and Equipment____
Seats____
(include drawings of interior layout)
Lift____
Wheelchair Restraint System____
(include detailed description)
Options:
(1) Air Conditioning____
(2) AM/FM Radio____

INCLUDE ONE COPY OF EACH WITH BID:

1. $5000 Bid Bond (made out to the EOTC).
2. Written guarantee of availability of replacement parts (C-2).
3. Designation of local representative (C-3).
4. Certification that equipment will meet state and federal requirements.
5. Supply a detailed Maintenance and Inspection Schedule (see C-5).
6. State in writing that the vehicles to be supplied will meet the specifications in all respects (see D-7).

An important element to consider in the bid process is timing. For most minibus and van manufacturers, the period from March to September is an "in-between" time in which prior-year models may be becoming scarce and the new models are not on-line yet. This is likely to mean higher prices and longer delivery times. The administering agency should investigate the cycle of the relevant manufacturers. In general, bids should be requested in the fall for a winter delivery or in the winter for an early spring delivery. Vans generally take 3-4 months for delivery, minibuses 4-6 months, and small transit buses 12 months.

One proposal for reducing vehicle cost and delivery time is consortium purchasing. The California Department of Transportation has attempted to organize a consortium among several states. A problem with this approach is that different state bid laws must be reconciled and most states are required by law to make their own final decision on a purchase. Since many states require that a third party such as a state purchasing agent manage the entire process for a transportation agency, chances for cross-state cooperation and flexibility are reduced. Such a party will typically be most concerned with adhering to the letter of an individual state's laws and procedures.

It may be more feasible to pursue intrastate consortiums among PNPs or transit authorities.

Awarding Bids

As mentioned, there are a number of factors that an agency should include in its bid documents regarding desired performance in specific areas. One such area is delivery time. A stated maximum delivery time should be included, and the bidder should be required to indicate a proposed delivery date. The cost of delivery to the ultimate recipient should be made part of the bid price, to be used in determining the low bid.

The warranty represents another problem, particularly for modified vans and body-on-chassis vehicles, which may have several manufacturers. It is recommended that one supplier be responsible for all warranty work. It may not be practical, however, to have one of the actual manufacturers perform warranty work because of the distance involved. A solution to this problem is to require that the manufacturer sign an agreement with a local dealer that assigns all warranty work to that dealer.

Vehicle inspection can be another difficult area. In some cases, a vehicle may have to pass a third-party inspection by a public utility authority or the like. Acceptance of the vehicle should be subject to passing that inspection. In any case, the recipient will want to ensure that the vehicle meets specifications and has no apparent defects. The bid document should provide for a period of time in which the recipient can examine the vehicle pending full payment. Fifteen days or so is a typical time frame. The recipient should make a bulk payment (80 percent) on receipt of the vehicle and a cursory inspection but withhold the balance pending the full inspection. Manufacturers do not generally like this process, but it is essential for the protection of the recipient. The balance withheld should be large enough to ensure that the manufacturer has an incentive to perform needed repairs. (In general, recipients should be "tough" in inspecting the first vehicles of a large shipment. Defects not rejected in those vehicles will likely be repeated in the rest.) These requirements should be clearly stated in the bid document.

Since determination of "responsible" bidder may include consideration of technical capability, the agency should require that it be permitted to make an on-site inspection of the facility prior to the bid award. A key element to investigate is the availability of spare parts for all components as well as the general condition of the facility.

Life-Cycle Costing

Although agencies are required by federal regulation (and most state regulations) to accept the "lowest responsible bid", this bid may be determined on the basis of life-cycle costs rather than initial purchase price. Since May 1980, UMTA has required that life-cycle costs be included in the evaluation that leads to the determination of a low bid.

The method for evaluating life-cycle costs is flexible and left to the discretion of the recipient. OMB defines life-cycle cost as "the sum total of the direct, indirect, recurring, non-recurring, and other related costs incurred, or estimated to be incurred, in the design, development, production, operation, maintenance, and support of a major system over its anticipated useful life" (4).

The basic factors that should be considered in evaluation of life-cycle costs are (a) purchase price, (b) operating costs, (c) productivity (availability of vehicle for service), (d) useful life, and (e) salvage value. In using life-cycle costs, it is particularly important to use general performance standards rather than detailed specifications, since the purpose of life-cycle costs is precisely to evaluate different methods of achieving the same service levels. It is also particularly important to use life-cycle costs in the procurement of small transit vehicles, an area in which there are many manufacturers and rapidly evolving technology (4).

Nevertheless, life-cycle cost has disadvantages that should not be underestimated when the process is initiated. The evaluation procedure will be more costly and time-consuming than a straight low-bid method. Insufficient data may exist for new products, and smaller manufacturers may be excluded due to an inability to produce the required data. Finally, the end result may produce very small differences between products so that the decision will not be clear-cut and may prove controversial (4).

One way to reduce the problem of insufficient data is for the authority to acquire and test vehicles prior to the issuance of performance specifications. This will enable the authority to publish specifications based on actual vehicle performance in the service area. It will also create a data base for the vehicles actually tested. Most important, specifications will be developed based on the actual conditions under which the vehicles will operate. The performance of small transit vehicles can vary greatly depending on level of service, geography, and climate. Manufacturers who participate in pretests also gain valuable knowledge of design weaknesses that they can correct prior to the actual bidding process (4).

Only the vehicles that meet an initial performance specification should be acquired for testing. The "rules" of the test should be carefully spelled out in a request for proposals for test vehicles. For statistical reliability, three test vehicles should be acquired and operated for one year. The success of the test depends on close cooperation between the transit authority and the manufacturer and the publication of all data and results so that future bidders can profit from the experience (4).

After the completion of the vehicle tests, amended performance specifications can be developed and published. These specifications should state

that life-cycle costs will be the basis for the award, the data sources that will be used (tests, manufacturer's data, experience in other systems, etc.), and how the results will be evaluated. It should be stated that, within a certain percentage range (usually 2 percent) of costs, the results will be considered inconclusive and other factors (purchase price, reliability, and capacity) will be determining (4).

The life-cycle-cost analysis itself should determine the following: (a) projected annual operating costs over the expected life of the vehicle, (b) estimated salvage or residual value, and (c) productivity or availability ratio.

Annual operating cost consists of maintenance costs (labor and parts) and commodity costs (fuel, oil, and tires). Maintenance costs are typically high during the break-in period, then lower significantly, and level off before beginning a gradual rise. Comparisons should be made on the basis of trend lines that display these tendencies (4).

The salvage value equals the fair market value of the vehicle at the end of its useful life to the operator. When one compares many vehicles, it can be expected that some will have a useful life longer than the time period used as the basis for analysis. In such cases, the residual value to the operator of this extra time period should be calculated.

Vehicle productivity can be measured by the availability of a specific vehicle for service--in other words, how often it is "down" for scheduled maintenance or unscheduled repair and thus unavailable for service. Productivity can also be measured by the number of vehicles (fleet size) necessary to maintain a certain level of service. For example, how many spares are necessary to enable the operator to meet peak-period demand 90 percent of the time?

Finally, future costs must be adjusted for inflation and discounted to net present value. To determine the discount rate, the interest rate on U.S. Treasury notes of a duration equal to the useful life of the vehicle should be used. The annual inflation rates for the various parts and commodities can be determined from the Monthly Labor Review, codes 05-7 and 14-1, published by the U.S. Bureau of Labor Statistics (4).

"Buy American"

Preference must be given to domestic manufacturers if the vehicle is obtained through a federal grant and the amount of the order exceeds $500 000. Bidders should be notified of this provision in the bid document. According to the Code of Federal Regulations (49 CFR 660.11-32), a waiver of this requirement may be obtained under the following circumstances:

1. If the requirement is "inconsistent" with the public interest,
2. If the requirement will impose an "unreasonable cost",
3. If supplies to be used in the manufacture are unavailable in the United States, and
4. If the inclusion of domestic material will increase the cost by more than 10 percent.

If only a single bid is received, the administering agency must conduct a price analysis, comparing the bid received with bids received elsewhere on orders of similar quantity and specification. This analysis must be conducted by qualified auditors or a price analyst. The federal government can assist an agency in carrying out this task through the Defense Contract Audit Agency.

There are no federal requirements regarding preference for local purchases. In fact, an agency cannot make a local purchase in contravention of federal law and regulations. Obviously, a local purchase often has a strong political attraction and can even be required by state law. This can result in a state-federal conflict. An executive order of the Governor of Massachusetts requires that contracts be awarded to a Massachusetts bidder if the bidder's price is within 5 percent of a low bid submitted by a non-Massachusetts company. This provision conflicts with federal low-bid requirements, and UMTA refused to approve an attempt to award a contract on this basis. The state purchasing agent eventually relented.

If delivery cost is included in the purchase price for the purpose of determining low bid, it may be possible to provide a nonexplicit advantage to in-state contractors.

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Part 5
International Activities

Abridgment

Integration of Public and School Transportation: Hohenlohe, Germany, Case Study

PETER A. FAUSCH

The rural public transportation demonstration ongoing in Hohenlohekreis in the Federal Republic of Germany is described. Hohenlohekreis is roughly the equivalent of a small county in the United States. It contains an area of 775 km² (300 miles²) and is essentially rural. The demonstration in Hohenlohe appears to be a unique effort in that it integrates public school traffic into public transportation to achieve the goals of reducing the overall cost and making transit more useful and attractive to users. What has been accomplished is the coordination of all rural public transit (regular-route transit, school bus, intercity bus and rail, and elderly and handicapped services) into one geographic area under one coordinated organizational strategy. The demonstration will not end until August 1982, but it shows that integration of rural public transportation and school transportation works in the physical sense; that cooperation of school officials is essential; that planning for this type of service takes a lot of time, is very difficult, and involves considerable planning at the tactical level; that coordination of rural public transportation services can only be realized if there is an institution to provide for the coordination; and that there is significant room for more innovation at the planning level in paratransit services, both in Europe and in the United States.

In September 1980, transportation officials from the state of Minnesota traveled to Stuttgart in the Federal Republic of Germany to complete the second phase of a project between the German government and the state of Minnesota by exchanging information on rural public transportation. The project was sponsored by the German Marshall Fund of the United States, a private U.S. grant-making foundation, which was established by a gift from the Federal Republic of Germany as a memorial to the Marshall Plan.

In the first phase of the project during July 1979, a German team visited Minnesota to examine innovative transit services in small communities and rural areas of the state. The German officials gathered information on the Minnesota Department of Transportation Paratransit Program--at that time the first statewide paratransit program in the United States--to encourage all forms of paratransit and the largest statewide commitment to paratransit nationally.

The purpose of this paper is to describe the rural public transportation demonstration ongoing in Hohenlohekreis, about 64 km (40 miles) northeast of Stuttgart in the state of Baden-Wuerttemberg. The German demonstration in Hohenlohe appears to be a unique effort in that it integrates public school traffic into public transportation to achieve the goals of reducing the overall cost of transportation and making transportation more useful and attractive to all potential users. What has been accomplished is the coordination of all rural public transit (regular route, school bus, intercity bus and rail, and elderly and handicapped services) into one geographic area under one coordinated organizational strategy. The demonstration is being conducted by the Kommunalentwicklung Baden-Wuerttemberg, a community development organization in Stuttgart. This paper provides a general overview of the Hohenlohe demonstration.

HOHENLOHE RURAL PUBLIC TRANSPORTATION DEMONSTRATION PROJECT

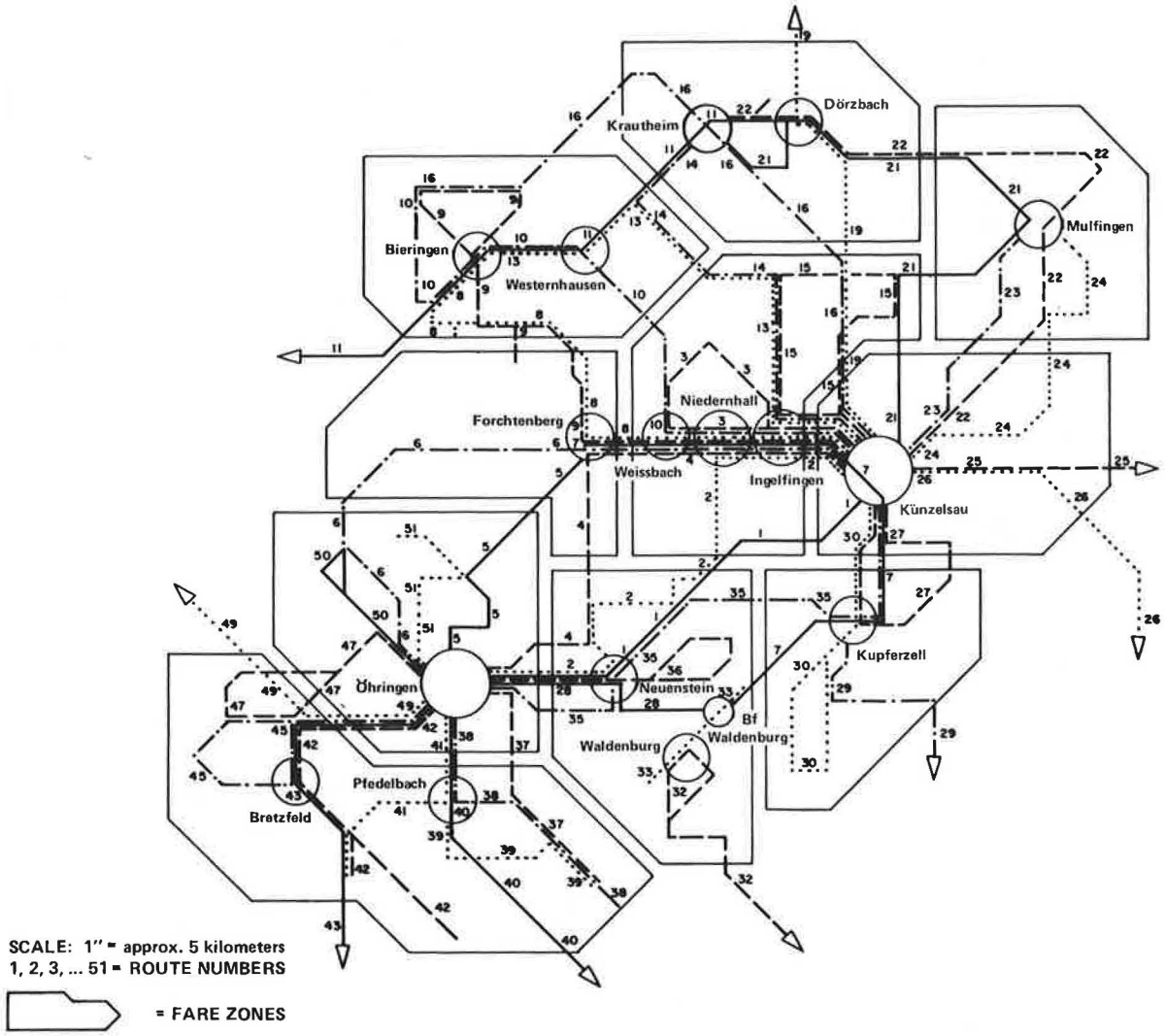
Hohenlohekreis is roughly the equivalent of a small county in the United States. It contains an area of 775 km² (300 miles²). Hohenlohekreis is essentially rural: Approximately one out of four of the 83 000 people work in agriculture. The two biggest communities are Oehringen (population 15 850) and Kuenzelsau (population 11 800). It is about an hour's drive from Stuttgart on the Autobahn.

Before the Hohenlohe rural transportation demonstration began, the area was serviced by traditional, uncoordinated services, including public bus transportation provided by private operators between major towns on major highways and only in peak hours, regular school bus service, intercity bus service, and some special services. Before the demonstration, the mobility and transit coordination problems were not unlike those in most rural areas. As Horst Krautter, the director of Kommunalentwicklung Baden-Wuerttemberg, pointed out, "People used to quarrel about which routes were profitable and which were not and about who was to get what municipal subsidies, licenses, parallel lines and restricted areas...." Many regular-route, public transit services were suffering from low productivity and were subject to being dropped.

With this background, research was begun by the Federal Ministry of Transportation to determine whether it would be practical to integrate all public transit services in the study area to realize the economic advantages of combining parallel vehicle routes, services, etc., by federal, state, and private providers. This research, conducted by the Kommunalentwicklung Baden-Wuerttemberg, produced a report in September 1976, entitled Alternative Models of Reorganizing Public Transit Systems in Rural Areas with Low Traffic Volumes. The study described the nature of service needs in predominately rural areas, the role of large communities as hubs or "pulse centers", the beneficial effects of higher vehicle productivity rates on operating costs, the extensive and ubiquitous nature of public school bus systems (especially here where children go home for lunch), and the problems of coordination and cooperation between transit operators, administrative officials, and neighboring governments. The study also pointed out the problems of developing a service concept that did not take away from anyone yet improved service. The study concluded by proposing a regional public transportation model (Nahverkehrsmodell) that included (a) restructuring regional public transportation networks to identify line-haul needs between major service centers (called "middle-level centers"), as well as collection and distribution service needs of the "catchment areas of middle-level centers"; (b) integrating school bus service with public transportation (probably the key to the whole concept); (c) coordinating all providers while at the same time ensuring that all private providers maintain a share of the market equal to current "licenses", and (d) reducing overall costs to both riders and government through improved coordination and consolidation.

After the completion of the study, a decision was made to demonstrate the concept in Hohenlohekreis. Although the details of the selection process are not available, it is clear that the federal government (through the Ministry of Transportation and Ministry of Education), the state of Baden-Wuerttemberg, the district parliament of Hohenlohekreis, and private providers were all involved in the decision. The financial role of the federal government,

Figure 1. Transit routes and service plan for Hohenlohe rural transit demonstration.



which guaranteed funds to cover the cost of organizing the demonstration and ensuring that transportation operators would not experience financial losses, played a key role in the decision to go ahead with the three-year demonstration project.

Figure 1 illustrates the service concept that was implemented in September 1979. The concept within the demonstration area is built around connecting middle-level centers both inside and outside the demonstration area (which receive 66 percent of the commuter traffic and 50 percent of the school traffic) as well as providing service within various zones or "catchment areas" of the centers (circled areas in Figure 1). The middle-level centers operate as pulse centers. The stated goals of the concept are to connect 95 percent of the population of the area and provide service to all communities that have more than 50 residents (provided no person is farther than 1 km or a 15-min walk from a bus stop). The basic route and schedule plan for the overall service was built around a 3-4-3 system (that is, three trips on all routes in both directions in the morning, four trips at noon, and three trips in the evening at regular intervals). Weekend and holiday service, as well as service in the fringe rural areas, varies somewhat from this. The 3-4-3 system subdivides a service day into three blocks separated by two service interruptions, one in the morning and one in the early afternoon, when traffic volume is low. The service interruptions give drivers a break, as specified in collective-bargaining agreements.

A uniform zone fare system and schedule ("the little red book") are two other features of the project. All middle-level centers are linked to the national railroad system. A large amount of time was spent actually planning routes, stops, and waiting times. The implementation of the demonstration was delayed a whole year because of the extra time requirements of coordinating schedules and contracts. One important point is that school starting times were changed (by as much as 30 min) to optimize scheduling for the bus.

The implementation of the concept has required unusual cooperation between school administrators, private operators, local transit administrators, and municipal and regional governments. All of these people who were interviewed in the fall of 1980 were highly complimentary.

A key to the demonstration is the funding. Overall, it is estimated that the total cost of the project services will be 10 million DeutschMarks (DM), or about U.S. $6 million. The project planning called for 80 percent of the cost of the proj-

ect to be covered by fares and federal funds and the remaining 20 percent to be shared by federal, state, and local subsidies. Apparently, 60-70 percent of the project costs will come from school traffic, which comes from both fares paid by students (unlike in the United States) and school district subsidies [estimated at 3.5 million DM (U.S. $2 million)].

Unfortunately, there are no specific financial and ridership data on the first year of operation. The first progress report envisioned that total system mileage (bus kilometers) would increase about 20 percent but the number of drivers and vehicles would not change. It is estimated that the system will carry about 10 million riders (66 percent school trips, 14 percent work trips, and 20 percent miscellaneous). It was assumed that the demonstration area had a 25 percent modal split (transit versus private car) for commuter trips, in spite of the fact that automobile ownership in the region is quite high.

Except for students, the fare system is as follows (1 DM = U.S. $0.6):

Type of Ride	Fare (DM)	
	Adult	Minor
Within a town	1.35	0.90
Between towns	1.80	1.35
Between several towns	2.25	1.80

Apparently, handicapped persons ride free.

One of the unique aspects of the demonstration is the treatment of private operators. A total of 18 private and public operators held licenses (much like the operating authorities under the Interstate Commerce Commission in the United States for common carriers) that had to be dealt with during the demonstration. Each operator was guaranteed a share of the market equal to that before the demonstration. Each operator was guaranteed his or her original license back after the demonstration (assuming it was not continued). It is important to note that the equipment used for school buses is equivalent to the highest-quality intercity coaches in the United States. A ride on the school buses revealed no graffiti or torn seats, in spite of the daily busing of school children.

COMPARISONS AND CONCLUSIONS

The Hohenlohe demonstration is not complete; it will end in August 1982. Complete data are not available to evaluate the specific accomplishments of the demonstration. There are some breakthroughs here that could potentially be considered in the United States. There are also aspects of the demonstration that are not comparable to the United States. The following section compares the two environments and provides some conclusions:

1. The demonstration shows that integration of rural public transportation and school transportation works. There are no data on costs, so we do not know "how well", but our visit indicated no serious problems. This example shows that physically the two systems can be put together.

2. The key conclusion from an examination of the demonstration is that the cooperation of school officials is essential. While the demonstration was concerned about maintaining starting times and school activities, the school schedules and the role of school transportation were a variable in setting up the demonstration. It was pointed out that it would not be possible to successfully carry out the demonstration in a large rural area without coordination of school buses because no regular-route system is economically feasible without the income from the school traffic (which at this point is estimated to be 60-70 percent of the total fare revenue). The state of Minnesota spends more than $120 million/school year transporting school children, plus $9 million for handicapped persons. Combining the current public paratransit demonstrations in Minnesota with school-system transit service could potentially create a much more extensive overall rural public transportation network in Minnesota.

3. Probably the most significant difference between the background transit environment in the United States and in Germany is the density of population. People live much closer together in Germany. The average farm size in Hohenlohekreis is 4 hm^2 (10 acres) whereas the average farm size in Minnesota is 117 hm^2 (290 acres). The population density in Minnesota is 10 persons/km^2 (25 persons/$mile^2$), without the Twin Cities metropolitan area population, whereas in Hohenlohekreis it is 106 persons/km^2 (275 persons/$mile^2$). However, the school bus service must still cover all of these areas.

4. A key conclusion from the demonstration is that planning for this type of service takes a lot of time and is very difficult. Planning for implementation involved a lot of "nitty-gritty", tactical-level planning of routes and schedules; integration of school activities; integration of public, private, and federal operations; and financial planning. In many cases, this is why separate school transportation systems and separate public transportation systems are more common. Putting these planning activities together is very difficult and time-consuming. But there is a big payoff--significant savings in operational costs--as well as an overall improvement in coverage of the network.

5. The coordination of rural public transportation services can only be realized if there is an institution to provide for the coordination. It appears that the German government exercises far greater control and regulation over transit and urban planning than does the federal government in the United States. It is apparent that some mechanism to encourage this larger role in pulling together the diverse interests of school transportation and public transportation would be needed if this demonstration were to be implemented in the United States. In Minnesota, for example, existing state law prohibits nonstudents from riding the bus with schoolchildren. The United States has institutionalized the separate school transportation system in rural areas. The identification of a coordinative agency, or "broker", is a significant barrier to overcome. It is interesting to note that, where good urban public transit exists, school transportation and public transit have already been successfully combined.

6. The Europeans are ahead of the United States in bus upkeep and maintenance. They have put the highest priority on system quality, maintenance, and appearance. There is also a major difference between the two countries on the treatment of the safety issue. The United States has placed special emphasis on safety through the use of color, lights, signing, and stopping regulations, which are not used in Germany. These U.S. conventions accomplish the safety objectives but create barriers to integration with public systems.

7. The demonstration points out that there is significant room for more innovation at the planning level in paratransit services, both in Europe and in the United States. It suggests the need for more trained transit planners in rural areas. This will require a strong commitment in the United States and Europe to greater investment in the training and

education of transit planners. In these economic hard times, however, the concern is to reduce costs. The planning resources needed to consider these kinds of system changes often do not exist. Why do we need to do planning when we have to cut back? is the concern of the budget maker. So much of the implementation of these systems will involve the foresight of investing in this type of planning, which is much like convincing the farmer not to eat the seed corn in times of famine.

8. Hohenlohekreis is apparently demonstrating one example of the "try it, you'll like it" approach to transportation. The Germans have established a small project that emphasizes software rather than hardware or large capital-intensive answers to problems. This demonstration, the battery-powered standard bus, the Duo-bus, and the O-bahn concept all indicate the Germans' feeling that you should begin small and change or adopt other systems or ideas should the demonstration prove impractical.

The Hohenlohekreis demonstration is a significant contribution to the rural public transit experience. The lessons to be learned in this demonstration should be a good lesson in times of increasing governmental costs, skyrocketing fuel prices, and the resultant demands for reducing costs through innovation, coordination, integration, and combination of public services.

ACKNOWLEDGMENT

I wish to thank Richard P. Braun (1) and Robert Howdek (2) for assistance in preparing this paper. Appreciation is also expressed to Horst Krautter and August Gustke, the project sponsors in Stuttgart, as well as the German Marshall Fund for making the trip possible.

