

## TOWARD THE DEVELOPMENT OF AN ACCOMMODATION SERVICE POLICY

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*Continued public support for ever-increasing operating deficits of transit service demands that uneconomic services be curtailed. Nevertheless, a certain amount of service may be justified in terms of community welfare as "accommodation" to particular user groups -- those which are dependent upon public transportation for mobility. This paper suggests that transit agencies no longer need make this judgment intuitively. A rigorous set of decision-making rules which test uneconomic routes or services for their efficacy in meeting community-welfare demands is presented. Under these rules, routes are successively evaluated against five criteria: operating ratio, effectiveness, intensity, captive riders and community welfare. A case study of the application of this algorithm to a medium-size transit system is presented to illustrate the method. The procedure, by specifying the threshold values for each parameter, may be adapted to the needs of any transit system -- every segment of the system can be continually re-examined to determine whether the drain on financial resources is justified by the contribution made to community mobility.*

Only recently has the downward trend of transit ridership been reversed in American urban areas. Between World War II and 1972, the number of public transportation users declined by nearly 70%. Principally because of the energy crisis and the attendant high cost of gasoline, transit usage increased by 514 million annual trips between 1972 and 1976 (Table 1).

That more people are coming to recognize the necessity and virtues of public transportation is a long overdue realization. Transit patronage gains have been accompanied, however, by more than proportional increases in cost. As indicated in Table 1 (1), vehicle kilometers between 1972 and 1976 increased twice as fast as ridership. While operating revenues registered a significant gain during the period, operating expenses increased nearly four times faster. The nationwide operating ratio reached 1.92 in 1976, meaning that only 52% of costs were met from operating (largely farebox) revenues. And there is no evidence that this trend of ever-increasing deficits has been halted.

Thus, while citizens are clamoring for service extensions and entirely new services, and are in fact using these services in increasing numbers, transit agencies are caught in the difficult position of making increasing demands on the public monies which support them. Even the long-awaited passage of the 1974 amendments to the Urban Mass Transportation Act, permitting the use of federal formula grant funds to meet operating deficits, has been insufficient to stem the tide.

To keep abreast of public requests for service while keeping the operating deficit under some control, a number of cities including New York, Washington, New Orleans, San Diego, Baltimore and Philadelphia have recently increased the fares on their transit systems. This is a drastic step for public agencies to take, particularly when so many of the public acquisitions of the Sixties were conditioned upon lowering, or at least stabilizing, fares. The impact of these increases can be seen in the quantum increase in average fare between 1975 and 1976 -- in a single year, fares increased by nearly twice as much as they had in the preceding four years.

The last general round of fare increases this country saw represented the final attempts of private transit operators to stem the tide of red ink. Despite the haunting similarity in the cries of the riding public, there is a fundamental difference today. The deficits of the Fifties and Sixties were brought on by shrinking patronage, followed and exacerbated by deterioration in both quantity and quality of service. The contraction of the industry begun decades before had reached the critical stage. Today, under public ownership, service has been improved, extended and expanded until it is out-distancing the public's ability or willingness to pay. Still, a public agency has an obligation to serve: it is difficult to say no to a constituent whose tax money is being used to support the system.

### Accommodation Service and Present Policies

Yet, because of economic constraints, hard decisions must be made concerning who will be served and how much service will be provided. In the past, systems offered certain services with the knowledge that revenue generated would not be suf-

Table 1. Recent trends in american mass transit operations.

OPERATING CHARACTERISTICS	1972	1973	1974	1975	1976	PERCENT CHANGE 1972-1976
PASSENGERS (MILLIONS)	6,567.0	6,660.0	6,935.0	6,972.0	7,081.0	7.8%
VEHICLE KILOMETERS (MILLIONS)*	2,926	3,058	3,179	3,316	3,377	15.4
AVERAGE FARE	\$ .3142	\$ .3180	\$ .3220	\$ .3297	\$ .3571	13.7
OPERATING REVENUE (MILLIONS)	\$1,728.5	\$1,797.6	\$1,939.7	\$2,002.4	\$2,161.1	25.0
OPERATING EXPENSE (MILLIONS)	\$2,128.2	\$2,419.8	\$3,102.4	\$3,534.9	\$4,139.4	94.5
OPERATING RATIO (EXPENSE/REVENUE)	1.23	1.35	1.60	1.77	1.92	56.1

Note: 1 kilometer = .6 miles

ficient to offset costs of operation. Such routes were termed "accommodation" services because the service was maintained as an accommodation to the traveling public. In a privately owned, profit-making transit enterprise, the operator could schedule a sufficient level of profitable service to more than offset the losses arising from accommodation routes.