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Abridgment

Swiss Postal Passenger Service

DAVID L. GENTON AND G. RATHEY

Solutions for public transportation in less populated regions are considered with respect to (a) region size and topography, (b) the national political structure of the country, and (c) population density and standard of living. The Swiss transportation system is characterized by a very wide range of transportation opportunities, operational factors, and financial aspects. The postal passenger service is the result of a long-term evolution that attempts to offer a satisfactory response to mail and passenger transportation needs in rural resorts. This response emphasizes efficiency for both the users and the collectivities. The organization of the service, the network structure, service quality, tariffs, and the financial situation of the companies involved are analyzed. Long-term experience has resulted in the following measures: (a) adaptation to a diffused demand with the highest possible flexibility and spirit of creativity, (b) integration of the transportation operations of all private and public companies in order to take advantage of their common resources, and (c) sharing the responsibility between regional and local authorities in order to ensure a budgetary balance between the operating companies.

This paper discusses some general aspects of land use and transportation systems, public transportation policies in rural and mountain areas, some characteristics of the Swiss postal passenger service (PTT), and some lessons to be learned from past experiences. The scope of the paper is limited to Switzerland.

LAND USE AND TRANSPORTATION SYSTEMS

The topography of Switzerland is characterized by two mountain ranges, the Jura and the Alps, bordering a plateau. The Jura Mountains are approximately 3300 ft in altitude; numerous Alpine summits are above 13 000 ft. The average altitude of the plateau varies between 1300 and 1600 ft. The Alpine area is cut by numerous longitudinal and transversal valleys.

The following comparative data on population density and employment for Switzerland and the state of California provide a context for the issues discussed in this paper:

Item	Switzerland	California
Inhabitants (000 000s)	19.2	6.3
Area (miles^2)	158 700	15 900
Population density (inhabitants/mile^2)	120	400
Employment (% of inhabitants)	42.4	46.8

A fundamental objective of land use policy in Switzerland is to reinforce the decentralized structure in order to ameliorate living conditions, especially in regions that suffer regional disparities (especially the mountain regions). Such disparities are the cause of migrations from economically weak regions into developed areas.

When the net population remains constant, the attraction of population centers causes a migration from other areas. Among the measures implemented to combat such a trend are the efforts of federal and local authorities to increase accessibility to small or medium-sized urban centers in areas of low population density.

Switzerland, which is located in the heart of Europe, benefits from very heavy tourist traffic, either in transit or terminating in plain or mountain resorts.

Management of the transportation system is strongly influenced by the federal structure of the Swiss Confederation. The 23 cantons and their numerous towns and cities have great political and financial power. Moreover, financial resources per capita are of the same order of magnitude at the

federal, canton, and local levels. This explains, in part, the structure of the transportation system and the fairly large independence of its various components.

The 1848 Federal Constitution recognizes the authority of the cantons in building and maintaining the road network. The rapid development of motorized transportation after World War II was responsible for the introduction of new articles in the Constitution that allowed the development of a large network of national roads. Even though two-thirds of the country is mountains, the total length of the road network is large. As the table below indicates, network density is remarkable, even in regions of low population:

Government Level	Length (miles)	Density (miles/mile)²
National	680	0.04
Canton	12 000	0.75
Local	27 000	1.70
Total	39 600	2.50

In comparison, road-network density in the United States is approximately 1.1 mile/mile².

PUBLIC GROUND TRANSPORTATION

The various networks of public transportation are either administered by the federal government (Swiss Federal Railways and automobile services of the PTT) or by contracting companies that hold concessions under public or private shareholding arrangements (see Table 1).

Legal Basis

Regular passenger transportation by contractors is based on Article 36 of the Federal Constitution as well as on various laws and federal regulations. These basic laws stipulate that professional passenger transportation, either regular or occasional (special), falls exclusively under the authority of the Confederation. Nevertheless, the Confederation does not exercise this right itself; according to the law that regulates the postal services (Postal Regale), this right is assigned to the PTT. However, the Confederation can grant concessions to third parties. These concessions can be granted either for the regular operation of lines (type 1) or for special services such as transportation "on request", e.g., of workers or schoolchildren (type 2).

The main obligations of a type 1 contractor are (a) to operate and to transport, (b) to establish a timetable and submit it for approval, (c) to produce tables of fares that are accepted by the Confederation, and (d) to follow social regulations.

Table 1. Swiss public ground transportation system in 1978.

Type of Network	Length (miles)	No. of Companies	Annual Ridership (000 000s)
General traffic railways	3100	60	300
Mountain railways	510	280	110
City and suburban transportation	1300	21	700
PTT	4800	1	60
Company buses and coaches	2050	170	50

Contracting Companies Operating Bus Lines

Except for those companies operating bus lines that cross the border between Switzerland and neighboring countries, it is possible to group the contracting companies involved in road transportation according to the regulations that pertain to the attribution of concessions (see Figure 1). For instance, the regular operation of bus lines of type 1 concessions, which has been granted by the Federal Department of Transportation, Communications, and Energy, is organized as follows:

1. Postal lines are operated by the PTT or by private contractors under its supervision.
2. Town, suburban, or regional bus lines are operated by holders of concessions. These concessionaries can be either private companies or public institutions.
3. Bus lines that replace railway lines or bus lines operated by railway companies are either self-operated or operated by private road companies or the PTT.

This great variety of regulations for regular passenger and professional road transportation has been substantially influenced by the past evolution of legislation as well as by the evolution of the transportation system. During the second half of the 19th century and the beginning of this century, the railways grew rapidly. This growth resulted in a crisis for postal traffic carried by stagecoaches, especially on lines that previously carried heavy traffic. The development of the road network and of motor vehicles, in turn, hurt the railway lines. Regions that had low equipment density suffered most. These were regulated by PTT contractors or by holders of concessions according to the particular conditions of the region.

TODAY'S POSTAL PASSENGER SERVICE

General Organization

The two groups of activities of the Federal Post,

Figure 1. Public road transportation concessions and operators.

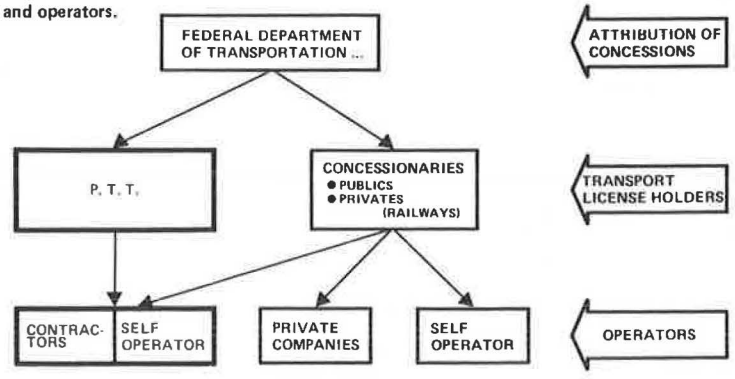


Figure 2. Spatial organization of PTT.

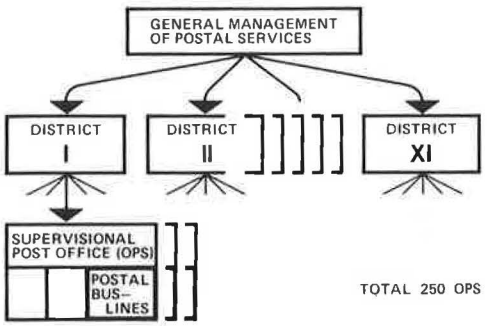
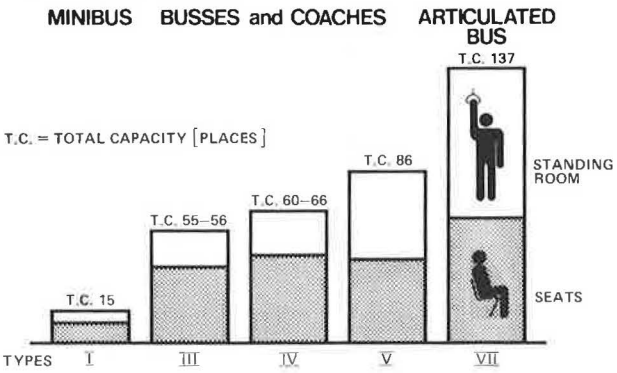


Figure 3. Capacity of PTT buses and coaches.



for which the Post is granted a monopoly by federal legislation, are

1. The postal services, including (a) delivery of letters and parcels, (b) movement of money, and (c) transportation by car; and
2. The telecommunication services, including (a) operation of telephone and telegraph services, (b) processing of teleinformation, and (c) operation of radio and television.

One objective of the operation of these public services is the efficient use of personnel, buildings, equipment, vehicles, workshops, and other resources. The passenger postal services are thus integrated in the overall organization of the postal service. Such an integration evidently does not facilitate the calculation of costs and the pricing of a passenger trip.

Geographic Organization of PTT

The regional administration of the PTT is entrusted to 28 post offices in important population centers. These supervisional post offices (OPS) administer regular self-operated lines (Regie), regular lines operated by contractors, connections by messengers, and special trips.

The regular self-operated lines (Regie) are those operated by the PTT with its own vehicles and staff. The regular lines operated by contractors are those operated by the PTT but with vehicles and personnel from contractors. These contractor personnel are remunerated according to their operating expenses (kilometers-vehicles). The connections by messengers (in very small numbers) refer to passenger transportation performed by a postman in thinly populated areas. The postman uses his own vehicle and the service is performed either on demand or regularly. The postman is then indemnified for the trips supplied on routes with very little traffic. Special trips concern the transportation of personnel of firms, schoolchildren, tourists, and the like. These trips can be made with vehicles assigned to regular lines, at times outside of the regular schedule. Bus transportation of schoolchildren is often organized separately. It is usually handled by school groups, with or without the cooperation of the PTT. Sometimes computer models aid in the organization.

The spatial organization of the PTT is shown in Figure 2.

Networks, Lines, and Terminals

At the end of 1980, the network of PTT postal lines comprised 613 lines with a total length of 4800 miles and 6500 stations. One-third of this network was operated by the PTT itself.

Vehicles

The range of the PTT vehicles includes (a) buses or coaches used both for long-distance runs and on mountain lines and (b) buses of different capacities and some articulated buses adapted to requirements in the plain for suburban traffic.

The constant effort of standardization of the PTT stimulated by the directives of the IUPT International Union of Public Transport resulted in seven types of vehicles. Their total capacity (standing and seating) varies between 15 and 137 places (see Figure 3). These vehicles are adapted to transporting mail and luggage. When the volume of the cargo is too great, either trailer or light trucks are used.

The 560 vehicles used by the PTT for passenger transportation are housed in the PTT garages with the other 9800 vehicles used by the postal services. This leads to efficient use of staff in dealing with operation and maintenance.

Schedules and Quality of Service

In the beginning, the schedules of passenger postal services were established primarily according to the mail requirements and passengers had to adapt to the contingencies of postal deliveries. But this means of passenger transportation has been constantly improved. The schedules now offer more possibilities for connections in order to meet passenger needs.

In the most remote regions, the number of daily runs has been increased to 6. In the more populated regions, this number can reach 16 runs/day. Extra runs are made during peak hours. The schedules are adapted to those of the railways, to daily and seasonal variations, and to passenger requirements. Moreover, they are planned to suit the needs of employees, workers, and schoolchildren. A great effort is made to respect the schedules, to provide punctual service, and to improve average speed and comfort, in spite of the great variations of demand and the disturbances caused by operating on nondedicated roads.

Fares

In 1849, the Swiss Parliament focused on a uniform fare policy for the whole country. This uniformity still exists.

The postal service applies a sliding-scale tariff; i.e., the price per passenger mile decreases with distance. There is a tariff for lines on the plain (ordinary fares), a tariff for mountain lines (increased fares), and a tariff for natives in moun-

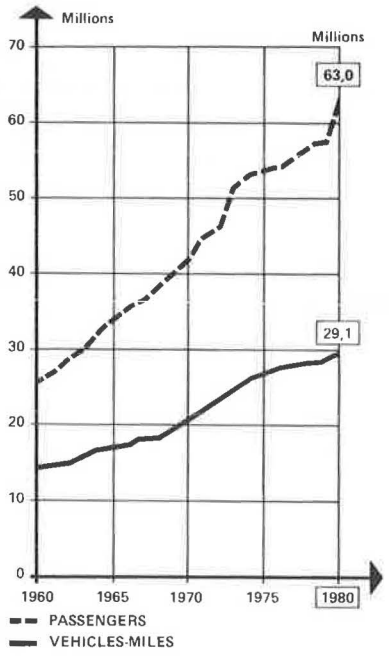


Figure 4. Evolution of operating allowance and traffic.

tain regions. But, because of the social character of this type of transportation, the PTT fares have not been determined only on an economic basis. The holders of concessions can, however, freely determine their fares according to their operating costs.

The Confederation tries to decrease regional disparities by, among other means, decreasing the disparity in the fares between passenger services and the Swiss Federal Railways. It covers losses at its own expense and thus favors the mountain regions.

Finally, a very important factor is the issuance of special transportation tickets, the offering of excursion packages, and other activities designed to promote tourism.

Evolution of Demand

Improved road networks, more suitable schedules, more frequent runs, increased comfort, and more attractive fares resulted in a spectacular increase in the demand for services. A comparison between the progression of vehicles miles offered and that of passengers carried (see Figure 4) shows that, in spite of the considerable increase in the use of private automobiles, the PPT has benefited from the increased mobility of the nation. In the course of the past 20 years, the number of passengers on the postal service has more than doubled, reaching 63 million in 1980.

Financial Situation of Contracting Companies

The financial situation of the Swiss operators for public transportation has rapidly deteriorated in the course of the past few years. The essential reason for this deterioration is the rapid increase in the gap between costs and receipts. Especially important are increases in the costs of personnel, energy, and money.

Receipts cover, on the average, only 60 percent of the costs for the PTT. This percentage varies largely from one region to another and depends, in particular, on population density and employment. This deficit is not similar to the deficit of an industrial enterprise. It can be covered only to a very small extent by increased fares, by improvement in the management of the enterprise, and by the cancellation of allowances. The existing situation plays a very important social role.

The deficit of the PTT is completely covered by the profitability of PTT telecommunications. The deficits of the holders of concessions, however, are subsidized by the Confederation, the cantons, and the local communities.

The Confederation indemnifies the contractors for general economic allowances, mainly concerning fare-related concessions, the fares having been imposed on the contractors by the Confederation. The subsidy allocation for cantons and local communities takes into account specific economic situations.

CONCLUSIONS

One might learn a few lessons from the many years of experience of a small country that, without natural resources other than the beauty of its landscape, has an extremely high gross national product ($11 500 per capita in comparison with $8300 per capita in the United States). The legal basis dating from the middle of the 19th century and arrangements adopted by the authorities ensure good public transportation in rural as well as in mountain areas. It is deemed essential, even at the price of often large public contributions, to reduce regional disparities and to restrain rural migration. Therefore, it appears useful to promote mobility, to provide accessibility to employment centers, to offer professional training, and to further the exchange of ideas.

A public transportation system in regions of low population density must be conceived so as to realize a spatial and temporal distribution of very flexible means that should be strictly adapted to requirements. It is advisable, therefore, to integrate all passenger transportation operations, both public and private, and to use, with the greatest flexibility, all resources of personnel, buildings, equipment, and vehicles. Measures must be undertaken not only for regular and special passenger transportation but also for the transportation of mail and goods and other needs that may arise.

As the receipts from passenger transportation cover only a part of the costs, public collectivities must, according to legislation, subsidize the deficits. For instance, it is justified that contractors be released of general economic allowances and be repaid for costs resulting from social tariffs. But it is also essential that local communities assume the financial responsibility, within their resources, toward the realization of a budgetary balance of public contractors.

It is necessary to adapt transportation services to the country and to the way of life of its inhabitants. The more diffuse the demand, the more flexible the organization should be. This is an important characteristic of public transportation. The increase in demand for postal passenger transportation is larger than the increase in its supply. Such a fact confirms the efficiency of the management.

However, supporters of market economy often recommend a separation of the federal postal services as well as the restitution to the private sector of some of its services. On the other hand, the supporters of increased interventionism would like to see all the operations of regular passenger transportation assumed by the collectivity. It seems preferable to distribute the various tasks of public transportation between private and public sectors at the regional level, the local level, or even, as is the case for postal passenger transportation services, at the level of the operation of regular lines.

Surface Rural Public Transportation in Canada

BRIAN E. SULLIVAN AND S.L. SUEN

Events and activities in rural public transportation in Canada during the past 10 years are described based on material drawn from government reports, transportation guides, and field observation. All surface modes that provide common-carrier "public" access service are included as well as certain paratransit services that do not completely fit this definition but are nonetheless judged to be relevant. In Canada, most rural public transportation services are medium-distance operations [80-400 km (50-250 miles)] and perform an intercity function as well. Short-distance rural transportation can be found in a variety of forms across the country but is less widespread. Existing service arrangements and government programs are outlined, and a number of case summaries that illustrate new activity in recent years are discussed.

This paper provides a description of rural public transportation services in Canada along with highlights of recent research and project developments. Examples are taken from every aspect of surface rural public transportation, including paratransit and the activities of intercity carriers. In contrast to U.S. practice, city transit in Canadian towns that have less than 50 000 people is not considered to be part of the rural system but is seen as a smaller counterpart to transit in larger centers. Therefore, such operations are not discussed in this paper.

NEED FOR RURAL PUBLIC TRANSPORTATION

Since there is a good body of literature on the subject of rural public transportation, in both trade and academic journals, only a summary of the highlights is presented here. Rural public transportation services cater to specific markets, such as commuting and shopping trips, as well as to more general-purpose travel, such as personal business trips, visiting friends and relatives, touring, and so forth. In cases such as commuting to work or school, the orientation is toward short-distance journeys (less than 40 km) and a twice-daily frequency. A different market is the "hinterland", where people make one-way journeys of as much as 300 or 400 km to cities for shopping or related purposes and return that day. Finally, in geographic terms, there are long-distance trips of various durations and for various purposes, for which a rural service may serve as a feeder to a limited-stop intercity service or may be the means of travel for the entire trip.

Both choice and captive travel markets provide customers for rural public transportation. Persons who come from automobile-owning households (the choice market) may elect to make a particular trip by rural public transportation for a variety of reasons (1): (a) unavailability of a car for a particular trip, (b) bad weather, (c) traffic congestion (especially if the destination is a large city), (d) long distances, (e) variety, or (f) access to other public transportation (air, rail, etc.).

Captive patrons (those without a car) will be dependent on rural public transportation for many journeys because their age, health, or income precludes the use of a car. Because of the importance of maintaining mobility for all members of society, this market receives special attention from people involved in public policy and those who design publicly funded services.

Studies of specific mobility problems within Canadian provinces have been done in Alberta (2), Saskatchewan (3), and Ontario (4, p. 55). The Canadian government has undertaken studies of the transportation disadvantaged in 12 rural areas across Canada, and a number of other studies on a nationwide basis have been done (5-7).

RURAL PUBLIC TRANSPORTATION IN CANADA TODAY

Services

Rural public transportation services in Canada are provided by large and small bus and motorcoach operators, national and provincial railways, and, in some instances, water transportation operations. If service to northern or coastal communities is included, then "third-level" (commuter air) services may be added to the list. In this paper, only the land modes are considered because they provide service to the majority of points.

Two major characteristics of Canadian rural public transportation make the country's network of services different from that typically found in Europe. Both are principally the result of a generally low population density:

1. Rural bus and train routes in Canada are commonly 40-400 km in length. In comparison with Europe, there is little in the way of short-distance rural public transportation (less than 40 km).
2. In Canada, most rural bus and rail services also offer intercity carriage, and intercity services often offer rural services. Of necessity, then, the terms intercity and rural may be used interchangeably in the Canadian context.

The motorcoach industry in Canada is characterized by a limited number of large firms that run most of the scheduled services and a very large number of small firms that run one or two routes or provide only charter service. One comprehensive listing (8) placed the total at 1060 firms. Of the 15 largest scheduled bus operations, 7 are publicly owned and the remainder are private enterprises. With a few exceptions, most intraprovincial services are regulated by provincial commissions that also carry out extraprovincial regulation on behalf of the federal government.

All bus companies receive economic benefits from government in the form of the provision of roadways at less than cost. However, because a variety of vehicles share the roads, the determination of how much of the annual road deficit in Canada accrues to buses is largely a subjective process for which a definitive answer cannot be provided. Depending on the cost of capital and other assumptions used in calculations, the annual highway deficit for all road users ranged between $2.6 and $5.0 billion and showed a cost-recovery rate of 35-55 percent (9,10).

The basic road network in the settled parts of the country was largely completed by 1970. In the very active decade of the 1960s, the opening of new highways occasioned major restructuring of intercity and rural bus services. The ongoing development of roads in the northern part of western Canada in the early 1970s and more recently in remote parts of Newfoundland has been accompanied by network changes among principal carriers in these areas.

The passenger-train networks of the two major railways, Canadian National (CN) and Canadian Pacific (CP), with their set of interrelated water and

bus routes, reached their zenith, in terms of service offered, in the late 1950s. Most passenger trains are now the responsibility of VIA Rail Canada, a federal crown corporation created in 1977 that plans and markets services and contracts with railways for operation in a fashion similar to the German Verkehrsverbunds. Seven railways other than CN or CP provide their own services beyond the scope of VIA. These railways generally operate within one province; in total, they account for a small proportion of route mileage and passengers carried.

The public funding of an extensive roadway system permitted the bus to compete more effectively with many rural passenger trains, but the same roads made the automobile more of a threat to both. A two-part process can thus be seen:

1. Withdrawal of lightly used railway services in favor of bus operations that are generally operated by companies not affiliated with the railways and generally with services already in place and
2. Withdrawal of major bus companies from their light-duty services, either in the form of the sale of a route from a large carrier to a small independent or by outright abandonment.

Ferry services act as vital transportation links for coastal communities. The federal government provides direct financial support to a number of ferry and coastal shipping services, mainly in eastern Canada. The major operator of such services on the East Coast is Canadian National Marine, which owns and operates some 14 ferry services under contract to the government. The federal government and the provinces also undertake joint funding of various ferry services that support development programs and relieve the isolation of small, remote communities in British Columbia, Newfoundland, and Quebec.

Subsidies to Rural Public Transportation

Direct subsidies, unlike subsidies that result from government supply of infrastructure at less than cost, come in two forms:

1. Some carriers receive direct subventions from government (British Columbia, Saskatchewan, Ontario, and Newfoundland all contain examples).
2. The principle of internal cross subsidization is widely practiced (a carrier is protected from competition on lucrative routes and/or in the charter bus business in exchange for agreeing to provide socially desirable but unremunerative routes identified through the regulatory process).

The federal government subsidizes passenger-train services within the scope of VIA Rail Canada. Certain services of non-VIA lines also receive aid from senior levels of government.

GOVERNMENT PROGRAMS

General

The most significant government involvement in rural transportation, as with all transportation, is in the area of the provision of infrastructure. This is primarily a provincial responsibility, since that level of government provides the road system, and in some provinces also involves some marine and local-service airport facilities. The federal government also provides marine facilities and the nation's major airports. All of these facilities, viewed nationally and in a commercial sense, lose money and hence provide a subsidy to their users.

The federal government and, to a limited extent, some provincial governments also provide direct subsidies for passenger trains. Some portion of these subsidies can be seen as a counterforce to infrastructure subsidies provided to the other modes, although the degree to which this figures in decision making is unclear.

Specific

Specific programs relevant to rural public transportation abound:

1. Research--Both the federal government and some provincial governments conduct studies on rural transportation needs and possible solutions.
2. Bus--The governments of British Columbia, Saskatchewan, and Ontario own intercity-rural bus companies that offer considerable rural service. The British Columbia services operate at a deficit. Saskatchewan and British Columbia both provide subsidies to certain rural services that are not operated by crown corporations (as in the case of the Saskatchewan Local Transit Authority, discussed later in this paper). Most provinces provide urban transit subsidies, and in some places this benefits rural service. A federal crown corporation, Terra Transport, provides the principal intercity-rural service in Newfoundland at a deficit. Specific grants for equipment in the Atlantic provinces have been made by the federal government.
3. Water--Significant service networks on the East and West Coasts are subsidized by the federal government (primarily the East) and the British Columbia government. Ontario and Quebec have a limited number of such services.
4. Rail--The most significant provider of rail service is the federal government. More than 800 hamlets, villages, towns, and small cities, as well as major cities on corridor and transcontinental routes, receive service under this program.
5. Block-type grants--The province of Alberta provides an unrestricted $2 per capita grant to each small municipality to help them to find solutions to their own rural transportation needs.

RECENT EVENTS AND ACTIVITIES IN CANADIAN RURAL PUBLIC TRANSPORTATION

Modal Substitution

Many passenger-train services that were uneconomic and unsatisfactory in some rural areas of Canada were abandoned in the 1960s and early 1970s. In some cases, no special replacement bus was provided and patrons were expected to use existing bus services. The discontinuance of the train service sometimes occasioned an effort at upgrading bus services by the existing bus operators. In some cases, bus services were not upgraded or otherwise did not capture the traffic, and passengers have turned to private cars or reduced their tripmaking. In mid-western Ontario in the early 1970s, train passengers by and large did not transfer to the bus mode and a significant number of public transportation users were lost. One substitution of bus for train is of particular interest: the CN (now Terra Transport) replacement of its trans-Newfoundland train with a CN bus service. Newfoundland's only trans-island land route from 1889 to 1965 was a narrow-guage railway. In 1965, a 909-km-long trans-island road, paralleling the railway for most of the way, was opened. CN considered upgrading its train service with new self-propelled rail equipment, but a bus service was felt to offer similar schedules at lower cost. So in 1968 CN applied to discontinue its Newfoundland passenger-train service and replace it with bus service.

CN operated both the bus and a reduced-frequency train for several months. Customers switched to the bus, and in 1969 the train was retired. The public response to the bus service was substantial: In comparison with an annual ridership of 100 000 in the last year of the train service, the first year of the bus operation attracted 180 000 customers. Ridership grew to about 365 000 in 1973 and is now on a slight decline. In 1976, the ridership was approximately 320 000.

Increased patronage immediately after substitution can be attributed to the increased frequency of service, the ability to get on and off the bus at more places than the train served, and the provision of daytime (rather than overnight) service. On the other hand, for very long trips (the 909-km cross-island trip takes 15 h), patrons found that the bus did not offer the comforts of sleeping cars and diner service. In addition, it has proved somewhat awkward for the CN bus to handle passengers on both local corridor segment trips and over longer distances and has resulted somewhat in a compromise service.

The slight decline in ridership after 1973 was partly due to the automobile, which dominates transportation in Newfoundland and is used for 9 percent more trips than the national average. The bus also lost passengers to the air mode. Nonetheless, the percentage of trips made by bus is twice the national average.

Until 1976 CN charged the equivalent of train fares but has now reduced these to a point between bus and train fares. In 1976, the CN bus deficit amounted to $1 479 900 and revenues were $1 315 000, which gives a cost-recovery ratio of 0.47. Twenty-two motorcoaches are used to give twice-daily service.

Changing the Transportation Providers

There are a number of ways to improve the delivery of transit. Three approaches that have proved successful in the past decade are discussed here: cooperative bus operations, Saskatchewan's Community Transportation Service (CTS) and Local Transit Authority (LTA) programs, and public marketing agencies.

Cooperative Bus Services

Prince Edward Island, with an area of only 5656 km² and a population of 120 000, is Canada's smallest province. Bus services were provided by a major industrial conglomerate until 1975, when all public service was discontinued. After a one-year hiatus, nine consumer coops and one craft coop formed the Island Transit Coop Ltd. (ITC) to operate over the routes earlier abandoned.

There are two basic routes, one east and one west of the capital, and in the summer a third route is run on the ferry to the mainland. Service is once daily, six days a week, and vehicles are garaged at the outer ends of the routes. Round trips are offered on a same-day-return basis from rural areas to Charlottetown in the morning and outbound in the early evening. Passengers are picked up and dropped off anywhere along the route.

The coop is a simple, low-cost, community-based enterprise. Its directors are volunteers. The manager of ITC is also one of the bus drivers. The store-front Charlottetown terminal houses the business office. During the daytime layover in Charlottetown, business matters are taken care of and maintenance service and fuel are purchased from the adjacent public school board.

In 1976, the service carried 20 190 customers; the deficit was $6631 and revenues were $63 549, which gives a cost-recovery ratio of 0.91. In 1977, Transport Canada and the province funded a study of the service with a view to improving efficiency and cutting the loss. In 1978, Transport Canada supplied ITC with two new motorcoaches to replace the modified school buses ITC was using. Eventually, as route improvements are made, the service is expected to break even on all of its routes. In 1978, one route lost money, one almost broke even, and the summer tourist route was quite profitable.

A coop approach is also used to provide small-city urban service in Whitehorse, Yukon, and is featured in commuter clubs in the Ottawa and Vancouver areas (since replaced by expanded regular transit). This is discussed further later in this paper, in the section on industrial services.

CTS Program

Some places in Canada, such as southern Saskatchewan, have not had bus or train services for many years. The wheat-producing prairie was settled in the familiar "checkerboard" township-and-range system, with maximum dispersion of individual residences and 135 km of road for each township. Difficulties in travel initially caused dispersed settlement, and low-density scatter hindered road improvements. By the 1960s, all-weather roads had connected most settlements but many of the small centers were facing depopulation and obsolescence.

A 1974 study of bus transportation in the province identified several unserviced areas. It was determined that the communities in question should have a one-day-return service to regional centers and should also serve as feeders to provincewide lines. In 1975, 10 routes were started from five centers: Mankota, Lake Alma, Hudson Bay, Ituna, and Humboldt. Frequencies range from one to five round trips per week.

The 1974 study envisioned the operation of these services by independent entrepreneurs under contract. When the services actually began, they were operated by a division of Saskatchewan Transportation Company (STC). Flexibility was essential to the CTS concept, and cooperation was obtained from the STC union to permit the "division center" concept. It meant that buses were housed in rural areas, driver-service personnel were employed to cut costs, and maintenance was purchased from service stations along the routes.

CTS commenced service in 1975 with four 18-passenger minibuses but later replaced two of these with conventional buses that were better able to cope with operating conditions. In 1976, CTS carried 7037 passengers and 11 684 pieces of express parcels and mail and the deficit of $114 000 was covered by the parent company (STC). The CTS service is well-received and has adjusted its services to demonstrated needs. It is regarded as meeting its stated goals and objectives and helps to fulfill the provincial government's policy of supporting small communities. More recently, the separate operation of CTS has ended, with STC handling the tasks.

Public Marketing Agencies

A useful organizational mechanism for integrating urban and rural transit is the public marketing agency for transportation services (11). The public marketing agency approach can be used to provide all services in an area or just some; it can be used alone or in conjunction with the more traditional government ownership and/or regulation of privately owned firms; it may be solely the child of a govern-

ment department or may involve an association of carriers. The basic principle is the same: Decisions as to what shall be provided, where, and at what price are made by an organization separate from that which answers the equally important and difficult how question.

Government of Ontario (GO) Transit is one of the earliest examples of a public marketing agency in Canada. It coordinates train and bus activities in the "Toronto-centered region", a region that includes large rural areas and many small towns. In 1974, GO Transit assumed responsibility for NorOntair (later passed to the Ontario Northland Transportation Commission), another public marketing agency that had been created to integrate intercity services to small cities and large towns in the northern part of the province.

In Saskatchewan, a public marketing agency approach was created to deal with the very lowest of traffic volumes. The LTA program permits towns or villages to specify service needs and, with the aid of provincial grants, arranges with local firms to operate vans on a scheduled basis. The first such service linked Beechy with the town of Outlook, where connections with a Western Trailways motorcoach route to the city of Saskatoon was established. In order for communities to qualify for LTA assistance, patronage must amount to at least 0.5 ride per capita each year.

Rationalizing and Integrating Existing Services

For many reasons, a transportation system may not operate at its theoretically maximum efficiency. It is often possible to provide rural public transportation more economically by combining efforts with certain other transportation operations, by combining loads at one time onto one vehicle, and by sharing operating resources, particularly fixed-cost items.

Relevance of School Bus Services

School buses are a familiar sight in all rural areas. In terms of passenger volume, miles operated, and expenditures, school bus operations are the most extensive form of bus or van paratransit in Canada (see Table 1). School bus operations range from school district or provincially owned fleets to chartered or contracted fleets. They are typically operated on short routes--i.e., routes with a maximum length of 40 km. School buses offer two important ways of meeting general-purpose mobility needs: (a) by finding ways to accommodate the general public on existing school runs and (b) by using school buses and drivers in the off-peak to provide regular transit services.

Table 1. School bus operations in selected Canadian provinces.

Province	Year	Annual Ridership	Annual Expenditure ($)
British Columbia	1975-1976	41 508 000	11 655 977
	1976-1977	42 985 800	14 770 295
	1977-1978	42 041 160	17 407 568
Manitoba	1975	NA	13 822 000
	1976	NA	15 552 000
	1977	NA	NA
Ontario	1975-1976	213 746 040	107 348 382
	1976-1977	215 766 720	119 719 453
	1977-1978	NA	NA
Quebec	1975-1976	NA	123 678 000
	1976-1977	NA	154 490 300
	1977-1978	NA	159 625 100

Note: September 1978 data from the Roads and Transportation Association of Canada.

Several places have attempted to integrate school and public transit. In some cases, this has taken the form of children switching to a regular public transit service, as in western Quebec. Some places in Canada have opened school buses for use by adults. Unfortunately, the very local nature of many school bus operations has hindered the collection of data on this form of transit.

Another form of integrating school bus and public transit is to use the school buses during the off-peak, or daytime, hours. The use of school buses and drivers when they are not needed for journeys to and from school offers flexibility in routing, but it also poses two main problems: (a) There are possible conflicts with special school excursions to museums, sports events, and the like, and (b) even where the bus is already paid for and the driver is on a guarantee, the low person-trip volumes of some services make for a high-deficit operation.

Integrating Urban and Rural Transit

Most urban transit systems have a peaking problem (caused by weekday journeys to and from work) that presents them with idle personnel and equipment at midday. For towns within an hour's drive of a big city, urban buses can be used after the morning rush to bring rural people into town by 11:00 a.m. A return journey can be made at 2:00 p.m., which enables the bus to be back for the afternoon rush. An example of where this now happens can be found in Kamploops, British Columbia (population 60 000), where service to rural points 32 km north of the central city is provided by midday route extensions. In this particular instance, the two service areas involved are within the same political jurisdiction as the central city.

An alternative to running services on special schedules in the off-peak is to extend certain rush-hour urban or suburban trips into the countryside. Routes for selected Montreal commuter trains have been extended up to 80 km. A 12-km Hamilton commuter bus service extends another 24 km on some runs, and a 120-km line runs from Toronto as an extension to regular 44-km commuter territory runs. This is an efficient way of providing service; however, there are two limits on how far such routes can penetrate the hinterland: (a) the length of the deadhead out and back for the hinterland trip and (b) the fact that prime work start times of 8:00 and 8:30 a.m. make for a 2-h limit if service is not to begin before 6:00 a.m. from the outer end of the line.

It is worth noting that both the Hamilton and Toronto transit systems own intercity-rural motorcoach companies that have extensive service networks and suburban, rural, and intercity runs into the countryside. These companies are autonomous units, although both service and operations are coordinated.

Another possible means of urban-rural integration is to develop a regular route that includes in its territory both rural and urban areas, a "town-and-country" service. In 1978, the Nova Scotia Department of Municipal Affairs began a demonstration service of this type. The 12-km-long route operates at regular intervals throughout the day, six days a week, using a conventional bus. Normal urban service is provided in two towns, Wolfville and Kentville, and to the intervening rural territory. The total population served is 23 000 persons, about 13 000 of whom are rural residents.

The bus line attracts more than 6000 riders/month, and ridership is growing. The fare is $0.50/trip, and a budgeted public expenditure of $75 000 has been set for each year.

Of course, there are numerous examples in which

the unit of local government that provides urban transit takes a regional, county, or municipal district form. In such circumstances, rural as well as urban routes are often provided. Examples include special runs to villages in the Ottawa valley that are part of the Ottawa-Carleton region of eastern Ontario and District of Maple Ridge, British Columbia, service to Whonnock, Albion, and Webster's Corner.

Combined Services

Where rural passenger transportation services are not economically viable, they can be augmented by additional responsibilities and incomes, provided that the new functions do not seriously delay passenger traffic. The most obvious new opportunities for passenger carriers are parcels, mail, store deliveries, and newspapers. Parcel traffic includes medical supplies and samples, drug prescriptions, small machine and automotive parts, and ordinary parcels. Many passenger carriers in Canada are members of the bus parcel express network that transports parcels from operator to operator; some also carry mail between small towns. The parcel express on the Newfoundland CNR bus earned more than $100 000 in 1977.

Paratransit

Three important classes of service are described below: shared-ride taxis, "mobility clubs", and vanpools. Of course, there are numerous private paratransit services that go unreported.

Shared-Ride Taxi

Taxi is the most pervasive of the communal passenger transportation modes in any community. There tend to be between 1-2 taxis/1000 people in all Canadian cities. In smaller cities of 1000-5000 people, this figure is about 1 taxi/600-800 persons. Transit buses, by contrast, are almost nonexistent in these communities. In places where taxi regulations tend to be less strict, a form of public transit can emerge through the informal sharing of rides among passengers who have different origins and destinations.

The only known organized small-city/rural shared-ride taxi system in Canada is the Battlefords Taxi-Bus System, which provides taxi feeder service to the line-haul bus linking the town of Battleford and the city of North Battleford. These two communities have a combined population of about 17 000. This system is provided by a private operator under contract to the local government, similar to a taxi feeder system to the City Transit Service in Peterborough, Ontario (population 58 000).

Mobility Clubs

An alternative to providing a formal transit service to improve rural mobility is to sponsor volunteer or low-cost mobility improvement projects. Bruce, Grey, and Huron Counties are predominantly agricultural counties in Ontario that are experiencing growth in urbanization, hobby farms, and recreational land uses. In 1970, day-return train service to major regional centers was discontinued. As train service was withdrawn, some bus service expansion took place, but many train users either switched to automobiles or traveled less. Changes in this region were the subject of a series of Canadian Transport Commission studies (12).

In 1974, the government of Ontario became concerned about passenger transportation problems in this area and undertook a two-year program to study needs and produce an inventory of possible solutions that could be tested "in the field". Examples included the use of retirees as volunteer drivers, the formation of coops, and public use of school buses or delivery vehicles.

In 1978, the federal Transportation Development Centre of Transport Canada undertook a demonstration of the mobility-club concept in Huron County. This approach uses a group of concerned citizens (or a hired ride matcher) as a nucleus to match the specific trip needs of individuals with a wide range of available vehicle types and operating arrangements. The club is required to have a public vehicle license, although volunteer drivers do not need a chauffeur's license.

This two-year demonstration project succeeded in increasing public awareness of transportation problems in the area and pointed out some likely solutions. Five volunteer driver systems have been formed; they serve 20-80 riders/week and have as a nucleus such groups as a homemakers' association, senior citizen clubs, and day centers for the homebound (13, p. 28).

Vanpools

Self-drive schemes are now enjoying a measure of success, especially in servicing employees of large manufacturing plants at remote industrial locations. Since the typical vanpool trips are long, such service is an essential component of the rural transportation scene.

In 1977, a vanpool demonstration program was initiated by Transport Canada as part of the federal energy conservation program. The program involved the selection of demonstration sites in consultation with provincial governments. The federal government funded studies to identify sites, monitor and evaluate the demonstration, and provide a lease guarantee for each van during the first year of its operation. Vanpools in five provinces (Newfoundland, Prince Edward Island, Manitoba, Ontario, and New Brunswick) were organized and in operation in 1979 and 1980. The vanpools thus formed are all employer based, taking employees from the surrounding rural area to the employer located in the city or its suburbs. In one vanpool in Winnipeg, Manitoba, the trip length is quite long: 125 km one way. These demonstration projects are currently being evaluated (14).

At the provincial level, the Ontario government has under way a program to render technical assistance and the renting of vehicles to groups that wish to form vanpools. It is estimated that more than 100 vanpools are in operation in that province.

Industrial Services

Many workplaces, especially in primary or secondary industry, are in rural locations that are not well-served by urban transit. In many instances, employers arrange special services for their employees to enable them to get to and from the job. Employers are motivated to do this by a desire to meet the demands of unions or groups of employees, to reduce demands for parking, for reasons of security, and to ensure safe and reliable access to the work site (late arrivals and injuries to employees can have serious consequences for productivity).

Some industrial bus services are organized and operated directly by the employer and often use employees as drivers. In British Columbia, the MacMillan-Bloedel lumber company provides an example of the services required in that industry. The company provides a total of 717 vehicles, which are

used primarily for the transportation of employees to and from work sites. These vehicles range in capacity from 40-passenger buses down to "crew cab" pickups that have a capacity of 6 passengers. Intermediate sizes include 12- to 17-passenger bodies mounted on a 680-kg chassis (15).

In Ontario, a government agency provides an important industrial service. At Chalk River, the Atomic Energy Commission runs a full-scale transit service to take people from the nearby town of Deep River to the atomic plants at Chalk River.

Industrial firms sometimes make arrangements with privately owned bus companies to provide service. A major example is found in Fort McMurray, Alberta (population more than 20 000), whose economic base largely revolves around the Athabasca Tarsands. A total of 100 coaches provide worker services to the two major work sites, located 37-51 km from the town.

Industrial bus services are sometimes organized on a cooperative basis. For the towns and villages in the mountains around Trail in southeastern British Columbia, coop bus services provide access to the large lead and zinc smelter located on the edge of the city.

Not all industrial transportation is by bus. The lumber mills on the Dease Lake extension of the British Columbia Railway have a contract with the railway for a passenger-train service. Note that on this line the typical worker has to work "in" for several days and then travel out to a major town or city.

At Hinton, Alberta, large Sikorsky helicopters provide morning and evening commuter service to "Coal Branch" mines.

Maintaining Community Viability

The availability of intertown public transportation is important to the health of rural communities quite apart from the benefits to individuals. Good bus or train service is important if a town is to be an attractive place to live, especially for retired people. Package express services are important to businesses since small goods can be moved economically and quickly. The lack of public transportation can make it difficult to attract young people and others to the provision of necessary social and other services.

In 1977, the Department of Northern Saskatchewan and the STC implemented a 404-km bus demonstration service from Prince Albert to the northern community of Creighton. Two feeder services were included in the plans to draw from three smaller communities not on the main route.

The Creighton-based vehicle makes two trips a week to Prince Albert. Most passengers travel the entire route. Connections with southern bus routes at Prince Albert are important. Two paratransit feeder services extend service off the main line to the small northern villages of Sandy Bay, Pelican Narrows, and Deschambault Lake.

The provision of paratransit feeder services has had some start-up difficulties. Existing taxi firms were not interested in the paratransit role. Paratransit operators receive assistance to obtain vehicles; they are paid a flat rate of $0.50/mile, and STC collects the regular bus fare.

Initial performance results in 1978 showed anticipated yearly passenger and freight revenues of $32 000 and estimated costs of $91 000, which gives a tentative cost-recovery ratio of 0.35. Monthly patronage averaged 157 passengers, or about 17.5 passengers/round trip.

CONCLUSIONS

Canada has an extensive set of medium-distance rural public transportation services, often combined with intercity schedules. Short-distance rural services are less comprehensive and can take a variety of forms. There has been considerable activity during the past 10 years with respect to rural public transportation. Governments have been active in the research and funding areas, and both public and private sectors have introduced many new services. Although the level of interest in rural transportation is variable among the federal and 10 provincial governments, one can be optimistic about the future prospects for improvements in this area.

ACKNOWLEDGMENT

We acknowledge the contributions of Eric Darwin and Peter Cameron to a 1978 document from which some of the material for this article was drawn (16).

The opinions expressed here are ours and are not necessarily coincident with policies of the government of Canada or the government of Alberta.

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Rural Passenger Transportation in the Netherlands

ALEX ECKMANN

The close relation in the Netherlands between rural passenger transportation, national transportation policy, and rural development objectives is described. Although Dutch cities are geographically close to one another, they remain physically separated by rural countryside as a result of strict land use control. More than one-third of the total population lives in rural areas or small towns. A high level of demand for intercity trips gives rise to high frequency and capacity of service for rural passenger travel, by both train and bus. The nationwide regional bus network is more extensive than the rail system and trip lengths are shorter. Official Dutch transportation policy seeks to maintain the distinction between intercity rail service for lengthy trips and regional bus service for rural trips and for travel on small urban transit systems. In developing new transportation facilities, including highway construction, the national plan for transportation seeks to restrain further migration of city dwellers to rural communities. For the convenience of existing rural transit travelers, central government policy is designed to relate frequency of bus service to observed levels of passenger demand. Alongside the Dutch policy of extensive national transportation service has been a recognition that traffic and transportation are essential elements in regional development planning. Improved passenger transportation in rural areas has helped to preserve the rural way of life by affording access to important urban jobs and services. The lesson of the Dutch experience is that rural transportation is most effective when integrated with national transportation policy and linked to clear objectives for rural area development.

The lesson of the Netherlands experience with rural passenger transportation lies in the close relation between Dutch rural transportation, national transportation policy, and rural development policies and not so much in the specific characteristics of Dutch transit operations and finance, which may not be widely replicable abroad. The purpose of this paper is to describe how rural transportation in the Netherlands is integrally tied to the national transportation system.

Before proceeding, it is important to highlight the major characteristics of the Dutch passenger transportation network. A railway system provides the structural skeleton for national transportation service, and a high-density regional bus network fills the spaces of the railroad grid. The Netherlands National Railway links the country's principal towns and cities. Regional bus routes accommodate the mobility needs of rural passengers, providing access to nearby town centers and to the railroad stations that serve larger, more distant cities. Within towns, the regional bus systems also provide local transit, thereby serving a dual function.

The density of the Dutch regional bus network is far greater than that familiar in the United States, averaging 5 km of bus route per 10 km^2 of nationwide area (3 miles/4 $miles^2$). Moreover, a high level of demand for intercity trips in the Netherlands permits a high frequency of service by both train and bus. From many towns, there are train departures every half-hour or less. Intercity buses are typically operated on hourly headways, although half-hour and 15-min frequencies prevail on routes used most heavily. To enhance passenger convenience, bus arrivals and departures are scheduled to coincide closely with local train schedules as well as with hours of employment and schools that provide substantial patronage for rural transit.

Finally, in terms of physical components of the Netherlands regional transportation system, most intercity buses are conventional 40-ft-long vehicles furnished with seats for 45 passengers. Articulated buses, with a passenger capacity of 75, are used on more densely traveled routes, and 12-passenger buses are deployed on some lightly used routes. A few experimental demand-responsive services are provided in locations where use is inadequate for conventional fixed-route operations.

DEMOGRAPHIC ORIENTATION

The Netherlands is the most densely populated country in Europe: Its 14 million population, about one-tenth greater than that of Pennsylvania, lives on a land area less than one-third the size of that state (1). Yet even within so small a country, population density varies widely. Almost half of the people live in three western provinces: Utrecht and north and south Holland. Most of the population that resides in these three crowded provinces lives in an urban complex known as Randstad, a ring-shaped conurbation that embraces the nation's four largest cities: Amsterdam, Rotterdam, the Hague, and Utrecht. Figure 1 shows the distribution of population centers in the Netherlands. In addition to the large cities, approximately 5 million people, or more than one-third of the total, live in rural areas or small towns that have less than 20 000 population. Thus, despite the high level of urbanization in the Netherlands, a large population resides in small urban and rural areas and constitutes a significant potential market for public transportation.

Though Dutch cities are geographically close to one another, they remain physically separated by rural countryside as a result of strict land use control. This gives rise to an excellent nationwide system of interurban rail and rural bus lines. The networks make possible easy access to town services by rural inhabitants as well as business trips between towns. The transportation system that serves the Randstad, its rural separations, and surrounding regions is basically a ring-shaped set of high-speed rail lines and high-frequency bus

Figure 1. Major cities and transportation infrastructure of the Netherlands.

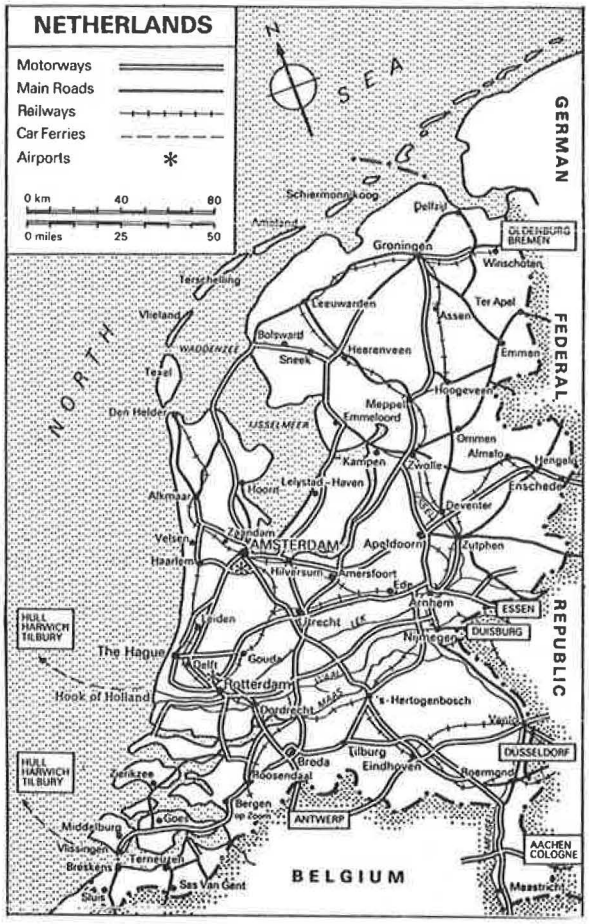
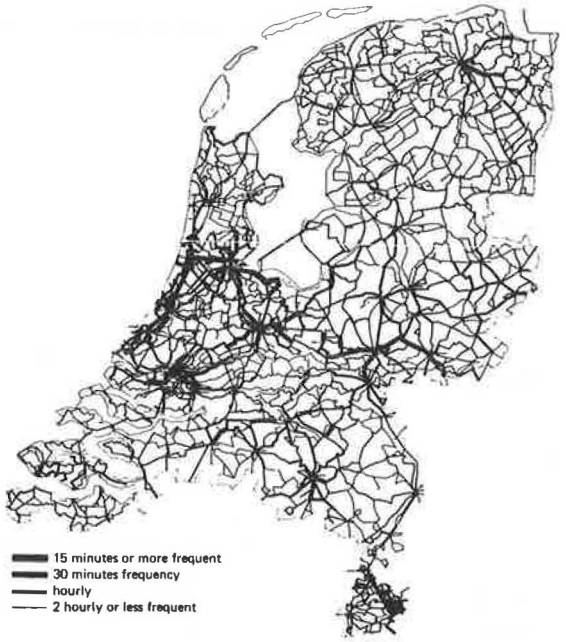


Figure 2. Regional bus service.



routes around the circumference of the conurbation, as shown in Figure 2. The degree of high-frequency bus service reflects the extent of passenger travel in this ring-shaped conurbation in western Holland.

RURAL TRANSPORTATION OPERATIONS AND ORGANIZATION

Thirty-eight regional bus companies licensed by monopoly franchise awards provide service throughout the Netherlands, as shown in Figure 3. Thirteen of the regional operators are subsidiaries of the National Railway, 8 are provincial government undertakings--some partly controlled by the railways--and the other 17 are private enterprises. Involvement of the railroad in ownership and management of several rural bus companies has ensured correspondence between bus and train schedules as well as complementary routing between bus and train services (2).

According to the National Railway, 46 percent of the country's population live within easy reach of a railroad station (via local transit without transfers). The remaining 54 percent, or 7.6 million people, depend on bus service for intercity transportation and for local transportation within their region. This second group comprises 710 municipalities out of 841 total municipalities nationwide. Indeed, very few Dutch towns are inaccessible by either train or bus.

Table 1 gives comparative annual operating characteristics of railroad and regional bus companies in the Netherlands. From this table, two observations are significant: (a) The regional bus network is more extensive than the rail system--i.e., it has greater route length, fleet size, and vehicle operation--and (b) the average trip length is greater for journeys by rail than by bus so that, even though more passengers travel by bus, more passenger kilometers are traveled by train (3). These observations are consistent with the use of rural buses for local and regional distribution and with the function of railroads as intercity carriers. Official Dutch transportation policy seeks to maintain the distinction between intercity rail service for lengthy trips and complementary regional bus service for rural trips and short intralocal trips, thereby assuring the preservation of this bimodal nationwide system.

INTERRELATION OF URBAN AND RURAL TRANSPORTATION

Only nine municipalities in the Netherlands operate their own municipal transit systems, and these are principally located in the country's largest cities. Forty additional municipalities have contracts with regional bus companies to supply strictly local transit. Many towns, moreover, receive a measure of local transit service from regional buses that cross their town limits and pick up and drop off local riders as they distribute their intercity passengers. Regional and local routes in all small towns tend to converge at central business districts and railroad stations to facilitate transfers between modes.

Table 2 gives comparative annual operating characteristics of local transit systems in the Netherlands. As illustrated, approximately 22 percent of local transit vehicle kilometers is provided in contract cities, including rural towns and small urban areas. A smaller proportion of local transit use (measured in passenger trips and passenger kilometers), 11-12 percent, is generated in these towns, which indicates a generally lower load factor in small-city operations. These distance and ridership characteristics exclude that share of local transit service provided by regional buses on intercity routes, as given earlier in Table 1. Such intercity routes are significant for local transit

Figure 3. Service areas of regional bus companies.

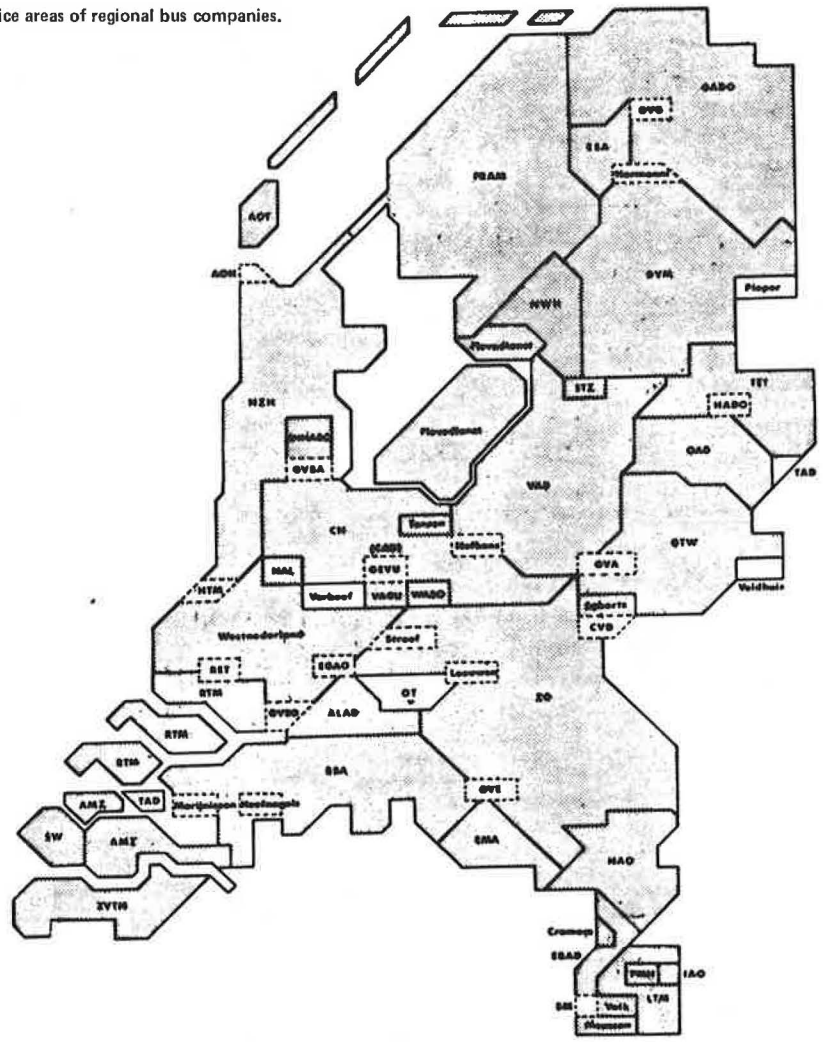


Table 1. Comparative annual operating characteristics of Netherlands rail system and regional bus companies in 1975.

Item	Railroad	Regional Bus Company
Route length (km)	2800	15 000
Rolling stock (no. of vehicles)	2000[a]	4000[b]
Vehicle operation (bus-km)	NA	250 million
Ridership (no. of passengers)	189 million	250 million
Passenger distance traveled (km)	8.5 billion	3.2 billion
Avg trip length (km)	45	13

Note: 1 km = 0.62 mile.
[a]Passenger cars.
[b]Buses.

circulation, particularly in the small urban and rural areas.

Overall, the amount of local transit service reported in contract cities is large--in aggregate larger than all but two or three of the largest Dutch cities that receive service from municipally operated transit systems. This provides insight into the level of dependence on local transit service by residents of small urban and rural areas and the close interrelation of urban and regional transportation in the Netherlands.

FINANCIAL CONDITION OF LOCAL AND REGIONAL TRANSPORTATION

Until 1969, regional passenger transportation by bus was a profitable business. Since then, the public transportation deficit has increased sharply. Table 3 gives the financial condition of local and regional transportation in the Netherlands in 1975, prior to a decision by the central government to fund all local public transportation deficits from the national budget rather than from local government revenues.

The central government of the Netherlands finances the deficits of transportation operations subject to certain conditions, the most important of which is prior approval by the Ministry of Transportation of the annual budgets and operating plans of the transportation companies. This has led to a growing influence of central government policy on transportation service in the Netherlands.

CENTRAL GOVERNMENT POLICY ON RURAL TRANSPORTATION

The Structure Plan for Transport Policy (4) of the Ministry of Transportation states that, where rural transportation facilities are provided, "care must be taken not to encroach upon the countryside. Facilities provided for traffic and transport must not lead to further migration of city dwellers to rural communities...." The policy emphasizes the

Table 2. Comparative annual operating characteristics of Netherlands local transit service in 1978.

City	Population	Vehicle Kilometers of Operation (000s)	Passenger Trips (000s)	Passenger Kilometers (000 000s)
Amsterdam	719 000	33 833	213 305	811
Rotterdam	582 000	30 559	158 223	633
The Hague	458 000	18 656	95 336	334
Utrecht	236 000	9 287	35 670	148
Arnhem	127 000	4 821	19 298	69
Groningen	161 000	2 994	12 148	36
Maastricht	109 000	3 468	12 499	44
Nijmegen	148 000	3 195	10 632	50
Dordrecht	106 000	2 034	5 344	27
Total	2 646 000	108 846	562 454	2152
40 cities that contract for local transit service with regional operators	2 923 000	31 036	75 870	271
Total	5 569 000[a]	139 882	638 324	2423

Note: 1 km = 0.62 mile.
[a]Out of 14 million total.

Table 3. Financial condition of Netherlands local and regional transportation in 1975.

Mode of Operations	Total Revenue (f 000 000s)	Fares		Central Government Subsidies	
		Amount (f 000 000s)	Percent	Amount (f 000 000s)	Percent
Railways	1150	600	52	550	48
Regional bus companies	570	300	53	270	47
Municipal transit companies	635	195	31	441	69
Municipalities that contract for local transit	94	34	36	60	64

Note: 1 f = approximately U.S. $0.50.

relation between rural transportation and desired rural development.

Toward that end, regional buses that cover short and medium distances are favored for providing most public transportation mobility in rural areas. Railways will continue to provide high-speed intercity service over longer distances.

The current government policy for regional bus transportation is designed to leave the route network largely unaltered except where new towns or new housing projects are developed. Central government policy concerning bus scheduling is designed to relate service frequency to the level of passenger demand, an objective that has been effectively met through the following method.

The table below gives the system of standardized schedule frequency for regional buses:

No. of Buses Permitted per Hour	Necessary No. of Travelers	
	Peak Period	Off-Peak Period
1	8 to 34 or 44	8-24
2	35 or 45 to 84	25-49
3	85-134	50-79
4	135-179	80-139
5	180-224	
6	225-269	140-209
7	270-314	
8	315-350	210-280

During peak periods, a minimum of 8 passengers/h is required to justify 1 bus/h on a given route between two municipalities. Thirty-five or 45 passengers/h are required before a second bus can be put into service (5). The higher level of 45 passengers justifies deployment of a second bus when all passengers travel simultaneously--e.g., when they all depart from work or school at 5:00 p.m. The lower level of 35 passengers justifies a second bus when passengers arrive for service randomly throughout the hour. Increments of 40-50 additional passengers/h are necessary for each additional bus deployed during peak hours.

Lower levels of demand are necessary for additional buses beyond one per hour during off-peak periods. On some routes that have very low passenger volume, as few as 3 round trips/day are permitted for a minimum of 8 passengers/day. The basic vehicle for this system of standards is the conventional 45-seat regional bus.

One final element of national transportation policy with implications for rural passenger transportation is the introduction of a unified national transit ticket. The "strippenkaart", as the national pass is called, is a multiple-trip ticket that applies to any transit carrier in the country. The 15 zones of travel permitted on each strippenkaart can be used in a series to allow lengthy trips on regional buses, shorter trips on local transit, or a combined trip on both modes. The national transit ticket is intended to promote integrated use of regional and local transportation services to any location in the country and thus improve the mobility of rural passengers.

CONCLUSIONS

A strong policy commitment to integrated transportation in the Netherlands has led to a highly developed passenger transportation system, including excellent mobility for rural inhabitants. The main reasons for this have been the high density of population and the relatively short distances between cities. There are hardly any areas in the Netherlands inaccessible by public transportation.

Alongside a policy of extensive national transportation service has been a recognition that traffic and transportation are essential elements in regional development planning. Improved passenger transportation in rural areas has helped to preserve the rural way of life by affording access to important urban jobs and services. Simultaneously, rural

land use controls have prevented suburbanization and urban sprawl into rural areas.

The lesson of the Dutch experience for other countries is that rural transportation is most effective when integrated with national transportation policy and linked to clear objectives for rural area development.

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Part 6
Training and Technical Assistance

Information and Training Modules for Planning, Implementing, and Operating Specialized Transportation Services

JOSEPH S. REVIS

An information dissemination program designed to upgrade the skills and expertise of individuals involved in planning and operating transportation services for the elderly is described. The framework of the program comprises seven training modules that include technical memoranda, case studies, slide presentations with illustrated scripts, resource lists, and an annotated bibliography. The program is intended to be used in conjunction with a 1979 planning handbook sponsored by the Administration on Aging. Although the focus of the program is transportation service for the elderly, the training materials are designed to cover a wide range of applications and can easily be adapted to other population groups.

Under a grant from the Administration on Aging, Transportation for the Elderly: An Information Dissemination Program (1) was designed as a means for upgrading the skills and expertise of individuals involved in planning and operating transportation services for older Americans. The seven information dissemination modules developed as part of the materials included technical memoranda, case studies, visual aids, resource lists, and a bibliography, all of which were intended to supplement a planning handbook prepared in 1976 (2) (also sponsored by the Administration on Aging).

This paper highlights the materials developed for training in the provision of paratransit service. Copies of the materials are available from each state agency on aging or from Crain-Revis Associates.

The information dissemination program was intended to be used in conjunction with the planning handbook as a training program and a source of technical assistance on transportation. The materials were structured to serve different levels of skill, and they were designed to be used either individually (in a "self-training" program) or in group sessions. Because the materials were developed under a grant from the Administration on Aging, much of the language has focused on agencies and transportation providers that serve the elderly. However, the basic planning and training elements that constitute the training modules have been designed to be used in a broad range of applications. In most instances, only the word "elderly" will need to be removed or expanded to cover other population groups. At a few rare points in the training materials, some modification may be needed to account for the concerns of specific programs that involve the non-elderly.

Before the modules are discussed in more detail, it will be helpful to summarize the overall strategy behind the effort.

BASIC APPROACH

The specific approach used in developing the training materials was based on two strategies:

1. Design the materials so that they could be used in modules--either separately or in combination--and at different levels of skill, and
2. Base the modules on actual operating experience drawn from field work at specific sites.

In the context of these two objectives, the various training elements were structured around materials designed to correspond with functional areas covered in the planning handbook and, by supplementing each functional area of the handbook, increasingly complex issues could be specifically dealt with. To provide a sense of immediacy and relevance, specific sites were selected, in cooperation with the Administration on Aging, to receive technical assistance based on the relevance of their problem to the functional areas developed and the validity of the specific site as a training example. Approximately 12 sites were used in the training materials.

FORMAT OF MODULES

We structured our efforts around seven "transportation project milestones" drawn from the planning handbook: getting started, building a sound base, equipment evaluation, problem areas, system design, developing an operating plan, and system operation. These seven areas, shown in Figure 1, became the framework around which each of the training modules was built.

Table 1 (2) summarizes the seven training modules and describes the elements in each of them. The modules consist of the planning handbook, the milestones, 11 case studies, 11 technical memoranda, five slide shows with illustrated scripts, 19 resource lists, and an annotated bibliography.

The relation between the planning handbook and the training modules is shown in Figure 2. For example, case studies 1 and 2 relate to "getting started", whereas case studies 8 and 10 relate to "budgeting". A similar distribution is shown in Figure 2 for each of the seven training modules.

Table 2 describes the case studies and technical memoranda. Slide shows (with scripts) were developed for the following subject areas: the planning process, coordination, hardware and equipment, operations, and monitoring and evaluation.

In addition to the technical memoranda, case studies, and slide presentations, the following 19 resource lists were developed to help projects to establish sources of information from a large number of resources: potential federal funds, U.S. congressional committees, federal and other agencies, state highway and transportation officials, state public utility and service commissions, state insurance commissioners, state departments of labor, state and local safety organizations, governors' highway safety representatives, the American Red Cross, the Association of Volunteer Bureaus, the Legal Services Corporation, the Consumer Federation of America, American Advertising Federation clubs, Farmers Home Administration state directors, the State Agricultural Extension Service, higher education programs in gerontology, sources of transportation publications, and selected local plans, studies, reports, and evaluations.

An annotated bibliography was also prepared to provide the basis for further reading.

Figure 1. Transportation project milestones.

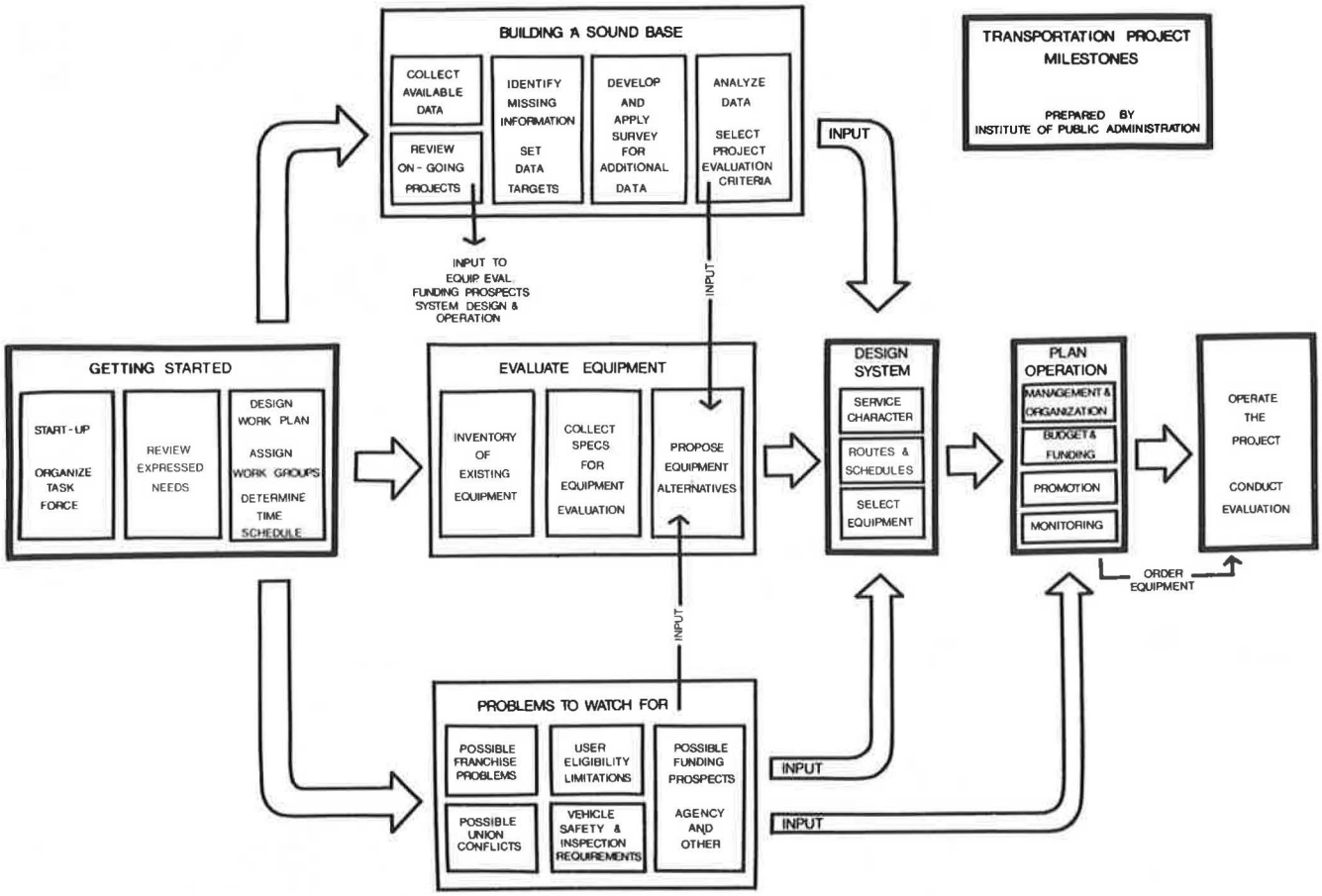

Table 1. Information dissemination modules.

Module	Description	Elements
1	Planning handbook: Transportation Services for the Elderly	Nine chapters and annexes covering all phases of planning and operations
2	Transportation project milestones	Flow and organization chart for overall planning format and content
3	Case study workbook: Transportation Services for the Elderly (cases and problems)	Eleven case studies covering all phases of planning and operations
4	Slide presentations	Four slide shows and illustrated scripts on planning process, coordination, equipment selection, operations, marketing, monitoring, and evaluation
5	Technical memoranda	Eleven technical memoranda on specific techniques and problems in all phases of planning and operations
6	Annotated bibliography	Detailed bibliography with full range of references
7	Resource lists	Nineteen resource lists containing information on available sources of assistance and current data

USE OF MODULES

By using the case studies, technical memoranda, slides, resource lists, and other materials in conjunction with the planning handbook, it would be possible to develop an excellent program for expanding skills in all aspects of transportation, particularly as it relates to special services and paratransit. Each state agency on aging was provided with a free set of the information modules along with special training on how to use it. Five special training sessions were held in different parts of the country, and our evaluation material indicated that the modules were well-received and understood. However, there has been no follow-up on how extensively they have been used.

As noted earlier, the materials were developed and assembled so that they could be used at different levels of skill from introductory concepts to detailed technical explanations. The information was also designed so that it could provide a curriculum for "self-training" or "group instruction", through workshops, seminars, or more formal classrooms. Training programs could be designed to use different formats for instruction, each of which could be tailored to the skill needs of the particular group or individual in question. Figure 3 shows the skill levels of each module. For example, visual-aid material (slides) could be used as a presentation to officials or political decision makers in order to provide them with some overview of and insight into the problems or requirements of planning and operating transportation services, whereas the technical memoranda are more appropriate for training use.

In combining the seven training modules with the

Figure 2. Information modules and subject coverage.

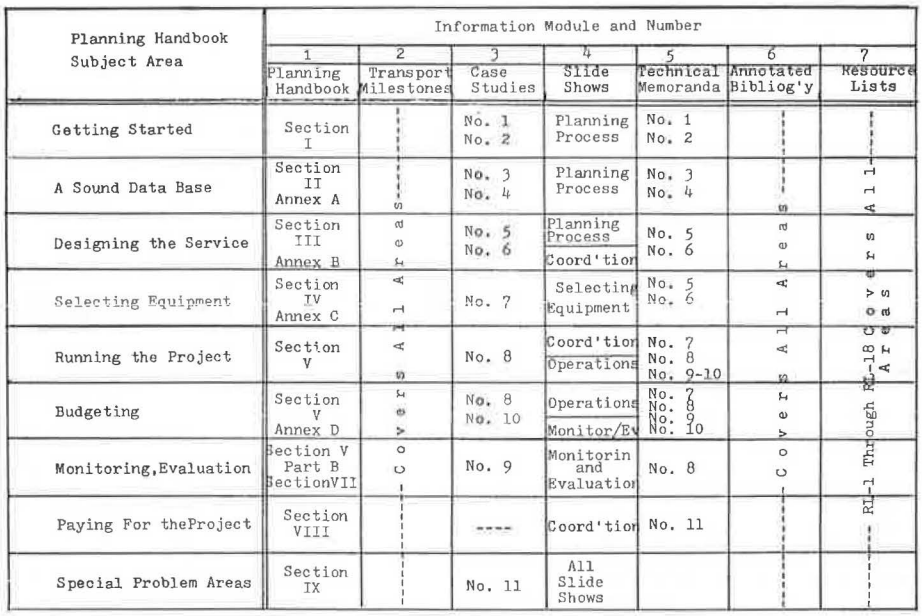

Table 2. Case studies and technical memoranda.

Element	Description	Handbook Coverage
Case study		
1	Trans-Aid, Winston-Salem, NC	Getting Started, Section I
2	Northeast Counties of Oklahoma (NECO) Area Agency on Aging in Vinita and adjacent counties	Getting Started, Section I
3	Valley Transit District, Ansonia, CT	Building a Sound Data Base, Section II
4	Clark County Health and Welfare Planning Council, Clark County, WA	Filling the Information Gaps, Section II
5	Lift Line, Palm Beach, FL	Designing the Service, Section III
6	Whistlestop Wheels, Marin County, CA	Designing the Service, Section III
7	Transportation of the Elderly, St. Petersburg, FL, and other systems	Selecting the Right Equipment, Section IV
8	Ottumwa, IA, and OATS, Columbia, MO	Running the Project: Financial Accounts and Controls, Section V
9	Senior Citizen's Transportation, Inc., Warwick, RI	Monitoring and Evaluation: Improving the Efficiency of Medical Scheduling, Section VII
10	SMELI, Southbridge, MA	Paying for the Project, Section VIII
11	Care-a-Van, Fort Collins, CO	Some Problems to Watch for: Obtaining Insurance, Section IX
Technical memorandum		
1	Transportation and the Social-Psychological Needs of the Aging	Getting Started, Section I
2	Public Transit and Agency Transportation Coordination	Building a Sound Data Base, Section II
3	Identifying the Elderly for Transportation in Rural Areas	Building a Sound Data Base, Section II
4	Inventory Mapping of Resources, Needs, and Potentials for Transportation of the Elderly in San Antonio, Texas	Building a Sound Data Base, Section II
5	Lessons in Equipment Selection for Small Urban and Rural Areas	Designing the Service, Section III; Selecting the Right Equipment, Section IV
6	Selecting Vehicles to Serve the Elderly and Handicapped	Selecting the Right Equipment, Section IV
7	Transportation Costs and Service Guidelines for Coordinating Agency Transportation Services	Running the Project, Section V; Putting the Budget Together, Section VI
8	Uniform Recording of Transportation Services and Operations	Putting the Budget Together, Section VI; Monitoring and Evaluation, Section VII
9	Depreciation of Transportation Equipment as a Cost of Operation for Coordinated Agency Transportation Services and the Case of Athens, Georgia, Department of Human Resources	Putting the Budget Together, Section VI
10	Urban Mass Transportation Administration Section 15 Accounts and Human Service Agency Transportation	Putting the Budget Together, Section VI; Monitoring and Evaluation, Section VII
11	The Need for Technical Assistance by State and Local Service Agencies and Transportation Projects for the Elderly	Some Problems to Watch for, Section IX

level of skill of potential users, three objectives were defined for the modules:

1. They were to be a source of general information on transportation.
2. They were to serve as an introductory course.
3. They were to have the capacity to be used by those who needed more advanced training and already had some experience.

In this context, the planning handbook was designed to serve as a basic text for an introduction to transportation planning for human-service-agency projects and covered the full range of activities involved. The case studies and technical memoranda were intended to be used as supplemental reading, whereas more advanced training efforts, either on an individual self-training basis or as part of a more formal effort, would use the case studies along with the technical memoranda. A full course of training could then be accomplished by using a combination of the slides and the transportation planning milestones in conjunction with advanced assigned readings from the planning handbook, the case studies,

and the technical memoranda. Discussions centering around the problems, issues, and solutions raised by each of the case studies and technical memoranda could also be stimulated.

CURRICULAR AND TRAINING FORMATS

To provide some further insight into the way in which all the materials might be combined to structure curricular and training sessions, Table 3 gives the ways in which the information modules may be used in terms of user skills and training objectives, the mix of information modules that can be used, the amount of time that can be spent on the materials, and the training formats for which they are relevant. Thus, when users have limited skills, and the objectives are public relations or general overview, the milestones and slides are adequate and can be presented in half-day sessions or less. More complex objectives and a mix of materials are, of course, also possible.

In Table 3 it can be seen that, for general information purposes, the transportation milestone chart and the slide shows serve as an important basis for introducing to public policy decision makers, or for presenting to agency staff, the general elements involved in providing transportation services for agency clients. These materials in combination could be handled on either an informal or formal basis and should be workable in a half-day session.

At the more intermediate level of providing a general course in transportation services for agency clients or for those who either have some limited background in operating systems or are about to become involved in such activities, a general training course is possible that combines the planning handbook, the transportation milestone chart, the case studies, the resource lists, and the bibliography. This material can be used either as a self-training program or in workshops, seminars, or formal classrooms and in sessions from one-half day to two full days. Self-training efforts can, of course, be paced by the individual.

Finally, for individuals who have some developed skills (say one or two years of experience), a program of readings and discussions can be organized, either on a self-training basis or in groups. By using the case studies and/or technical memoranda, seminars and discussions can be organized around specific subject areas. Each of the case studies illustrates an actual experience, and discussion and examination of that experience can serve to expand the insights of even experienced staff. Similarly, because the technical memoranda tend to cover more specific and technical subject areas, they help to stimulate discussion on specific problem areas, especially in terms of operations.

As a further means of providing guidance on the way in which the modules can be organized into training programs, Table 4 gives curricula formats for half-day, one-day, and two-day training programs. An important consideration is the degree to which advance reading of materials is required. If advance reading is possible, more discussion and longer sessions become feasible (and productive). However, given the amount of information to be

Figure 3. Information modules by level of skill application.

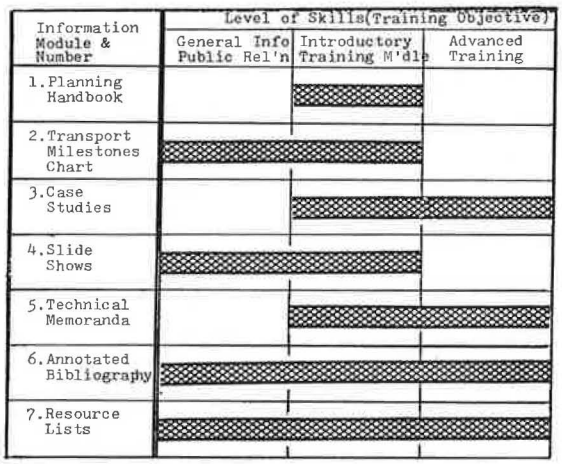

Table 3. Module objectives and format by level of skill in transportation.

Level of Skill	Training Objective	Materials and Modules for Training Objective	Applicable Group Time Period	Applicable Format
None, general knowledge only	Introduction to concepts, public information	Transportation milestones, slide shows	Half-day sessions	Self-training, formal and informal groups
Some background but limited experience	Training in human-service-agency transportation, upgrade skills	Planning handbook, slides, case studies, bibliography, resource lists	Half-day to two-day sessions	Self-training, workshops, seminars, classroom
Experience with transporting human-service-agency clients	Expand existing skills, stimulate further study	Handbook review, case studies, technical memoranda	Half-day to two-day sessions	Self-training, seminars, workshops, discussion groups

Table 4. Suggested curricula formats by skill objectives and training time.

	Curricula by Length of Training Session		
Skill Objective	Half Day	Full Day	One and One-Half to Two Days
General information, public relations	Slide shows, transportation milestones	Slide shows, transportation milestones, afternoon discussion	
Introductory training in human-service-agency transportation		No advance work; slide shows, transportation milestones, case studies, bibliography, resource lists, discussions	Advance reading; handbook review, case studies, technical memoranda, bibliography, resource lists, discussions
Advanced training, skills expansion	Advance reading; case studies, technical memoranda, discussion	Advance reading; handbook review, case studies, technical memoranda, bibliography, resource lists[a]	Advance reading; handbook review, case studies, technical memoranda, bibliography, resource lists[a]

[a] One- and two-day sessions differ in intensity and should be customized.

Table 5. Illustrative training agendas.

Time	Activity
Half-Day Session	
8:00 a.m. to 8:30 a.m.	Registration
8:30 a.m. to 8:45 a.m.	Introduction and description of program
8:45 a.m. to 9:00 a.m.	Discussion of transportation milestones
9:00 a.m. to 10:00 a.m.	Two slide shows: planning process, coordination
10:00 a.m. to 10:15 a.m.	Break
10:15 a.m. to 11:45 a.m.	Two slide shows: equipment selection, operations
11:45 a.m. to 12:15 p.m.	One slide show: marketing, monitoring, and evaluation
12:15 p.m. to 12:45 p.m.	Bibliography, resource lists, final discussion
Full-Day Session	
8:00 a.m. to 8:30 a.m.	Registration
8:30 a.m. to 8:45 a.m.	Introduction and description of program
8:45 a.m. to 9:00 a.m.	Discussion of transportation milestones
9:00 a.m. to 10:00 a.m.	Two slide shows: planning process, coordination
10:00 a.m. to 10:30 a.m.	Break
10:30 a.m. to 11:30 a.m.	Two slide shows: equipment selection, operations
11:30 a.m. to 12:00 noon	One slide show: marketing, monitoring, and evaluation
12:00 noon to 1:00 p.m.	Lunch
1:00 p.m. to 2:00 p.m.	Planning handbook discussion: coverage linked to slides
2:00 p.m. to 3:00 p.m.	Planning handbook discussion: continued coverage
3:00 p.m. to 3:30 p.m.	Break
3:30 p.m. to 4:30 p.m.	Selected case studies for presentation and discussion
4:30 p.m. to 5:30 p.m.	Open discussion

covered, two-day training sessions can be easily scheduled.

The formats in Table 4 are, of course, only suggestions. The only limitation in the use of the modules lies in being sure to tailor each of the uses and combinations of the modules into formats that meet the specific needs of the individuals who will be using them. It is essential to know what these individuals' skill levels are. The material in the modules ranges in difficulty from the slides, which present an overview, to the technical memoranda, which are quite specific and technical. It is therefore necessary to structure the curricula accordingly.

Table 5 summarizes two possible agendas for training workshops, one for a half day and one for a full day. Both are illustrative only and by no means exhaust the possibilities. The full-day session is designed to provide a quick introduction to materials with the expectation (hope) that the attendees would then follow up with more intensive reading of the materials. The half-day session is intended as a purely informational effort or a quick introduction to the subject. For more advanced training, a more tailored approach would be required, and this, as previously suggested, would be built around the case studies and technical memoranda and encourage more discussion and direct participation in the analysis and presentations. In the presentations, individuals could be asked to read and report on a specific case and the presentation would then be the basis for discussion. A similar approach could be used for the technical memoranda.

CASE STUDIES

The purpose of the case studies is to illustrate transportation project procedures for planning, operation, and evaluation and to disseminate information on transportation services for the elderly based on real-world experience. The case studies have been developed to illustrate a particular part of the planning process, and some have been supplemented with discussion questions and practice examples. Most of the information for the case studies was developed from on-site technical assistance provided to the specific projects described in the studies. Thus, the case-study material is based on the experience of actual transportation providers. Such information provides a valid and consistent view of the past experiences of projects.

Some of the case-study projects may have changed their situations or modes of operation since they were initially visited. However, modifications that might have occurred do not invalidate the value or representativeness of each case study. Technical review indicated that the material was still useful for illustration even when some of the original characteristics had changed.

In some case studies, details on specific aspects were lacking; to ensure relevance, where additional information was necessary and available, the original projects were contacted again for clarification and greater detail. In other cases, information may have been elaborated on by the authors for purposes of clarification, especially when insufficient detail was available from the project. For some of the case studies, materials from more than one project have been woven together to provide a more complete illustrative example, and, occasionally, hypothetical material has been added to improve the clarity, completeness, and representativeness of the case study.

Following the description of some of the case studies, discussion questions have been added for further understanding of the project planning process and for self-testing of comprehension by the reader. Not all questions have discrete or absolute answers, and great effort should not be necessary to arrive at reasonable solutions. Approximate answers and an understanding of their derivation will be sufficient in most cases. Some questions may have more than one correct answer and should be considered as thought-provoking rather than requiring a right or wrong answer. The questions are meant for individual consideration and group discussion, to explore topics based on the experience of readers, and to reinforce their comprehension of the material.

Where alternative case studies are presented, in the main body of the text or in the discussion questions, they are intended to illustrate varied approaches to a common problem. Often a single case study does not represent the only response or even the principal solution. In these situations, alternative case studies or discussion questions, based on information from other projects, are presented for a view of diverse procedures.

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FHWA Training Course on Managing Rural and Small Urban Public Transportation Programs

JON E. BURKHARDT

The contents of a two-day training course sponsored by the Federal Highway Administration for state and regional managers of rural transportation programs are summarized. Sessions in the course include an introduction to rural transportation, key issues, state management plans, coordination, funding, technical assistance, and monitoring. Instructions for access to the course are included.

In the past few years, it has been recognized that the transportation needs of a significant number of persons in rural and small urban areas are not being met. One of the recent efforts to respond to this need was the creation, in 1978, of the Nonurbanized Area Public Transportation Program as Section 18 of the Urban Mass Transportation Act of 1964, as amended. This program provides capital and operating assistance for public transportation in nonurbanized areas. The program is administered jointly by the Federal Highway Administration (FHWA) and the Urban Mass Transportation Administration (UMTA). Although approval authority for individual projects is currently vested in the FHWA division administrator, states are highly involved in the administration of the program and in providing technical assistance to local areas.

In view of the varying degrees of familiarity and expertise with rural public transportation among FHWA field offices and the states, FHWA and the National Highway Institute of the U.S. Department of Transportation contracted with Ecosometrics, Inc., to provide a two-day course (1) designed to assist FHWA personnel in managing rural transportation efforts and in administering the Section 18 program. [There is also a three-day course designed to provide assistance to the managers of rural transportation projects (2)]. In view of the need to coordinate Section 18 projects with human-service-agency transportation on the local level, the course is also intended to assist state human-service-agency personnel in their coordination with the Section 18 program. This paper summarizes the course.

It is intended that, at the end of the course, participants will be able to better administer the funds used under the Section 18 program. The skills that the course is intended to teach include

1. Preparation of a state management plan for Section 18 and the evaluation of a state's performance under the plan;
2. Development of guidelines for local applicants in preparing Section 18 applications that are within the capabilities of the prospective applicants;
3. Development of a fair and equitable program of projects;
4. Development of procedures for reviewing and evaluating applications in an expeditious manner for capital, administrative, and operating assistance;
5. Development of procedures for the coordination of the Section 18 program on the state and local levels;
6. Development of a process to encourage private operators to provide public transportation services in nonurbanized areas;
7. Management of contracts with local transportation providers;
8. Development of procedures to monitor and evaluate whether the implementation of Section 18 has achieved federal, state, and local goals (including the development of procedures to initiate required corrective actions); and
9. Development of a program to provide assistance to local providers.

The course is designed around seven sessions that address the course objectives:

1. Introduction to managing rural and small urban public transportation programs,
2. Problems and key issues faced by state personnel,
3. State management plans,
4. Coordination,
5. Funding considerations,
6. Assistance and technical support to local projects, and
7. Monitoring and evaluation.

Each session is structured so that course participants are presented first with an understanding of how the material relates to their responsibilities as program managers. A fairly brief technical presentation is made by the trainers on the subject area for that session. The trainers then encourage discussion by the participants so that information and experiences can be shared. Finally, the trainers draw the session to a close by presenting a brief review of what was discussed and how it relates to previous and upcoming topics.

Each student is given a workbook that covers material discussed during the course. The workbook is generally designed to follow the sequence of the course. Chapters correspond to the sessions in the course. The workbook is also intended to stand alone as a significant reference describing the management of rural transportation through Section 18 and other resources. The workbook has been produced in a looseleaf format so that each individual can easily update the material from time to time.

Each chapter in the workbook contains a synopsis, a list of objectives, a chapter outline, the chapter text, and references to material in the chapter. Important exhibits follow most of the chapters. The workbook also contains a bibliography of key references and other references plus glossaries of terms, agencies and programs, and acronyms. The following sections of this paper summarize the contents of each section of the course.

INTRODUCTION TO SECTION 18: PHILOSOPHY AND FUNDING

The Section 18 program offers federal financial assistance for public transportation in rural and small urban areas. The states administer the formula-grant program by establishing a state program of projects. The goals of the program are to "enhance access of people in nonurbanized areas for purposes such as health care, shopping, education, recreation, public services, and employment by encouraging the maintenance, development, improvement, and use of passenger transportation systems." The program was authorized for a four-year period (FY 1979 through FY 1982).

The total funding for Section 18 is small in comparison with the overall funding needed to maintain and develop viable public transportation systems in rural and small urban areas. Because of the relatively low level of funding, major themes of the program include coordination with other funding sources by or with the Section 18 projects and simplicity and flexibility in administering the program.

The original authorizations for the Section 18 program were as follows: FY 1979, $90 million; FY 1980, $100 million; FY 1981, $110 million; and FY 1982, $120 million. Of these funds, $75 million for FY 1979, $85 million for FY 1980, and $12.5 million for FY 1981 have been appropriated. Approximately $8 million of the FY 1979 funds and $41 million of the FY 1980 funds have been obligated by the states. By the end of December 1980, more than 600 projects had been approved, including more than 500 for capital and operating expenses. By April 1981, 43 states had initiated capital and operating assistance projects.

Funds may be used for capital and operating assistance by state agencies, nonprofit organizations, and public transportation authorities operating services. For capital and administrative expenses, the federal share is 80 percent and the local share is 20 percent; for net operating expenses, as much as 50 percent is supplied by the federal government. As much as 15 percent of the state apportionment may be used for state administrative and technical assistance activities (the federal share for these funds is 100 percent).

PROBLEMS AND KEY ISSUES FACED BY STATE PERSONNEL

The following are some (but not all) of the more important issues and problems facing state and federal administrators of the Section 18 programs in 1981. Most of these issues and problems are related to local implementation concerns that the state or federal administration may have to address when dealing with local projects. Additional issues and problems are identified for discussion by the participants at each course presentation. The issues and problems are not presented in any particular list of priority. The resolution of these issues depends on the active involvement and participation of state personnel. One of the objectives of this session is to make FHWA aware of current problem areas in the program. This is accomplished through a round-table discussion with the participants.

Local implementing agencies, whether an individual transportation system or a unit of government, usually have a number of concerns in implementing a project funded through Section 18. Specific common concerns include the following: (a) funding for the Section 18 program, (b) availability of other funding, (c) coordinating efforts of various programs, (d) general-public versus special-client transportation, (e) cash-flow problems, (f) insurance, (g) Section 13c provisions, (h) Section 504 accessibility requirements, (i) carrier certification requirements, (j) use of funds from multiple sources, (k) private-intercity bus operators, (l) vehicle reliability, (m) vehicle maintenance, and (n) depreciation and amortization of vehicles and equipment.

Local concerns affect the administration of the Section 18 program at the state level. The state will probably be called on to respond directly to these local concerns in two ways:

1. As a response to specific requests for technical assistance and
2. In its role as liaison between the local projects and the FHWA and UMTA regional offices.

In addition, a state's awareness of these local concerns may influence its establishment, as well as its use, of certain project selection criteria, particularly those related to fair and equitable distribution and coordination. These concerns may also influence the decision of a project as to whether or not to apply for Section 18 funds.

STATE MANAGEMENT PLANS

The concept of each state preparing a management plan for how it will administer its Section 18 program was first introduced to the states in the December 14, 1978, letter from the U.S. Department of Transportation to the governors of each state announcing the program. That letter stated the following:

> It will be the responsibility of this State agency to develop a State Management Plan in accordance with regulations to be published at a later date. This plan will set forth the State's method for administering this program and will be approved by FHWA and UMTA....
>
> Although final regulations governing this program will not be published for a number of months, we feel it is important to make assistance available to local projects as soon as possible. In the interim period, until a State Management Plan is approved, the State will be allowed to operate under interim procedures and submit to the FHWA Division Office a minimal Interim Plan and a program of projects for approval.

To date, most states have prepared interim state management plans in accordance with this requirement. Once the final regulations are published, the states will be preparing and submitting final state management plans.

The regulations also require each state to prepare and submit an annual program of projects. Unlike the state management plan, which is submitted once and updated as needed, the program of projects is submitted annually.

Other submissions that FHWA requires from the states are the project applications. These are usually prepared by those who will receive the funds at the local level. All project applications must be submitted to FHWA for approval. As part of the project application procedure, each state must collect and maintain the project supporting information described in the regulation and submit this information with project applications.

The basic components of a state management plan are

1. Program goals and objectives;
2. Program management responsibilities at the state level;
3. Program for distribution of grant funds;
4. Program for coordination;
5. State program characteristics, including (a) eligible applicants, (b) local match and state financial participation, (c) project selection criteria, (d) planning requirements, and (e) process for encouraging private enterprise;
6. Contract administration and monitoring, including (a) procedures for monitoring compliance with federal regulations, (b) purchasing procedures, (c) local recordkeeping and reporting requirements, (d) local financial audit requirements, and (e) insurance requirements; and

7. Project application procedures, including (a) application procedures (when submitted, to whom, when to expect response, etc.), (b) information required in application, and (c) standard forms and agreements.

COORDINATION

The legislation that created the Section 18 program calls for the "maximum feasible coordination of public transportation services" in rural areas. Only a few of the great variety of earlier coordinated transportation operations achieved their initial objectives due to unrealistically optimistic ideas about what was "feasible". Therefore, it is crucial that efforts to coordinate begin with an extremely clear understanding of alternative coordination objectives, coordination strategies that are particularly applicable to chosen objectives, and the probable costs and benefits of specific actions.

What Coordination Is

The coordination of transportation systems is a process in which two or more agencies interact to jointly accomplish their transportation objectives. Coordination is presumed to be able to increase efficiency and productivity. Proponents of coordinated transportation systems contend that they can rationalize any community's transportation network while eliminating waste and providing high-quality service, all of this despite budget cuts (3,4). Critics of coordination charge that it is being oversold as a panacea to "reconcile the irreconcilable, harmonize competing and wholly divergent interests, overcome irrationalities in our government structure, and make hard policy choices to which no one will dissent" (5).

Why Coordination Efforts Emerged

In many rural communities, a variety of public and private agencies and organizations provide transportation services to the elderly and the handicapped. Many of these organizations provide transportation services that are limited to their specific clientele alone. These services emerged when it became evident to organizations that their clients had no other means of getting to the social services they needed. Suddenly, it seemed that every human service organization had its own transportation system.

At the same time that we became increasingly aware of the need for special transportation services, two other factors also became more clear. The first was the need for general-purpose transportation services for the general public in rural communities. The second was the increasing cost of meeting these demands. Accordingly, service providers (and client groups and politicians as well) have been concerned with how to make existing transportation services more efficient and effective. A closer look at existing systems has shown that many of these systems have been operating without regard to certain principles of economic efficiency and that some of these principles may be achieved through coordination. During the past five years, the concept of using coordination as a means of improving expanding services has gained wide acceptance. Coordination of social service transportation services is a strategy that has substantial intuitive appeal; thus, numerous coordination attempts have begun with very high expectations.

A great deal of investigative research has been done on coordinated systems (6). Based on this research, both negative and positive observations can be made. For example, on the positive side,

1. Coordination often results in the filling of service gaps in a community or geographic area.
2. Coordination can reduce duplication and overlap involved in social-service-agency transportation services.
3. Cost savings can accrue to some participating agencies in special forms of coordinated transportation service.

On the negative side, it is often more costly, more difficult, and more time-consuming to achieve coordination than most persons initially perceive. Although achieving coordination may appear to be a relatively straightforward task, it most definitely is not. The monetary and nonmonetary costs of coordination must be weighed against the expected benefits (which should be quantified in detail) in order to determine how much coordination is appropriate in a given situation. Different levels of coordination are appropriate for different situations. Coordination is a useful concept in some, but not all, instances. In order for the potential productivity and efficiency improvements in transportation operations to be realized from coordination, significant planning and administrative expenditures are necessary. Because of certain fiscal structures, volunteer contributions, or special service requirements, some agencies will never benefit from coordinating their operations. Coordination is only one of the many steps along the way to achieve a broader goal-- improving mobility.

FUNDING

Financial considerations are often the most significant obstacle to implementing successful rural transit systems. Over the past two decades, it has become increasingly rare for even the largest urban transit operations to cover operating costs out of the farebox, to say nothing of meeting their capital needs. Although the Section 18 program provides the first stable source of funding at the federal level for rural transit capital, operating, and administrative expenses, it is by no means sufficient to provide all of the transit funding needed in all rural areas.

Sources of Funds

Anyone who has dealt previously with rural transportation problems knows that financial barriers are the most significant obstacle to implementing rural systems. There are a number of significant sources of revenue for a Section 18 operator to consider:

1. Fares and other payments (for example, cooperative membership fees) from passengers,
2. Contracts with nontransportation firms and agencies whose operations require them to provide some transportation services,
3. Nontransportation revenue or auxiliary revenue (such as advertising or sales from maintenance of services),
4. Taxes levied by the transit system,
5. Bonds issued by the transit system,
6. Contributed services (in kind and voluntary contributions), and
7. Direct subsidies or grants from local, state, or federal sources.

In addition to these revenue sources directly available to a transit operator, other funding can possibly be obtained through the public or government body that subsidizes the operator. These include local taxes levied for the transit system and bonds issued by the public bodies for the transit system.

Table 1. Technical assistance techniques useful at various stages of project development.

Technique	Stage		
	Project Planning	Initial Operations	Ongoing Management
Hot lines			*
Public meetings and forums	*	*	*
Visits to local projects		*	*
Case studies of other projects	*		
Informational clearinghouse among projects	*	*	*
Informal contact between state and local projects		*	*
Information sheets on "priority subjects" by state, federal, regional, or divisional office	*	*	*
On-the-job training		*	*
Workshops, seminars, conferences		*	*
Papers, manuals, studies	*	*	*
Reports and regulations	*	*	*
Audio visual programs		*	*
Speaker's bureau			*
Lending library			*
Tours of existing projects	*	*	
Lists of funding sources	*	*	
Worksheets		*	*
Sample applications and forms	*		
Explanations of "assurances"	*	*	*
Standardized administrative material and documents		*	*
Models and formulas (e.g., demand model, unmet needs, local match formulas)	*	*	*
Catalogs of technical assistance resources	*	*	*

Other Funding Issues

Because funding is such a critical consideration, issues other than the sources of funds need to be treated in depth. The training course also examines the following subjects:

1. Saving money and budget stretching,
2. Cash flow,
3. Options for coordinating funding,
4. Local organizational structures that affect funding, and
5. Matching Section 18 funds.

ASSISTANCE AND TECHNICAL SUPPORT TO LOCAL PROJECTS

Effective communication and interaction between the states and their projects will probably prove to be the key to success in the Section 18 program. Technical assistance is a key element in this communication and interaction. It is useful from both the state and local perspectives. It helps to ensure that the state gets projects that will help in achieving the goals of the state plan; it also improves local projects' chances of success. A technical assistance plan is a required part of a state management plan and a portion of a state's Section 18 allocation can be used to provide that assistance.

The session on assistance and technical support to local projects discusses ways of understanding and organizing state interaction with local projects and focuses on technical assistance tailored to meet the specific needs of a project at various stages of its development: project planning, initial operations, and ongoing project management. Techniques recommended specifically for the three stages are given in Table 1. Lists of current transportation assistance materials available from specific states are included in this session.

This session also includes sections on determining appropriate kinds of public transit and motivating private operators. Exhibits of selected sources of information and examples of various assistance techniques are included in the workbook.

MONITORING AND EVALUATION

Evaluation is a method of determining how well you are doing. It serves two purposes: to save money and to avoid problems. Evaluation determines the appropriateness of current behavior and suggests directions for future actions.

Specific purposes of an evaluation of a rural transportation system are

1. To better meet the needs of people and the objectives of the system,
2. To control the costs of service,
3. To support and justify charges to social service agencies and others that have contracts for service,
4. To provide data for public information purposes, and
5. To provide information that can be shared with other agencies involved in similar projects.

Evaluation implies a commitment to change and improve the system being evaluated.

Evaluation should produce hard data that are useful to the local agency; for example, what kind of vehicles can provide the best service under given conditions? Evaluative data often must be collected for other purposes as well. For example, an agency that asks for federal funding is obligated to provide information to the funding agency. But the funding agency should not ask for information that will not also be useful to the local agency and should return information collected to the local agencies.

A system should not be evaluated against all other systems because all systems are not sufficiently similar in objectives or operations for comparisons. However, some systems are sufficiently similar for useful comparisons. Peer-group analysis involves evaluating a project in comparison with others that operate under similar conditions.

Specific Performance Measures

No agreement currently exists on precisely how to measure and assess the performance of transportation systems. To date, it has been agreed that a certain small number of descriptors are probably useful (although different ones are better for different uses) and that no one alone is a sufficiently global indicator of performance. Multiple measures are mandatory. A complete evaluation would include assessments of efficiency and effectiveness. A complete evaluation would include at least the following factors:

1. Cost per passenger trip (one-way)--Total system cost (all operating expenses plus administrative costs plus capital costs on a depreciation schedule) divided by the number of passenger trips (costs and trips must be recorded over the same period);
2. Cost per vehicle mile--Total system costs divided by the total distance traveled by all vehicles in the system;
3. Cost per vehicle hour--Total system costs divided by the sum, for all vehicles, of the number of hours that each vehicle is operated;
4. Load factor--The sum of the distances for all trips by all passengers divided by the sum of the

Table 2. Probable ranges for operating statistics for rural transportation systems.

Measure	Low[a]	High[b]
Efficiency		
Cost[c] ($)		
Per passenger trip (one-way)	1.82	6.17
Per vehicle mile	0.45	1.05
Per vehicle hour	7.50	19.00
Load factor (%)	6	35
Operating ratio (revenues ÷ operating and administrative costs)	0.25	1.0
Effectiveness		
Passengers per vehicle mile	0.12	0.3
Passengers per vehicle hour	2.2	6.0
Monthly passengers per service area population	0.2	1.2
Other descriptors		
One-way passengers per month	1000	8000
Monthly miles per vehicle	2000	7000

Note: The data are 1981 estimates based on tabulations by Ecosometrics, Inc., for 107 operational Section 147 demonstration projects and on procedures outlined in Appendix E of the report by Burkhardt, Knapp, and Ramsdell (9).
[a]Only 20 percent of all systems referenced have lower values.
[b]Only 20 percent of all systems referenced have higher values (with the exception of the statistic for operating ratio).
[c]Operating, capital, and administrative costs included.

seat miles provided by all vehicles (seat miles are the product of the number of passenger seats times the miles the vehicle traveled);

5. Operating ratio--Total system costs divided by total system revenues;

6. Passengers per vehicle mile--The number of passenger trips divided by the number of vehicle miles provided by all vehicles;

7. Passengers per vehicle hour--The number of passenger trips divided by the sum of the hours each vehicle is operated; and

8. Annual passengers per service-area population--The number of passenger trips taken during a year divided by the population of the service area.

The first five factors measure efficiency; the last three measure effectiveness. Other indicators (for example, cost per passenger mile and deadhead factor) have been proposed for transit systems (8) and may be useful for some systems to compare their performance with respect to special situations or objectives (for example, cost per passenger mile for elderly passengers). However, the eight measures listed above are probably the most appropriate for rural transit systems in that they can be readily collected, they are useful for comparisons, and they indicate performance and problem areas (but not solutions). These measures are usually, but not always, available at the same time. When they are available, one can be sure of getting a reasonably accurate picture of the system being analyzed. Probable ranges of efficiency and effectiveness statistics for rural transportation systems are given in Table 2.

A truly impressive performance monitoring system is that operated by the Michigan Department of Transportation (DOT) (9). By providing current and comprehensive figures, the Michigan DOT provides very useful assistance to local operators. The system is designed not to compare local operations with each other but to focus on changes in the performance of individual systems over time.

General Actions or Responses Resulting from Evaluation

What a program does with the results of the efficiency and effectiveness measures collected in its evaluation process depends on many factors. The amount of funds available to make changes, the level of funds already invested, and community political support all affect the manager's decision about what action to take. There are four general categories of possible action that can be taken: (a) preserve, (b) enhance, (c) alter, or (d) terminate the local project's current service. Program administrators can use various methods to help project managers take those actions successfully. The specific strategies for making changes are discussed in the course.

ACCESS TO THE COURSE

The training course is being provided by FHWA and the National Highway Institute through the auspices of the regional FHWA offices. Interested parties may contact Perry Davison of the Rural and Small Urban Public Transportation Branch of FHWA (telephone 202-426-0153) or Donna Stickley of the National Highway Institute (telephone 202-426-9141).

Presentations of the course have been given in FHWA regions 1, 3, 4, 5, 7, and 9. Attendance is by invitation only.

ACKNOWLEDGMENT

This paper summarizes materials produced by Ecosometrics, Inc., under contract to FHWA and the National Highway Institute. Other authors of that material were Sue F. Knapp, Hannah Worthington, and Peter M. Schauer. I gratefully acknowledge their assistance in the preparation of materials used in this paper.

The materials presented in this paper do not necessarily reflect the policies or positions of the U.S. Department of Transportation or of any other agency or individual.

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Abridgment

University-Sponsored Technical Assistance Strategy

ROBERT P. SCHMITT AND DAVID J. CYRA

The technical assistance strategy of the Office of Statewide Transportation Programs, University of Wisconsin-Extension, is described. The program of university-based technical assistance is presented as part of an overall outreach effort that consists of four basic components: need-based educational programming, information transfer and sharing, training programs, and technical or community assistance. The goals of the technical assistance program are presented along with a brief discussion of the interrelations between technical assistance and the other three program components. Finally, three case studies are presented to demonstrate technical assistance in action. The major theme is that successful technical assistance demands a collaborative approach between university personnel and community representatives in solving transportation problems of importance to local citizens.

In 1976, the Office of Statewide Transportation Programs (OSTP) was established to address those transportation educational needs that were not being met by government or other University of Wisconsin-Extension programs. OSTP is housed in the Division of Urban Outreach, a unique entity within the university system because it is part of the University of Wisconsin-Extension and the University of Wisconsin-Milwaukee. In order to provide a diversity of programs in transportation that are designed to meet the diverse needs found in the urban and rural communities in the state, OSTP personnel work closely with faculty and staff of the University of Wisconsin-Milwaukee, through its Center for Urban Transportation Studies, and with faculty in other units of the university system, through the Urban Corridor Transportation Institute.

Although the functions of OSTP are many, this paper emphasizes the technical assistance component and its relation to the other outreach components of the program. For purposes of this paper, technical assistance is broadly defined as a two-step process:

1. The provision of information about technological changes that creates awareness and stimulates interest and
2. Adaptation, adoption, or demonstration of some transportation improvement.

PHILOSOPHY OF TECHNICAL ASSISTANCE PROGRAM

The philosophy of OSTP is founded on the premise that very often the technical expertise of the university system can be applied to community transportation needs. In this approach, community needs are the focal point and the university serves as the broker in administering to those needs.

The technical assistance program is part of an overall outreach effort that consists of the following six basic principles and beliefs (1):

1. There is a fundamental relation between the university and the community of which it is a part. Communities benefit from increased educational opportunities and from the application of knowledge obtained through university technical assistance, training, and information transfer. The university benefits because its faculty and staff gain practical experience that is reflected in future outreach activities and traditional educational offerings.
2. Transfer of information, technical assistance, research, and education can best be accomplished when there is close communication between those who are faced with problems and those who have the capability to lend assistance in solving problems.
3. Historically, the university has been viewed as a leader in education and the creation of new knowledge. If the university is to remain at the cutting edge of relevant applied studies and thus meet the demands of a complex society, it must reach out into the community and play an active role in defining problems, in providing objective information for policy formulation, and in offering diverse, nontraditional educational activities and direct technical assistance.
4. Transportation outreach programs must be able to respond to current needs on a real-time basis. That is, the demand for technical assistance and/or information by practitioners and others is often immediate, and university personnel must respond quickly.
5. As is well known, some of the issues that arise in transportation are highly controversial, and dialog between opposing forces may be confined to formal processes such as public hearings. In these situations the university, unlike participating agencies, can provide a neutral environment within which effective, focused dialog can take place.
6. The lifeblood of a transportation outreach program involves recognition of the community as a very important resource, not only in terms of expertise but also in terms of needs identification. The development of transportation outreach programs demands a collaborative approach consisting of a genuine interchange of information between program planners and community representatives, and the program philosophy attempts to incorporate these viewpoints. This interchange ensures that the resulting programs--conferences, training programs, or technical assistance--meet the expressed needs of the community.

ORGANIZATION OF TECHNICAL ASSISTANCE STRATEGY

Basically, the concept of technical assistance is viewed as an important part of the broader concept of community assistance through educational programming. Technical assistance is providing specialized information to address a specific problem on a one-to-one basis. However, our view of technical assistance is quite broad because it is integrated with other components of the transportation program and because we believe that the process of providing technical assistance starts with problem definition and clarification and proceeds to the direct application of the information generated through technical assistance efforts.

The overall transportation education program is based on four components: need-based educational programming, information transfer and sharing, training programs, and technical assistance. Each of these components is described below, and then the interrelations between technical assistance and the remaining components are presented.

Need-Based Educational Programming

Need-based educational programming involves the planning, development, and implementation of educational programs such as conferences, workshops, and seminars. These are need-based because experience has demonstrated that specific problems such as

budget reductions for rural and specialized transportation and alternatives to rail abandonment are what is important to people. Transportation practitioners and other knowledgeable individuals are often consulted during the planning phase of a conference and very frequently participate directly. In addition, OSTP has an internal planning committee consisting of university faculty and staff. Each member keeps in touch with transportation developments in the community and the state within his or her area of interest and applies this knowledge by suggesting possible topics for future programs.

Information Transfer and Sharing

The dissemination of relevant up-to-date transportation information is a key ingredient in any program that involves education and technical assistance. This component consists of four basic parts: requests for information, information dissemination, the Transportation Briefs project, and availability of the Transportation Research Information System (TRIS). Requests for information are handled on a one-to-one basis. In most instances, the person who requests information is sent the appropriate reports. This is possible since OSTP, with cooperation from the Office of Technology Sharing of the U.S. Department of Transportation (DOT), serves as a statewide clearinghouse for research reports, manuals, and how-to publications.

Information dissemination consists of the information presented at conferences by transportation professionals as well as the distribution of written material on the topic being covered. Experience has demonstrated that distributing written reports in this manner is an effective means of information transfer. Visits to offices of regional planning agencies and county commissions on aging provide living proof that these reports are being used by planners and others to provide technical assistance in their communities.

The Transportation Briefs project, currently being implemented, is patterned after the Service and Methods Demonstration Briefs. However, the Transportation Briefs cover a wider range of topics, from public transit to rail transportation. The briefs are designed to provide useful but capsulized information on recent developments in transportation as well as information concerning contact persons and availability of publications. Recipients of the briefs include the county extension agents in all Wisconsin counties, the central and district offices of the state DOT, and the Wisconsin Department of Health and Social Services. All individuals on the briefs mailing list are encouraged to provide feedback on the usefulness of the briefs as well as suggestions for future topics. This is in keeping with our belief that information transfer functions best when it is a two-way process.

The Center for Urban Transportation Studies at the University of Wisconsin-Milwaukee maintains access to TRIS. OSTP, in cooperation with the center, promotes the use of this information source among transportation professionals at other campuses and at transportation agencies throughout the state.

Training Programs

One of the newest components of the transportation program is training. Within the past two years, training programs have been developed and offered in specialized transit driver training, passenger assistance techniques for drivers of specialized transit systems, quick-response methods for transit planning, and statistics for transportation engineers and planners. All of these programs were developed in response to the expressed needs of a variety of individuals throughout the state. In addition, each program emphasizes specific skills and provides substantial hands-on experience for participants.

Technical Assistance

We view the concept of technical assistance to be an important part of the broader concept of community assistance. The primary reason for this view is that from the user point of view what constitutes technical assistance varies from person to person. The technical information provided to one person may be quite useful, whereas the same information may be general knowledge to another. Sometimes people need more than an independent, quick-response evaluation of their projects. Because our concept of technical assistance is broadly based, we are able to respond to a variety of requests.

The goals of the technical assistance component are

1. To offer technically sound, professional-quality applied research that responds to expressed transportation needs;
2. To apply the specialized talent of the university institutions to transportation problems and, when possible, to make this expertise available to agencies and groups within the state; and
3. To provide both professionals and citizens with up-to-date information on important topic areas such as public transit, specialized transit, goods movement, and transportation energy conservation through applied research and technical assistance activities.

Another example of technical assistance is the Urban Corridor Transportation Institute. In the fall of 1980, the University of Wisconsin-Extension established the institute by providing funds for the conduct of applied research projects in 14 southeastern Wisconsin counties (urban corridor). The universities at Green Bay, Milwaukee, Oshkosh, and Parkside participate in this program by conducting projects in their respective communities. The institute is administered through OSTP and serves as an extension of the technical assistance component. The institute is a mechanism that provides faculty the opportunity to work on transportation problems in their own communities. The administrators of the institute encourage collaborative efforts from both campus-based faculty and community-based personnel in designing an applied research project that will provide technical assistance that is timely and useful to the community.

The four components of the transportation program are interrelated, and it is these interrelations that form the basis of the technical assistance strategy. All four program components have two things in common: They rely on connections with people, and they deal with open communications concerning the transfer of information on transportation issues and problems. The technical assistance strategy capitalizes on these two simple commonalities in the following ways:

1. Need-based educational programs (e.g., conferences) provide specialized information to people on specific topics. Conference attendees, through the course of a conference, provide us with specific information on their transportation-related problems and, hence, their technical assistance needs.
2. Information transfer and sharing also provide specialized information to people on request. It is important to note that, in order to be effective,

information transfer and sharing must be open.

3. At first glance, training programs appear to have little to do with technical assistance. However, this component is a form of technical assistance and has been quite useful in providing us with information on technical assistance needs not directly related to training.

4. The Urban Corridor Transportation Institute was established, in part, to address the technical assistance needs of urban and rural communities in the southeastern Wisconsin region. Faculty work cooperatively with appropriate agency personnel to refine and mold the projects to meet local needs.

5. The technical assistance component itself is used to develop connections with people throughout the state and to make available specialized information tailored to individual community needs. The fundamental rule governing our direct involvement in technical assistance is that there must be an expressed need for such assistance. Our overall program of transportation education is designed to help people recognize and articulate their technical assistance needs. Sometimes this strategy leads to specific requests for technical assistance and sometimes it does not, but it does require that local agency representatives take the initiative to recognize their own need for technical assistance and to do something about it.

TECHNICAL ASSISTANCE IN ACTION

The following examples help to illustrate how the words describing philosophy, strategy, and organization are turned into action regarding technical assistance.

Case Study 1

Case study 1 was done in the summer of 1979. Transportation issues were raised in the state through governmental statewide questionnaires, hearings, and other public forums. Section 18 (Urban Mass Transportation Act of 1964, as amended) was new, and states were being asked to participate in the program. The need in this case was to provide some educational sessions for the residents of Wisconsin that would (a) educate by providing current and practical information, (b) promote local dialog concerning transportation issues, and (c) minimize barriers that deny program participation and therefore reduce mobility.

The Wisconsin Department of Health and Social Services, the Wisconsin DOT, and OSTP cosponsored 5 one-day workshops around the state. The subjects covered were (a) transportation funding, (b) revision of school bus law, (c) insurance, (d) driver training, (e) coordination, (f) statewide needs assessment, and (g) outreach assistance available in the community. The workshops were well attended and provided the public with information that was developed into programs of their own.

Case Study 2

Case study 2 was done in the winter of 1979. Many volunteer drivers providing human service transportation have encountered insurance problems. In many cases, the personal automobile policy limits were not adequate to protect against potential liability losses. Some agencies did not have adequate insurance coverage. The need in this case was to provide information regarding a new coverage under the category "social-service-agency automobile" and provide instruction in evaluating pertinent insurance programs.

The Wisconsin Department of Health and Social Services, the State Insurance Commissioner's Office, the Association of Volunteer Coordinators, and OSTP published an OSTP newsletter covering two topics: (a) Excess Liability Coverage for Auto Insurance and (b) New Classification--Social Service Agency Automobile. The result of this action made available a special classification of liability insurance that counties have purchased to provide further protection for volunteer drivers.

Case Study 3

Case study 3 was done in the fall of 1980. The Milwaukee County Institutions Grounds contain health care and social service facilities for the county. The daytime population is in excess of 16 000 people. This concentration of people has created traffic and parking problems. The need in this case was to provide a study that would define the problems and make recommendations for their solution.

OSTP was asked by the Milwaukee County Institutions Department of Administration to investigate the feasibility of instituting major ridesharing programs for employees. OSTP, together with the Center for Urban Transportation Studies, used students to conduct the study and develop a final report. This effort combined applied research with practical application to provide recommendations that proved feasible and implementable.

SUMMARY

The technical assistance strategy of the University of Wisconsin-Extension OSTP is based on principles that are relatively easy to implement. Since technical assistance has an important place in all components of the program, the opportunities to provide such assistance are thereby increased. Through a comprehensive program of transportation education, it is possible to assist people in recognizing and articulating their technical assistance needs. It is truly remarkable to observe the progress some transportation agency people have made in this respect over the past few years. This, coupled with their feedback concerning the usefulness of our program, provides sufficient evidence that the broad-based strategy actually works.

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Part 7
Innovations

Can the Postal Bus Play a Role in Providing Rural Transportation?

DANIEL FLEISHMAN AND IMOGENE BURNS

In the search for new approaches to solving the rural transportation problem, one approach that has been proposed and investigated in the United States, and has seen widespread application in Europe, is the "postal bus". The postal bus concept basically involves the transporting of passengers in vehicles that are also engaged in the distribution and collection of mail along designated routes. The feasibility of the concept in terms of the nature of operational and institutional requirements and potential barriers is examined. The overall conclusion is that the integration of mail and passenger transportation appears to be a feasible approach to providing passenger service where none currently exists and/or for achieving greater efficiencies in the provision of both types of service.

There currently exists a substantial unmet need for "public" transportation in many rural areas in the United States. Both local and intercity services have been declining in recent years, and this has seriously limited the mobility of those rural residents who do not have access to automobiles. However, the viable options are quite limited; because of the extremely low densities and long travel distances involved, it is difficult to serve these areas efficiently with traditional forms of public transportation. This situation is exacerbated by rapidly escalating operating costs as well as the promise of reduced federal operating assistance over the coming years; rural operators are increasingly facing the realization that they must find new sources of revenue if they are to continue providing existing services, let alone expand their operations.

Both of these situations--unmet needs and worsening fiscal constraints--have spurred a search for new approaches to solving the rural transportation problem. One approach that has been proposed and investigated in the United States, and has seen widespread application in Europe, is known as the "postal bus". The postal bus concept basically involves the transporting of passengers in vehicles that are also engaged in the distribution and collection of mail along designated routes. These rural routes (called "star" routes), on which mail is distributed from regional centers to individual post offices (and then collected later in the day), are generally served by private carriers (called star carriers) under contract to the U.S. Postal Service. Thus, the postal bus would pick up and/or discharge passengers at the regional center or post offices (or along the route).

This integration of mail and passenger service can be carried out through one of three basic arrangements: (a) a star carrier transporting passengers along its mail distribution routes, (b) a passenger service contracting with the U.S. Postal Service to transport the mail (i.e., on star routes), or (c) a combination of the first two--i.e., a passenger service provider or public body contracting with a star carrier to provide passenger service. The first and third frameworks allow for the expansion of service to areas that are currently without it; the second addresses the budgetary problem facing existing operators by providing them with additional revenue while also enabling them to extend their passenger operations (i.e., to the star routes).

There are currently very few postal bus operations in the United States, and those identified to date are fundamentally star carriers. On the other hand, there are many such services in Europe. The major question that needs to be answered, then, is whether the postal bus can play a role in providing rural transportation in this country. This paper addresses that question, based on examination of existing operations, a review of previous (and current) studies, and an assessment of the key operational and institutional issues related to the feasibility and the potential of the concept.

REVIEW OF EXISTING POSTAL BUS OPERATIONS

The postal bus concept is certainly not a new idea. During the 1800s, stagecoach lines, which had developed to carry the mail, began to transport people and freight as well. Most of these operations flourished into the early part of this century, when they were forced out of business largely by the expansion of the railroads. The joint transportation of mail and passengers was never reintroduced in the United States to any significant extent, but the idea has taken hold once again in Europe. Although institutional and operational conditions in Europe are generally somewhat different from those here, the existing operations abroad do provide some indication of the potential of the concept and thus bear examination.

Europe

Scotland, England, Switzerland, Germany, Austria, and Sweden currently operate various forms of postal buses. In Switzerland, Germany, Austria, and Sweden, passenger service is largely limited to the major bulk-mail collection and distribution routes. Most of these buses have been operating for a few decades and have developed into passenger buses that also carry mail; the buses generally travel on trunk routes at fairly high speeds.

The Swedish Postal Administration, for example, operates the Mail Coach Lines, which deliver mail and freight, plow snow, and carry passengers in rural northern Sweden. The system operates over a route network of 7680 km (4800 miles), delivers approximately 3648 kg (38 tons) of mail and 4500 kg (50 tons) of freight per day, and carries 2.4 million passengers/year. Most routes are served by 3-6 round trips/day, and vehicles range in capacity from 9 to 55 seats.

The Swiss Postal, Telegraph, and Telephone (PTT) Service operates more than 8000 km (5000 miles) of routes and as many as 1300 vehicles. The Reisepost, a department of the Postal Service, operates some routes itself (known as the Regie Lines) and contracts out some of the lines (known as the Postautohalter Lines) to individuals. In 1980, 63 million passengers were carried on the Reisepost system.

The majority of the British postal buses, on the other hand, are similar to other European services only in that they provide a basic two-way service to and from a town or village. The British services differ in that almost all involve house-to-house delivery duties and letter-box collections rather than bulk-mail transportation. A typical Scottish postal bus makes two runs a day, one in the morning to deliver mail to towns and wayside mail boxes and

the second to collect mail from the towns. On both runs, the empty backhaul is used to transport people. In certain cases, only one-way service is available for passengers because of the scheduled times of the runs; school buses or private cars serve the other leg of the trip.

The development of Scottish postal buses was expedited by the passage of two pieces of legislation. In 1969, the British Post Office was converted to a public corporation. In recognition of the fact that the postal vehicles in rural areas were underused, the Act of 1969 authorized the British Post Office to do anything "which appears requisite, advantageous or convenient for the purpose of executing its duties." It specifically stated that the Post Office "may carry for hire or reward passengers in vehicles used by it for the purpose of its business." Previously, the 1968 Transport Act had made capital grants available to operators of regularly scheduled bus services for new vehicle purchases and offered refunds on gasoline taxes paid to operate these vehicles. Postal buses were deemed eligible for these subsidies.

Most Scottish postal buses operate at a slight surplus under the grant program. As a result, the program expanded rapidly in Scotland from 1 bus in 1971 to 127 in 1980. In 1980, Scottish postal buses carried a total of 156 000 passengers, or approximately 24 passengers/service/week. The services are offered in locations where users have little real alternative. About half the trips are made by senior citizens, and most trips are made for shopping and personal business purposes. Of necessity, the timing of most trips made on postal buses must be flexible so as to be accommodated by the specific schedule of the vehicle.

Despite the apparent success of the Scottish postal buses, the enthusiasm of the Scottish Post Office has waned somewhat. Apparently, it finds the passenger operations more time-consuming than warranted given the small surplus of the operation. Current sources indicate, however, that service has not been curtailed and that the network is being maintained at the current level.

United States

Very few examples of postal bus service comparable to the European services exist in the United States. Although it is not uncommon for U.S. intercity buses to carry mail, their primary function is passenger transportation; the mail contract, like package delivery, is secondary. There are, however, a few U.S. examples of the postal bus concept; we have examined two of these, both located in California.

The Mount Lassen Motor Transit Company in Tehama County operates a single 176-km (110-mile) route, transporting people, freight, and mail between Red Bluff and Susanville as well as six communities in between. The service runs 6 days/week. The one-way fare for the entire route is $7.25 and the round-trip fare is $13.80. Lower fares, prorated according to distance, are charged for shorter distances. The vehicle used is a 1976 Transcoach that has a seating capacity of 8 passengers (there are plans to expand to 14) and a mail capacity of 9 m^3 (300 ft^3). Ridership, which has been gradually increasing, currently averages approximately 4 one-way trips/day; 886 passengers were carried in 1978, 1005 in 1979, and 1204 in 1980. Passenger revenues account for approximately 12 percent of total revenues. In 1980, passenger receipts totaled $8384, freight revenues $19 530, and the mail service $36 019. Passenger fares are regulated by the California Public Utility Commission (PUC); Mount Lassen has petitioned for a fare increase of 15-30 percent, since fares have not been raised in four years.

Whereas the Mount Lassen manager indicated that the company just breaks even on the passenger service, the numbers cited above suggest that it is making some profit, since marginal costs certainly do not amount to $8000. Although the vehicle capital cost is higher than it would be for a simple mail van, the primary marginal cost of the passenger service is the insurance premium; the Mount Lassen manager estimates that, without passenger service, the insurance costs would be one-third of the current premium. No federal funding is received, either for capital or operating subsidy, but the state of California would like Mount Lassen to begin operating a new route under its rural assistance program. However, Mount Lassen is reluctant to do so, feeling that the acceptance of the subsidy would subject them to further regulation.

Like Mount Lassen, Kernville Stage and Freight Lines, based in Bakersfield, also carries passengers as a secondary service on its 77-km (48-mile) mail route. The service began as a stagecoach line and has carried both mail and passengers since 1865. Service is currently provided to and from the Bakersfield Greyhound bus terminal. The service is operated 6 days/week; the one-way fare is $3.10 and the round-trip fare is $5.00. The vehicle used is a Ford van equipped with four seats and a 42-m^3 (1400-ft^3) mail compartment.

Ridership on the Kernville service averages 2 one-way trips/day; passenger revenues are approximately $6.00/day, or $1800/year. The passenger revenue accounts for roughly 5 percent of total annual revenue. The manager of Kernville Stage and Freight Lines indicated that the number of passengers using the service has remained virtually unchanged for more than 10 years. He attributes this to the slow travel times and the low population density of the service area.

The manager also indicated that, as in the case of Mount Lassen, the company just breaks even on the passenger service. However, since the manager does not perceive insurance costs to be significantly higher due to carrying passengers, it is likely that Kernville is also making some profit, albeit quite small. Nevertheless, the company has petitioned the state PUC to discontinue the passenger component of its operation, regarding it as "a nuisance".

Differences Between European and U.S. Operations

The major difference between European and U.S. postal bus operations can be traced to the institutional and regulatory climates in the various nations. Whereas the concept has not been formally promoted, or even sanctioned, by the U.S. Postal Service, it has been formally endorsed by the postal departments in the aforementioned European countries. These departments have encouraged--in some cases, even required--the integration of mail and passenger service as a means of achieving economies in the delivery of both. As indicated earlier, the Scottish postal buses are subsidized and have come to constitute an important element of the nation's rural transportation program. In contrast, the U.S. Postal Service prohibits the transporting of passengers in its own vehicles and, in at least one instance (in West Virginia, as discussed in the next section of this paper), resisted--and effectively defused--an attempt at implementing a postal bus demonstration.

Although there exist various sociodemographic and geographic differences between the United States in general and specific European countries (e.g., Scotland has a lower rate of automobile ownership

and Switzerland has a generally rougher terrain), variations within the United States are just as great as those between the United States and any of the European countries. Thus, such differences cannot be said to account for the different postal bus situations here and abroad. More significant, perhaps, are attitudinal differences toward public transportation on the two continents: Europeans are generally more inclined to use it than are Americans. Residents of rural Scotland, for instance, have apparently grown accustomed to accommodating their travel needs to the infrequent postal bus schedules, a situation that is less likely to occur in the United States. Of course, as automobile ownership and operating costs grow, the willingness of Americans to adjust their travel schedules to those of available transportation providers may increase as well.

FINDINGS OF PREVIOUS AND CURRENT STUDIES

Although the postal bus concept has yet to see widespread implementation in the United States, there have been several studies and preliminary investigations of its feasibility. Although none of these have either produced conclusive evidence as to the potential of the concept or led to a demonstration, it is useful to review their findings.

Thus far, feasibility studies have been undertaken by the California Department of Transportation, the West Virginia Office of Economic and Community Development, a student at Pennsylvania State University, and Multisystems, Inc. In addition to these studies, the concept is being actively considered by the Pennsylvania Department of Transportation, the Greater Portland (Maine) Council of Governments, and White River Transportation Services of Bethel, Vermont. (It is certainly conceivable that the postal bus concept is being investigated elsewhere as well, but our research has not identified any other examples.) These efforts are described briefly below.

In 1978, the California Department of Transportation (Caltrans) investigated the feasibility of star route passenger service in two communities (1). The study briefly discussed the regulatory environment in California but focused on the operational feasibility of a postal bus demonstration in the two study areas. The study looked at the following issues: route and schedule compatibility of mail and passenger operations, duplication of existing public transit, potential ridership, type and cost of vehicles for joint mail and passenger use, and operating costs.

One study location was quickly discarded, largely because the mail delivery schedules did not meet potential ridership needs with respect to time and direction. The other, however, was judged to be more promising. Revenue projections based on the study ridership estimate and a reasonable fare level were compared with equipment and operating costs. The analysis showed a small profit for star carriers from the passenger service.

Accordingly, the study enthusiastically endorsed a demonstration project. However, a decision was made not to proceed with the demonstration, apparently because of a judgment that demand would be lower than estimated due to the nature of the star routes under consideration. It was projected that lower ridership could result in a deficit instead of a profit, which would make an unsubsidized operation infeasible.

A second feasibility study was conducted by the West Virginia Office of Economic and Community Development (WVOECD). Instead of providing service in unserved areas, WVOECD proposed to replace the public transit service in rural Pocahontas County with postal buses as a Section 147 demonstration (Rural Highway Public Transportation Demonstration Program of the Federal-Aid Highway Act of 1973): Star carriers would enter into contract agreements with the regional public transportation authority.

The demonstration was not conducted, however, because the feasibility study uncovered a number of potential problems. First of all, the star routes in the area made only one trip per day and would need to be modified to accommodate the needs of passengers. Second, the vehicles would be expensive, because they would have to be accessible to the handicapped (i.e., meet the requirements of Section 504 of the Rehabilitation Act of 1973). Third, the U.S. Postal Service regional Transportation Management Office (TMO) resisted the idea; it would require changes in their operations that would only be in effect for a trial period and would produce no apparent benefit to the Postal Service. Fourth, the cost was deemed to be excessive in that it required a 50 percent subsidy (although the study also indicated that this was probably lower than the projected subsidies for other public transportation services). Apparently, however, the most significant factor that caused the proposal to be dropped was the lack of interest on the part of the U.S. Postal Service. It should be pointed out, though, that this was probably too ambitious a plan for an initial demonstration of the concept. A more modest effort would seem to have been more appropriate and might have been better received.

A more recent study was conducted by Adams (2), a student at Pennsylvania State University, to determine whether a viable postal bus demonstration could be conducted in the State College, Pennsylvania, area. The Adams paper contends that the routes selected in both the California and West Virginia studies were atypical of most star routes and that they were generally incompatible with the requirements of passenger transportation. Adams proposed a postal bus demonstration that would use routes he considered more appropriate. Although a long layover would be required on the selected routes, he pointed out that the postal bus would provide a means for residents in rural towns to make use of stores, medical services, and a senior citizen center and return home the same day. No demand or cost estimates were included in the paper.

In addition to these studies, offices in at least three states are currently interested in the postal bus concept. The Pennsylvania Department of Transportation (PennDOT) has become interested largely in response to the efforts of Adams and the enthusiasm of the manager of the local postal facility in State College. PennDOT wants to undertake a study, through its Section 18 program (Urban Mass Transportation Act of 1964, as amended), that would look at the institutional and administrative feasibility of postal buses in Pennsylvania. If a favorable recommendation ensues, a demonstration project will be conducted.

The Vermont Agency of Transportation (Division of Public Transit Operations) is also quite interested in the postal bus concept and encouraged White River Transportation Services (WRTS) of central Vermont to submit a transportation system management (TSM) proposal to the U.S. Department of Transportation (DOT), that would include funds to assess and implement postal bus service. WRTS proposed to conduct a needs survey and analysis that would lead to a demonstration. WRTS envisioned contracting with a star carrier to provide service in the most rural sections of its service area. The TSM study was not funded, but WRTS and the state are still interested in testing out the concept.

In Maine, the Greater Portland Council of Government (GPCOG) has expressed interest in integrating mail delivery and passenger service in Cumberland County. GPCOG has identified seven potential star routes on which passenger service might be provided. It has assumed that regular buses could be adapted to meet the U.S. Postal Service specifications; however, no cost analysis has been conducted.

Thus, there has been a fair amount of interest in the potential of integrating mail and passenger transportation in the United States, as a means of extending transportation service to people without other options by making more efficient use of existing resources (i.e., star carriers) and as a means of enhancing the operating base and revenues of passenger carriers. None of these studies or analyses have led to demonstrations (although there may yet be one in Pennsylvania), but current trends in transportation economics suggest that this may prove to be a valuable approach to serving low-density areas that do not have any public transportation. As costs for all types of transportation operations rise and as the level of federal operating assistance dwindles (the level of Section 18 funding is not expected to be increased over the next several years and may yet be eliminated), interest is likely to increase over the coming years.

Each of the studies discussed above looked at a particular area (in fact, particular routes) in assessing the feasibility of postal buses. Each study encountered specific barriers associated with its particular routes and/or institutional setting. However, the nature of the barriers is such that they may well be peculiar to the individual situation and would not constitute problems in other areas. The next sections of this paper examine the operational and institutional feasibility of the postal bus concept within the full range of potential barriers and benefits.

OPERATIONAL FEASIBILITY OF POSTAL BUS CONCEPT

The studies described above raised a number of key issues that affect the operational feasibility of postal buses. The following discussion reviews these issues, which include route and schedule compatibility, demand, costs, and the interest of the U.S. Postal Service and star carriers in the idea.

Routes and Schedules

As discussed above, postal bus routes and schedules must be compatible with both mail and passenger transportation needs. Many star carrier routes and schedules operate outward from regional centers in the mornings and inbound in the afternoons, against the normal pattern of demand for passenger transportation service. Many star carriers also travel during unacceptably early or late hours, and delivery schedules are tightly drawn.

Some star routes, however, do appear to better meet the travel needs of rural residents and would be good candidates for postal bus service. Where the (local) postal facility is interested, some routes and schedules could also be adjusted somewhat to better facilitate a postal bus operation. The manager of the State College, Pennsylvania, sectional facility, for example, has expressed a willingness to adjust routes to try to accommodate postal bus service if an interested star carrier can be found. He said that, although the star carrier contracts are put out for bid and processed at the regional TMO (in Pittsburgh), the local sectional facility has some latitude in defining the actual delivery routes and schedules. Thus, if the proper routes are selected and local postal managers are willing to make slight adjustments, routes and schedules should not constitute a barrier to the concept.

Demand

Data on rural ridership are seldom disaggregated so as to be useful in gauging potential demand for postal bus services (i.e., covering individual routes in very low-density service areas). The postal bus systems discussed earlier, Mount Lassen Motor Transit Company and Kernville Stage and Freight Lines, carry approximately 4 and 2 riders/day, respectively. Mount Lassen has experienced an annual ridership growth of approximately 13 percent for the past 3 years; Kernville ridership has remained stable for 10 years. Whether Mount Lassen advertises its service to the public was not indicated; Kernville does not.

To further complicate the problem of determining potential patronage, traditional methods of projecting demand are generally inappropriate for rural areas because the necessary background data are often not routinely collected (a major reason being that these operations often have very small staffs and cannot afford the time required to collect and tabulate such data). In any event, although the demand for postal bus service is likely to be quite low, considering the low level of service offered, it may be high enough to make the service feasible, at least as a secondary source of revenue. (A postal bus operator does not have to be especially concerned with the level of passenger demand on the star route, since he or she would be carrying the mail primarily for the purpose of generating additional revenue.)

Costs

The principal marginal costs associated with a postal bus service include (a) vehicle conversion or procurement, insurance, and licensing and (b) labor and fuel. As regards the vehicle used, the postal service specifies the size of the mail compartment based on the maximum anticipated daily mail volume over the four-year contract period. Most of the vehicles currently operated by star carriers are station wagons or vans that have a mail capacity of 6-30 m^3 (200-1000 ft^3). In terms of applicability to postal bus operation, station wagons generally do not provide the required locked compartment for mail separate from the passenger area, and vans typically do not have seating capacity for more than one or two passengers.

As mentioned earlier, the Caltrans study proposed use of a six-passenger crew-cab (four-door) pickup truck with a lockable camper shell and additional steps into the cab. Both 0.68- and 0.9-Mg (0.75- and 1-ton) models were considered, depending on mail volume requirements. (The 1981 cost of these vehicles was around $10 000/truck.)

In the case of a passenger transportation operator seeking to carry the mail, the only vehicle-related cost involves adapting the interior so as to create a separate mail compartment. The cost of this will depend on the size of the compartment required under the terms of the contract and the nature of the vehicle (e.g., how many seats and wheelchair stations).

For star carriers, insurance and licensing fees increase substantially when passenger service is added. For instance, the California PUC requires passenger insurance coverage as much as 15 times higher than that required by the U.S. Postal Service for the transportation of mail. Mount Lassen indi-

cated that, without passengers, its insurance costs would be only one-third of current payments; PennDOT expects that insurance costs might account for 80 percent of the cost of a postal bus demonstration. The cost tends to be especially high for new operators that have no history of providing passenger service. One rural transportation system contacted reported annual insurance costs of between $14 000 and $17 000 for 12 vehicles carrying 25 passengers/vehicle/day. Although postal buses would usually fall into lower coverage categories due to lower passenger volumes, premiums can still be expected to be fairly high.

Licensing fees would include the necessary driver's licenses and the cost of any required certification. The fees for certificates of public convenience and necessity (CPCNs) for transporting passengers are generally between $10 and $75, and renewals are between $5 and $35.

Labor and fuel costs for star carriers should not be substantially higher with passenger service. First of all, many star carrier drivers are self-employed. For other cases, the U.S. Department of Labor publishes the Register of Wage Determinations Under the Service Contract Act, which specifies the minimum hourly wage for drivers employed on contracts for mail hauling, based on region and type of vehicle. The March 1981 Register specifies an hourly minimum between $7.50 and $9.00.

Of course, integrally related to the cost of implementing and operating the postal bus is the level of additional revenue that the service will generate. For the star carrier transporting passengers, the amount of revenue will obviously depend on the fare level and the level of ridership. As explained earlier, the two postal bus operators contacted claim that they collect sufficient revenue to cover the additional cost of the passenger service, and it seems likely, in fact, that they make at least some profit. Nevertheless, several other star carriers contacted did not feel that they would be able to cover their additional costs through the farebox. That seems unlikely, given the nature of additional costs. However, such a concern is likely to discourage many star carriers from adding passenger transportation unless they are subsidized by a public body.

On the other hand, a public transportation operator stands to gain considerable revenue from taking over a star route. These routes carry contract reimbursement rates that average nearly $0.56/km ($0.90/mile), and total annual revenue from star route contracts has been as high as $85 000 for star carriers in Vermont and New Hampshire (most of these carriers are in the $15 000 to $30 000 range). Such guaranteed revenue is much needed by many rural transportation providers (i.e., in light of federal cuts in such areas as social service programs, the Comprehensive Employment and Training Act, and community action programs), and thus makes such an arrangement rather attractive, at least where operators can cover the star routes with minimal additional expenditure (i.e., without having to purchase additional vehicles).

Other Issues

Other considerations include the interest of star carriers in operating postal buses and the timing of the initiation of service. Star carriers interviewed were not interested in carrying passengers because they did not want to increase their administrative burdens and because they currently use their vans for other, more lucrative activities (e.g., freight delivery) in between mail deliveries. One carrier, for instance, delivers newspapers throughout the region, whereas another transports local produce.

If this lack of interest is indicative of star carriers in general (and it might well be, in light of the low potential payoff from carrying passengers), then the greatest potential for the postal bus concept probably lies in the passenger carrier option--either bidding on star routes themselves or contracting with star carriers. Several passenger service operators contacted (both public and private) were generally interested in one of these options, either adding mail service as a means of increasing revenues or contracting with star carriers to transport passengers in areas too difficult for them to serve.

Of course, the timing of the initiation of service is also a factor in terms of the organizational arrangement because of the four-year contract schedule of the Postal Service. A new four-year contract period began July 1, 1981, in Pennsylvania, Vermont, and New Hampshire and will start July 1, 1984, in Maine. Since the Postal Service must pay an indemnity for breaking a signed contract, any postal bus implemented on an existing star route would require the participation of the existing star carrier. It is essentially for this reason that PennDOT proposes to find an interested star carrier within the boundaries of a transit authority. The authority would then sign a purchase-of-service agreement with the star carrier to provide passenger transportation along its mail route.

The alternative option (i.e., if a passenger carrier wishes to directly operate the postal bus service) would require that the interested operator follow the standard star route contract process and bid on the star route in question at the appropriate time.

To summarize, the issues discussed here will have rather different impacts, depending on the nature of the particular location and situation. For instance, some routes and schedules do not lend themselves to passenger service, whereas others are more conducive to the integration of mail and passenger service. The nature of marginal costs probably constitutes the most significant operational constraint to implementing a postal bus arrangement, although this will obviously be affected by the level of demand and the fare and, thus, the revenue generated. Other issues (e.g., nature of interest and timing) will certainly affect who operates the service but would not seem to represent barriers to implementation in general.

REGULATORY AND INSTITUTIONAL ISSUES

The regulatory requirements and administrative procedures that can have a bearing on the feasibility of a postal bus operation in the United States are reviewed below.

U.S. Postal Service

As previously mentioned, although the U.S. Postal Service owns and operates a large fleet of mail vehicles, private contractors, known as star carriers, perform much of the mail distribution among rural post offices. Star carrier contracts are awarded by the U.S. Postal Service TMOs located in each of approximately 20 subregions. Generally, the contracts are renewed or advertised for bid on a state-by-state basis. In mid-1981, for example, the New England region TMO (located in Boston) renegotiated contracts for New Hampshire and Vermont. Most contracts are set for a four-year period, the maximum period allowed by U.S. Postal Service regulations. However, if the TMO anticipates a change in

mail volumes, it can set the contract period for a shorter period of time.

When the contracts are awarded, current contracts are renewed whenever possible. The contract is advertised for bids if the service provided by the contractor has been unacceptable, if an unreasonable rate increase is requested, or if the contractor does not wish to renew the contract. Sealed bids are requested; the bid price must include operational, fuel, and payroll costs and the contractor's profit. The contract is then awarded to the lowest reasonable bidder or to the bidder deemed "most advantageous".

Although federal rules and regulations prohibit the use of U.S. Postal Service vehicles for carrying anything other than mail, there is nothing in the rules and regulations for contract carriers that prohibits the use of these vehicles for carrying passengers; the Postal Service General Provisions (3) require only that the mail be carried in a locked compartment separate from the passengers. In fact, in contracting out a route, the Postal Contracting Manual (4) stresses that "it should be determined that no other form of transportation exists that would be less expensive to handle the mail involved at the desired service standards."

On the other hand, in the case of using star carriers to transport passengers, the prevailing attitude of the Postal Service is that passengers may be carried only if they in no way inconvenience or inhibit the timely delivery of the mail. The General Provisions (3) specifically state that "the mail shall not be delayed to accommodate passengers, freight, or other traffic."

Each regional TMO, however, has considerable latitude in the interpretation of these provisions. The reactions of the regional TMOs that were contacted ranged from some willingness to experiment with the postal bus concept as a possible way to hold down the rapid growth in the per mile rate, to general skepticism, to a feeling that, although there are no insurmountable legal hurdles, the administrative problems would be monumental.

Thus, although the U.S. Postal Service does not prohibit the carrying of passengers on its contract routes, it does have certain specific requirements (i.e, concerning the timing of delivery and collection and the nature of the separate mail compartment) and contracting procedures that affect potential postal bus operations. Although these do not constitute real barriers to the concept, a reluctant regional contracting office can create administrative roadblocks to its effective implementation and operation. Where the regional facility is amenable, it should be possible for the administrative and regulatory requirements to be worked out fairly easily (and modified if necessary).

State Regulations Pertaining to Passenger Transportation

Unless specifically given exempt status, as in the case of motor vehicles engaged exclusively in the delivery of the U.S. mail, most motor carrier and passenger transportation services that operate entirely within the boundaries of a state are regulated by the state PUC. These regulations cover safety (e.g., licensing of drivers) and insurance and, to varying degrees, rates, routes, and schedules for passenger transportation. The regulations that pertain to postal bus operations in selected states are discussed below.

As previously discussed, California has a history of combined mail-passenger operations. As a result, the California PUC has a set of regulations specifically for such operations. These regulations require a CPCN for all carriers that propose to transport passengers over a regularly scheduled route. Once a certificate has been awarded, a carrier must petition the PUC to transfer the certificate to another operator or to discontinue service.

Other states (e.g., Maine, New Hampshire, Vermont, and West Virginia) also require such certificates for passenger transportation operations and have similar requirements regarding license transfers or discontinuance of service. Maine and Vermont require a public hearing on each application to help ensure that the application or proposed discontinuance is in the public interest.

Some states exempt certain government activities from public utility regulation. Chapter 376 of the New Hampshire Property Transportation Law specifically exempts "motor vehicles engaged exclusively in work for any branch of the Government of the United States or for any department of this state, or for any county, city, town or village...." Pennsylvania law has a similar clause that exempts routes operated by public transportation authorities from specific regulation by the Pennsylvania PUC. As stated earlier, the postal bus study proposed in Pennsylvania plans to look into the feasibility of working through a regional transportation authority to avoid the requirement of obtaining a separate CPCN. By signing a purchase-of-service agreement with a star carrier, the authority could issue temporary operating rights that could be easily transferred from carrier to carrier by simply transferring the purchase-of-service agreement.

As suggested earlier, most states also specify the minimum insurance requirements for motor vehicles engaged in the transportation of passengers. These requirements are considerably higher than those set by the U.S. Postal Service for mail delivery alone.

The CPCN is not difficult to obtain in most states, on payment of the appropriate fee (ranging from $10 to $75 in the states surveyed), as long as the operation is "sound" and there is no competing service in the area. The major drawback of this requirement for star carriers willing to transport passengers is that, once a certificate is awarded, the requirement to provide service remains until such time as the issuing agency gives permission either to transfer authority or to discontinue service. Thus, if a star carrier chose to discontinue carrying mail or the postal service chose not to renew a star carrier's contract at the end of the four-year period, the requirement to carry passengers would not automatically be terminated as well. If the new star carrier wished to carry passengers, he or she would have to petition to transfer the certificate. If he or she did not wish to carry passengers, the holder of the certificate would have to provide service until authorized to discontinue service. Such a requirement may make many star carriers reluctant to enter into such an agreement; the proposed PennDOT arrangement may therefore make the postal bus concept considerably more appealing to star carriers.

Federal Transportation Regulations

If postal bus operators sought to use federal transportation funds--e.g., Section 18 (rural) or Section 6 (demonstration)--they would be subject to certain regulations affecting public transportation operations. These regulations include Sections 13c and 3e of the Urban Mass Transportation Act of 1964 and DOT rules pertaining to Section 504 of the Rehabilitation Act of 1973. The first, Section 13c, deals with protection of labor in existing public transportation operations; it requires that a new opera-

tor receive a "sign-off" by the U.S. Department of Labor. Section 3e pertains to the protection of the rights of private operators. The DOT Section 504 regulations relate to accessibility requirements (for the handicapped) on public transportation services; as currently stated, all transit fleets in areas of 50 000 or more people must be made accessible to the handicapped (i.e., a certain percentage of vehicles must be equipped with wheelchair lifts).

Although Sections 13c and 3e might present certain administrative hassles to potential postal bus operators, they are not likely to constitute serious impediments to implementation of the concept. Section 18 applicants have generally been granted a one-time waiver of the Section 13c provision if absolutely no service exists at the time of project implementation. Since there typically would be no existing transit service in areas that initiate postal bus service, Section 13c should not be a problem. Similarly, Section 3e is not likely to be a problem in the implementation of a postal bus service, since such a service would generally be introduced only in areas not currently served by other private operators (e.g., taxis).

The Section 504 rules, as they are now stated, could prove troublesome in that postal bus operators might be required to provide lift-equipped vehicles (at least 50 percent of the fleet would have to be accessible). However, these rules have not been finalized. At this time, it is unclear how the final rules will affect rural operations in general and the postal bus in particular.

CONCLUSIONS

Based on the research conducted thus far, it would seem that the postal bus is certainly a feasible concept for providing passenger transportation service where none currently exists and/or for achieving greater efficiencies in the provision of both passenger and mail distribution and collection services. The integration of these two functions can potentially be accomplished through three different arrangements: (a) a star carrier transporting passengers, in addition to its normal mail distribution functions, on its own initiative; (b) a star carrier providing passenger service under contract to a public body (i.e., a regional transportation operator or authority or a county government); or (c) a passenger transportation service operating a star route in addition to its normal functions.

Of these alternatives, the first would seem to offer the least potential for developing a postal bus operation. As Table 1 indicates, there are considerably more potential barriers to a star carrier adding passenger service than to a passenger carrier adding mail service. Whereas none of these barriers is insurmountable (actually, most will not be factors in the majority of situations), the combination of several can make the endeavor more trouble than it is worth. Moreover, the cost issues alone may be serious enough to dissuade most star carriers from initiating such an effort. There is certainly the potential for making a profit. However, in a market in which demand is highly unpredictable and uncertain, it would seem that many star carriers would be unwilling to put up with the administrative problems associated with procuring a CPCN, and the operating requirements of marketing the service, collecting fares, and attempting to meet passengers' travel needs, for a limited potential benefit. Furthermore, the requirements associated with common carrier regulations discourage experimentation with the postal bus concept in that those star carriers that receive a CPCN cannot readily discontinue passenger service if it does not prove financially viable.

The second alternative, which involves subsidization of a star carrier, appears to have some promise. Although the star carrier might still be faced with the regulatory requirements mentioned above, he or she is guaranteed a profit (or at least a break-even situation) and thus has an incentive for carrying passengers. This arrangement will benefit the contracting body in that it is likely to be less costly to subsidize a mail carrier to transport passengers along its existing route than to provide a separate passenger service in that area.

Finally, the third option--the passenger carrier taking over a star route--would seem to have considerable potential, providing an operator can successfully bid on a star route. Since star contracts are generally renewed as long as the existing carrier wishes to continue (and if the carrier provides adequate service), this alternative can only be implemented in a location where an existing star carrier does not wish to renew the contract at the end of a four-year cycle and where the public transportation operator is able to submit a low enough bid. Since star carriers do on occasion retire, die, or simply decide to get out of the business, renewal is not a major barrier in all locations; however, the ability of the prospective postal bus operator to come up with a low enough bid may constitute a serious barrier in most places. The cooperation of the Postal Service in a particular location can therefore be quite important.

The third arrangement offers several advantages (over the other two) for the prospective postal bus operator: (a) no need for a new CPCN, (b) little or no increase in insurance payments, (c) no need for major vehicle modifications, and (d) less uncertainty about the ability of revenues to cover costs, since a certain demand may already exist and, more important, since the primary reason for carrying the mail would be to increase revenue by way of the Postal Service contract (generally considerably more remunerative than carrying passengers in low-demand areas). In light of proposed federal transportation cutbacks, as well as rapidly escalating operating costs, the prospect of a guaranteed revenue source

Table 1. Potential barriers to postal bus implementation and operation.

	Barrier	
Type of Issue	Star Carrier Providing Passenger Service	Passenger Transportation Operator Providing Mail Service
Regulatory and/or institutional	Must get CPCN and must continue to carry passengers, even if no longer carrying mail; Section 13c; Section 504	Proper mail compartment; timing of star contract cycle (every 4 years) and nature of bidding procedure
Operational	Strict mail distribution schedules (i.e., without tolerance for passenger pickup and drop-off); probability of very low level of service and potential difficulties of passengers getting to and from postal bus stop; incompatibility of some star routes with passenger needs	Strict mail distribution schedules
Cost	New vehicle; additional insurance	Adaptation of vehicle (for mail compartment)

is likely to appeal to many rural operators.

Thus, it is not surprising that interest in the postal bus concept is growing, as demonstrated by the number of recent studies and planning efforts as well as increasing concern on the part of rural operators over future funding sources. Although it is difficult to predict demand for such service, the results of current systems suggest that there is certainly some demand, however modest, for even a very low level of service in low-density areas. Permutations of the various institutional and operational issues may impede efforts to implement a postal bus operation, but none of these issues should constitute major barriers, at least in a cooperative institutional setting (i.e., referring to the state PUC and the regional postal facility). Plans for implementing postal bus service to date (except for the existing operations, of course) have been thwarted by uncooperative Postal Service officials and/or inappropriate scope of service. In the proper setting, a modest effort (i.e., covering only one or two routes to start with) would seem to have a good chance at successful implementation and operation.

In summary, this paper has examined the feasibility of the postal bus concept as a means of improving the rural transportation situation. Based on the evidence to date, it would seem that the integration of mail and passenger transportation functions can potentially play a role in providing rural transportation, at least in certain areas and institutional settings. This last point is the key: The regulatory requirements and restrictions, operational environment, and nature of demand vary considerably from one area to the next, and the feasibility of the postal bus varies accordingly. Therefore, demonstrations and attempts in several diverse settings are necessary to enable a true assessment of the applicability and potential of the concept.

ACKNOWLEDGMENT

This paper is based on research sponsored by UMTA and performed under contract to the Transportation Systems Center (TSC). Special thanks are offered to Joel Freilich of TSC for his commentary and assistance during the project.

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Abridgment

Section 13c Labor Protection: A Review of Its Effectiveness and Impacts

JOSEPH W. HARRISON AND LONG H. PHAM

The impacts of the Section 13c special warranty and waiver procedures on the nonurbanized transportation program, which were authorized by Section 18 of the Urban Mass Transportation Act of 1964, as amended, are assessed. The study found that warranty procedures at the state level caused significant initial program delays. Once the warranty was accepted by the state department of transportation, however, little delay was observed. Conversely, rural transit operators and government officials expressed their concern over the unknown liabilities implied in the warranty. Most operators signed the warranty to fulfill grant requirements only, not understanding fully their obligations under the warranty. Generally, transit employees as a group were not aware of the protections offered them. The study uncovered no evidence indicating that labor rights would have been violated in the absence of the warranty. Furthermore, the lack of understanding by transit managers and employees of the warranty provisions seriously constrains the effectiveness of the Section 13c labor protections in the Section 18 program even if labor rights were violated.

The Surface Transportation Assistance Act of 1978 added a new Section 18, Formula Grant Program for Areas Other Than Urbanized Areas, to the Urban Mass Transportation Act of 1964. Section 18 authorized funds for capital improvement and operating subsidy for public transportation projects in small urban and rural areas. As with urban transportation projects, the labor protection provisions under Section 13c have been extended by the Urban Mass Transportation Administration (UMTA) to all grants under Section 18 programs.

Section 13c requires that fair and equitable arrangements be made to protect the interests of existing transportation employees who may be affected by such assistance. Such arrangements shall include provisions as necessary for (a) preservation of rights, privileges, and benefits under existing collective bargaining agreements or otherwise; (b) continuation of collective bargaining rights; (c) protection of employees against a worsening of their positions with respect to their employment; (d) assurances to employees of acquired mass transportation systems and priority of reemployment for employees terminated or laid off; and (e) paid training or retraining programs. Anticipating cases in which Section 13c requirements may not be necessary, the law provides that the Secretary of Labor may waive the Section 13c provisions.

Initial efforts by the U.S. Department of Transportation (DOT) to press for a liberal waiver of the Section 13c requirements proved unsuccessful. Months of negotiation between DOT and the U.S. Department of Labor (DOL) followed. In June 1979, DOL finalized the special warranty and waiver procedure

for exclusive application of Section 13c to the Section 18 program. This procedure avoids case-by-case negotiation of Section 13c provisions used in urban areas by furnishing ready-made labor protection arrangements. However, DOL ruled that a waiver may be granted by the Secretary of Labor only if there are no transportation employees who might be affected (adversely or otherwise) by the project. To date, all four waiver requests have been denied by DOL.

DOT and transit advocates feel that the lengthy Section 13c special warranty document is overregulatory and overprotective. It increases paperwork and significantly delays the implementation of the Section 18 program. DOL and labor advocates, on the other hand, believe that the special warranty and waiver procedures successfully meet statutory requirements for labor protection with a minimum of red tape. The different views stem primarily from their different interpretations of legislative intent concerning the application of the waiver. The purpose of our research, however, was not to reevaluate the congressional intent concerning the waiver. Rather, we attempted to empirically assess the successes and problems with the Section 13c special warranty requirement in the Section 18 program and to evaluate the effectiveness of the warranty in protecting rural transit workers.

STUDY DESIGN

Two approaches were used to obtain information for the study. First, existing information sources were reviewed, including published reports, congressional records, testimonies, unpublished letters, memoranda, and data available from DOT and DOL files. Second, unstructured interviews were conducted with officials from DOT, DOL, state, and local transportation agencies; managers, employees, and union representatives of rural public transportation systems were also contacted. (Time and funds available for this project did not permit the use of scientific sampling and survey methods. The information obtained is considered to be indicative but should not be extrapolated to all similar programs.) In all, representatives of 17 states covering many regions throughout the United States were interviewed. The interviews were designed to solicit the opinions of labor advocates (i.e., DOL, transportation labor unions, and employees) as well as transportation advocates [i.e., Federal Highway Administration (FHWA) division offices, state administrators of Section 18 programs, and rural transit operators].

EFFECTIVENESS IN ACCOMPLISHING LABOR PROTECTION GOALS

The effectiveness of Section 13c in accomplishing labor protection was evaluated in terms of the ability of the warranty and waiver procedures (a) to prevent possible job displacement and (b) to preserve benefits and privileges of workers that might be affected by Section 18 programs. We were unable to find evidence that job displacement was avoided due to the inclusion of the labor protections under the Section 18 programs. Most of the operators contacted felt that Section 13c provisions had done little to protect employees. Rather, employees were protected naturally by the fact that the rural systems were in a growth mode. New buses or vans were purchased with Section 18 funds; thus, more employees were needed. Although Section 18 grants might be used to increase automation and displace workers, no operators contacted in our interviews would cite a case in which this would occur in their operations.

Even if some workers were adversely affected, the usefulness of the Section 13c warranty is limited by the lack of effective enforcement procedures. For example, the notice required by DOL to inform employees of their rights under the warranty was rarely (if ever) posted in the operator facilities visited. State administrators were aware that the technicalities of Section 13c were not being followed by operators; however, efforts to enforce compliance were rare. State administrators neither had the time nor believed that employees would benefit from such actions.

Even if the notice was posted and an employee was aware of a possible adverse effect, the employee may not have known how to initiate a Section 13c claim. State administrators were also unclear about what action to take if a claim is made. For example, one state official erroneously believed that he could make a final determination on the possible Section 13c violation if the complaint was addressed to him. In some cases, the claim has to be settled in court; however, the legal fees may be too costly for rural transit employees who are not union members.

The special warranty does not seem to be an effective deterrent to violation of labor rights because neither rural transit operators nor their employees seem to understand it adequately. Some local administrators and operators simply signed the warranty in order to receive funding. They knew that a labor protection document was signed but had little knowledge or memory of the particular protections they had accepted. The lack of knowledge among local administrators and operators may account for the general lack of knowledge found among employees. Very few employees were aware of any protections offered them by Section 13c.

We also found no evidence to indicate that Section 13c has helped to preserve the benefits and privileges of employees. Where unions do not exist, Section 13c provides a minimum coverage and a method for settling labor disputes. Thus, one might expect an increase in employee protection in areas where unions are not prevalent. We found no support for this assumption. In most instances, neither employees nor operators perceived changes in labor protections due to Section 13c. Whether the system was a union or nonunion shop had no bearing on the response received. The notion that the special warranty had no impact on the extension of labor protections to employees was also suggested by state DOT officials and field representatives from FHWA.

Positive statements about the effectiveness of Section 13c and the special warranty came from DOL representatives and union officials. Both of these groups stressed the importance of the warranty as a means of resolving disputes and setting up minimum rights and standards. They viewed the significance of Section 13c as a mechanism for enforcing protections. If this is the major purpose of the special warranty, then its usefulness might be measured in terms of the number of violations submitted for grievance. For Section 18 programs, only one labor violation claim had been filed, yet no determination had been reached. The DOL and the unions view this as an indication that the warranty is working effectively: It has served as a deterrent to violations of labor rights. Although this may be true, neither warranty advocates nor state administrators and transit operators were able to document that labor protections would have been violated without the warranty.

In brief, we found no evidence that labor violations would have occurred without the warranty. Furthermore, if violations did occur, the warranty might not have been effective because employees did not know they were protected or how to initiate a grievance. In addition, the warranty does not seem to be an effective deterrent against violation of

labor rights because few transit operators in rural areas understand the document adequately.

IMPACT ON RURAL TRANSPORTATION PROGRAMS

The special warranty and waiver procedures have been criticized for causing adverse impacts on the Section 18 program, such as delaying implementation of Section 18 programs, promoting unionization of workers in the rural transit industry, and reducing the operational efficiency of rural transportation systems. These issues are examined below.

Program Delays

The first perceived impact of the Section 13c special warranty was the delays experienced at the state level when the program first started. These delays were particularly significant where a state constitution prohibited the state DOT from accepting the liabilities implied in the warranty. Despite DOL assertions that it did not intend to make the state the ultimate guarantor of Section 13c claims, these states did not feel adequately protected by the DOL interpretation. Delays attributed to Section 13c ranged from a few weeks to about a year. However, about four-fifths of the states were estimated to have experienced little or no delay because the state DOT was unable to accept the special warranty. Budget and coordination requirements delayed many state applications for the Section 18 grants. This finding contradicts the widespread belief that delays in initiating the Section 18 program were due mostly to the special warranty requirement.

Our study also revealed that there would have been little or no program delay at the state government level if the DOL had not required the state to serve as a party to the warranty. This requirement, implied in the language of the warranty and the state Section 13c certification letter, was interpreted differently between the states and DOL and among the states. Once accepted by the states, the warranty caused little processing delay by state and FHWA administrators.

A few counties and municipalities refused to apply for Section 18 grants because of the concern about the warranty requirements. Generally, the warranty was accepted, although the operators were unanimous in opposing it. They feared the warranty's "unlimited liabilities" and argued that the requirement is inapplicable to rural areas. Rural operators accepted the warranty because others did and because no claim had been successful. For these reasons, state administrators and FHWA personnel agreed that a few successful claims may create panic among operators and seriously delay Section 18 programs. Most of the local problems with Section 13c were matters of perception, not actual experience. Operators were fearful of unknown liabilities associated with the warranty. Nevertheless, this perception strongly influenced the decisions of the operators and caused many of them to postpone the submission of applications for Section 18 grants.

State administrators and transit operators generally regarded the Section 13c labor protection requirements as another burden. The Section 13c protections caused changes in structures and procedures that affected Section 18 recipients. In Virginia, Utah, and some other states, public corporations were formed to implement Section 18 and the protections of Section 13c. Where constitutional barriers were encountered in Texas, a certification by legal counsel was required to release Section 18 funds. In both cases, administrative layers and paperwork increased. In general, significant delay was experienced only at program start-up, when many state representatives and operators had difficulty at first selling Section 13c to local elected officials.

Unionization

The study found no evidence indicating that acceptance of the warranty would promote the unionization of rural transit workers in the area. In fact, unionization is not even a concern of Section 18 grant recipients in most cases. Only in the state of Washington, state administrators and transit operators were strongly concerned about the effects of Section 13c on unionization. In all other states, administrators and operators believed that the Section 13c warranty had no effects on creating an environment favorable for unionization.

Operational Efficiency

Transit advocates contended that the application of the Section 13c warranty to rural transportation led to interference with transit coordination, competitive contracting procedures, and the general operational efficiency of transit systems. To gauge such impacts, we examined the following measures:

1. Service--Were the number of routes, runs, or hours of operation extended or reduced due to Section 13c?
2. Performance--Has the level of service (quality) provided by the system changed because of the implementation of Section 13c protections?
3. Coordination--Has the state's efforts to coordinate with human service organizations or other transit providers for more efficient transit systems been hampered because of Section 13c?
4. Contracting procedures--Has the ability to contract for services been affected by Section 13c protections?
5. Innovative practice--Has the institution of Section 13c protections affected innovation in transit system practices?

The results of our interviews indicated little connection between efficiency and Section 13c. Changes in service and performance were due entirely to the availability of Section 18 funds. Without the federal assistance, at least three-quarters of the systems examined would have folded or would not have been initiated. The remainder would have to curtail their operations substantially, and many will eventually discontinue all services if federal assistance is lost.

None of the 17 states contacted planned to coordinate and reorganize their rural systems in a way that would require the discharge of some employees. Therefore, the Section 13c protection was seen to have neither perceived nor actual impacts on the coordination. Similarly, our interviews revealed no case where transit managers expected to change their plan to adopt new technologies or innovative practices because of Section 13c provisions.

DOL did not clarify whether employees of a provider that loses a competitive bid or negotiation for continued service are protected by the warranty. DOT officials were concerned that such a protection would reduce the competitiveness of transit management companies. However, with the phasing out of operating subsidies in the Section 18 program, possible Section 13c effects on contracting procedures will no longer exist.

CONCLUSIONS

The net impacts of Section 13c on employment condi-

tions, compensation, and operational efficiency have been small. On the negative side, the Section 13c warranty has caused some initial delays in the Section 18 program. It has also caused considerable uneasiness among operators because of the "unlimited liability" requirement. However, from the overall perspective, operational efficiency has not been signficantly affected and no major and lasting harm could be found. On the benefits side, no evidence was found that Section 13c has made a significant contribution to labor protection in the Section 18 program. Thus, although the warranty requirement has no serious negative impacts, it adds little, if any, measurable benefits.

Obviously, certain Section 13c benefits are not measurable in this study. These include the effects of Section 13c as an assurance to transit employees that their rights and interests are recognized and protected. In addition, it is possible that some employees who may have benefited from the Section 13c warranty were not detected in our investigation. From our interviews and the lack of Section 13c claims, we believe those employees to be very few. Their possible benefits may not compensate for the perceived or actual problems involved in implementing and maintaining the Section 13c protections in the Section 18 program.

ACKNOWLEDGMENT

This paper was developed from a May 1981 report by JWK International Corporation. The research project was conducted under contract with FHWA. FHWA and DOL staff members were very generous in helping us to obtain information and in sharing their program experiences. Their comments on the draft report were considered in the preparation of the final report. Nevertheless, we alone are responsible for the opinions and conclusions expressed in that report and in this paper.

Abridgment

Using a State Management Plan Option for Section 18

DAVID E. SMITH

An overview of experiences of the Kentucky Department of Transportation with the federal Section 18 program for public transportation in nonurbanized areas is presented. The difference in administrative philosophy between urbanized-area and non-urbanized-area transit programs is given as one reason for the success of Section 18 in Kentucky. Kentucky's first state management plan was short and concise and drawn from existing transit programs. The revised management plan gives Kentucky the authority to administer the Section 18 program with little federal interaction after receiving federal approval of a list of potential grants. The intent of the new management plan is to shift the administration of the Section 18 program in Kentucky closer to a block-grant program. The major benefit to both the local systems and the state is in the time and effort saved in getting grants approved.

The first comprehensive federal transit assistance for communities of less than 50 000 population became a law on November 6, 1978. The non-urbanized-area public transportation program, or Section 18 as it is more commonly known, was signed into law after several years of strong lobbying by the smaller transit systems across the country. Ever since Section 5 of the Urban Mass Transportation Act of 1964 established an operating assistance program for urbanized areas in November 1974, the smaller systems had been asking for equal consideration. Nonurbanized areas were eligible to apply to the Urban Mass Transportation Administration (UMTA) for capital grants under Section 3 of the Act, but operating assistance was unavailable.

Although the Section 18 program that emerged from Congress offered the same types of assistance as the Section 5 program, it was quite different in many respects. These differences had a lot to do with the success of the Section 18 program in Kentucky.

For example, the funds were apportioned to the states and the states were given an active role in administering the program. In the Section 5 program, the states were given the option of taking a strong role for cities between 50 000 and 200 000 population. The Kentucky Department of Transportation (KYDOT) decided against assuming such a role because there were only five eligible cities and three different UMTA regional offices to deal with. KYDOT did, however, believe that it could serve a legitimate role as the administrator of the Section 18 program. For the smaller systems (those with fewer than 10 vehicles), it made a lot more sense to have the state capital, Frankfort, serve as the focal point for the Section 18 program rather than have each small operator deal individually with an UMTA regional office many miles away.

Another important difference relates to the decision to permit three funding categories: capital, operating, and administrative. KYDOT has always felt that the most critical aspect of operating an efficient and effective transit system, especially in small urban and rural areas, was good management. KYDOT wholeheartedly endorsed the administrative grant category at the higher 80 percent/20 percent funding ratio. This funding option has served as an incentive for some of the smaller urban systems to hire full-time managers and for some agencies to join together and establish regional public transportation coordinators to manage the existing services better and increase public awareness of the benefits of public transportation.

Still another major difference was in the agency selected at the federal level to administer Section 18. When the Federal Highway Administration (FHWA) was first being talked about as the federal agency responsible for Section 18, everyone was a little apprehensive. KYDOT, obviously, had a long history of involvement with FHWA in its highway programs. The public transportation staff of KYDOT had a little experience with FHWA in the Section 147 Rural Highway Public Transportation Demonstration Program of the Federal-Aid Highway Act of 1973, but staff was much more accustomed to dealing with UMTA on transit planning, Section 16b2 (Urban Mass Transportation Act of 1964), and other public transportation

programs. FHWA's lack of transit experience concerned KYDOT. KYDOT did not believe that Section 18 should be administered just like any highway project. FHWA's policies and procedures were based on more than 60 years of experience in the highway field. On the other hand, the fact that the FHWA division office was right down the street was again a big benefit to both the state and the individual small system. In Kentucky, FHWA did, however, exhibit a strong interest in Section 18. Soon after Section 18 became law and before the emergency regulations were issued in December 1978, the FHWA division office asked to meet with KYDOT to discuss Section 18 and other KYDOT public transportation activities. It was this interest and spirit of cooperation that carried Section 18 to where it is today--Kentucky's new state management plan.

Following is an explanation of how the administration of Section 18 has evolved in Kentucky and has led up to the new state management plan. The Section 18 emergency regulations were issued on December 13, 1978. In early January 1979, KYDOT met with all existing non-urbanized-area transit systems to discuss the program. From the data gathered at that meeting and information received from FHWA, KYDOT submitted in late January a program of projects containing five capital, seven administrative, and seven operating projects. A short, six-page state management plan was prepared in early February. The plan contained some basic goals and objectives, an explanation of the KYDOT method of assuming a fair and equitable distribution of funds, a mechanism for faster coordination, public input procedures, application evaluation criteria, methods for dissemination of information on Section 18, reporting requirements for local projects, and the ability of KYDOT to provide technical assistance.

The primary goal of KYDOT was to get Section 18 project applications written and approved as quickly as possible. KYDOT did not spend a lot of time preparing a polished management plan, hoping to cover every possible situation that might occur. KYDOT made some mistakes and had some problems but, most important, Section 18 funds were awarded to local systems expeditiously. In fact, the first application was submitted to FHWA for approval in February 1979 and approved in March 1979. This was just one week after the first program of projects was approved. That particular application was one that had been submitted to UMTA in May 1978 for Section 3 funds and was returned to the applicant to seek Section 18 funds.

KYDOT did not prepare any formal application guidelines until March 1980. Until that time, the acceptable format included the 11 items listed in the emergency regulations and some standard assurances and resolutions taken from the UMTA Section 3 guidelines. If a transit system requested a sample application, it was sent a copy of one of the better Section 18 applications previously submitted.

The FHWA division office seemed to be satisfied with the KYDOT approach. Many of the early problems encountered centered around local match requirements. A majority of the federal agencies were slow in determining what unrestricted funds from other federal programs meant. Section 13c of the Urban Mass Transportation Act of 1964, as amended, never did seem to be a big issue. The KYDOT interpretation was that the state could not be held liable if the financial obligation was passed on to each applicant. To date, all applicants have signed the special warranty.

The program seemed to be going fairly smoothly, but the amount of paperwork that was going back and forth between KYDOT and FHWA was beginning to overwhelm everyone. It seemed that every aspect of an individual project had to get FHWA approval or concurrence. In almost every instance, approval was never in doubt, but FHWA written policies (Federal Highway Program Manual) dictated the need for FHWA action.

It was, in fact, the FHWA division office staff that first approached KYDOT about seeking more state autonomy over the Section 18 program. In March 1980, FHWA wrote some final draft regulations that were to be issued to replace the December 1978 emergency regulations. Those draft final rules did have an outline for a state management plan that, if approved by FHWA, would turn most of the administration of Section 18 over to the states. States would have the authority to review and approve applications and would only have to ask FHWA to authorize funds.

This type of arrangement between states and FHWA is not a new concept. The Federal-Aid Highway Act of 1973 permitted the U.S. Department of Transportation (DOT) to pass on to the states responsibilities concerning projects on the federal aid system, except the Interstate system, when states certified that they would comply with all required laws, regulations, directives, and standards. DOT had to make a final project inspection, and the states had to make periodic reports. KYDOT has been operating under this arrangement for more than five years. The results are that less time has to be devoted to paperwork between KYDOT and FHWA and more time can be spent on actual project-related activities.

The new KYDOT state management plan was submitted to FHWA in May 1981. As mentioned earlier, the format follows that outlined in the proposed draft final regulations of March 1980. The plan, exlusive of the appendices, is only 12 pages long and is divided into 10 sections. The plan, in itself, does not change any of the Section 18 procedures or guidelines that have been used all along. What it does do, however, is turn over 90 percent of the responsibility for the program to KYDOT. After the annual program of projects is approved by FHWA, the administration of Section 18 rests with KYDOT. FHWA still has to authorize funds for each project, but that is handled by FHWA fiscal staff and each application does not have to be approved by the FHWA planning and research staff.

The first two sections of the plan are introductory in nature and state basic KYDOT goals and objectives and its organizational structure. The third section details the types of technical assistance that will be offered to Section 18 grantees, such as transit planning, grant writing, system start-up, and management assistance. KYDOT strongly believes that management assistance is the most important and beneficial service that a state can provide. Other sections explain how KYDOT will promote and encourage coordination with existing public and private carriers primarily through the planning process and a mandatory coordination meeting prior to the submission of any grant application. The section on the KYDOT method for the distribution of funds simply states that distribution will be based on needs identified through the planning process and on the interest generated at the local level. KYDOT has been fortunate in that the amount of funds apportioned to Kentucky has exceeded the amount of qualified applications.

The most important section of the plan describes how KYDOT will manage Section 18 and ensure compliance with all necessary laws and regulations. The simplest way to explain how Section 18 is managed in Kentucky is to follow an application through the process. KYDOT accepts applications anytime. Applicants are encouraged to set the Section 18 application to a local fiscal year. KYDOT will also

accept two-year applications.

First, the annual program of projects is prepared through consultation with existing grantees and submitted with the KYDOT overall federal aid program of projects. The entire program goes through the A-95 review process at one time (Office of Management and Budget Circular A-95: Evaluation, Review, and Coordination of Federal and Federally Assisted Programs and Projects). Once a project has been cleared through the A-95 process and the program of projects has been approved by FHWA and UMTA, the application process starts.

Applicants are encouraged to submit draft applications three to four months before the beginning of the applicant's fiscal year. Existing grantees are expected to write their own application, and KYDOT offers to write applications for new applicants. The first step for first-time applicants is to submit a short (three- to five-page) proposal, including an estimated budget. It is hoped that most problems can be ironed out before a lot of time and effort is devoted to writing an entire application. The proposal review concentrates on the proposed budget and the state objectives of the project in an attempt to match funding to anticipated results. KYDOT pays a lot of attention to the financial expectations of a prospective applicant. The type of service to be provided is basically left to the local decision makers. KYDOT provides a lot of guidance and assistance to applicants in preparing realistic budgets so that the local community is well aware of the costs associated with providing transit service, especially in regard to the required level of matching funds. After an acceptable proposal has been negotiated, a draft application is prepared. New applicants and existing grantees seeking another year's funding are now on the same schedule. Applications are prepared in accordance with KYDOT guidelines. The guidelines are incorporated in the state management plan.

After the final application is reviewed by the KYDOT staff, it is recommended to the KYDOT Secretary for approval. If the Secretary concurs in the staff's recommendation, the KYDOT Office of the Controller sends the necessary forms to FHWA to get the federal funds authorized. A copy of the application is sent to FHWA for its files. When funds are authorized, a contract is executed between the grantee and KYDOT and the project is ready to go.

KYDOT has authority to review and approve all subcontracts, specifications, and budget modifications. This also includes the construction and inspection of maintenance facilities. FHWA does periodic reviews but does not really enter the picture again until the closeout of a particular grant.

Just as it scrutinizes a grantee's budget during the application process, KYDOT monitors requests for reimbursement. KYDOT maintains this fiscal orientation throughout the entire project. Its primary role is that of a financial manager of the federal funds. Local decision makers should have the responsibility for providing the most appropriate level and type of service for their community within the financial resources available. KYDOT will, however, provide technical assistance to communities interested in improving their performance. By maintaining a tight hold on the financial aspects of a project, KYDOT can subtly encourage systems to improve performance.

Time savings should be the most dramatic result of the implementation of the new management plan. The application approval process (the time between the submission of a final application and the execution of the project contract) should be reduced by two to three months. The time needed to approve specifications, subcontracts, and budget modifications should be reduced by one month. This management concept also frees up more staff time and makes it possible to provide additional technical assistance and project monitoring because a lot of the paperwork between KYDOT and FHWA has been eliminated. Obviously, KYDOT can be more responsive to the needs of each grantee.