Today, however, most services -- and, in fact, entire transit systems -- are deficit operations. The problem of determining which lines constitute atypical demands on system resources, which today may be regarded as accommodation services, is extremely difficult in the absence of the acid test of profit or loss. Most transit systems have no policies which guide them or other public decision-makers in defining the existence and the extent of accommodation service provided, other than *ad hoc* determinations usually based on political expediency. (2) This is true despite the very real responsibility of a publicly supported transit system to provide accommodation service to those user groups dependent upon public transportation for mobility.

As a notable exception to this rule, the Massachusetts Bay Transportation Authority adopted a "Service Policy for Surface Public Transportation" in January, 1976. (3) While not dealing explicitly with an accommodation service policy, the document contains a set of "Economic/Social/Environmental Standards." Taken together, these standards define differential levels of satisfactory economic performance depending upon what other social needs the service might be satisfying.

Starting from a similar premise -- that accommodation service must be justified on non-economic grounds if it is to be offered -- the authors have developed a comprehensive methodology for identifying and evaluating accommodation services. This three-step procedure is described below.

#### Methodology

The methodology was designed in the recognition that passenger service and community welfare measures, in addition to fiscal criteria, should be major determinants in defining true accommodation routes. The three steps in the process are:

##### Step One

Determine the important characteristics of each of

the routes in the system. The following categorical information is compiled for each transit line:

Fiscal Performance. Normally expressed as the operating ratio (cost/revenue).

Passenger Market Performance. Encompassing both effectiveness (defined as the ratio of passengers/kilometer) and intensity (defined as the percentage of system passengers using the particular service or route).

Captive Rider Performance. Some measure of the route's function in serving the transit dependent -- e.g., the ratio of users with no automobile available/total route users.

Community Welfare Performance. Some measure of the aggregate mobility needs of the specific area or community served -- e.g., the percentage of households with no automobiles in the service area or some comparable measure of immobility or economic deprivation.

##### Step Two

The second procedural step involves the formulation of minimum acceptable threshold values or standards for each characteristic that should be met by every route in the system. This step is the policy determination element of the process, but standards can be rigorously determined. Any one of several different approaches can be chosen but it is important for the measure to be dynamically related to the economic, operational and social service characteristics of the services offered. Static measures (e.g., labeling a route as unsatisfactory if it carries less than 2.0 passengers per kilometer) are inherently inflexible and subject to continual redefinition over time. Such statistical measures as system mean values and standard deviations may be more satisfactory. Another approach is to specify a threshold value which divides each set of characteristics so that one third of the routes fall below this level.

### Step Three

The final step consists of the comparison of individual route performance against the minimum acceptable values established above. This comparison is a successive filtering process in which each route failing the test on one characteristic is tested on the next parameter. Routes failing all five tests are not justified in terms of their economic performance or contribution to community mobility. They are thus candidates for redesign or abandonment.

### Case Study Application

This procedure was developed and applied in a recent study of a medium-sized transit system. Route statistics for each of the five characteristics for the 17 routes in the system are set out in Table 2. Using the "worst third" method described above yields the threshold values for each parameter shown at the bottom of the table.

The filtering decision process is illustrated schematically in Figure 1 as a sequential series of five questions. The analysis proceeds as follows:

**Operating Ratio Criterion.** All routes must have an operating ratio of 3.31 or less. If the operating ratio exceeds 3.31, consider the:

**Effectiveness Criterion.** Services failing the first criterion must have an effectiveness measure of at least 1.59. If the route's effectiveness is less than 1.59, consider the:

**Intensity Criterion.** Services failing the preceding criteria must have an intensity measure of at least 2.9%. If passenger intensity measures less than 2.9%, consider the:

**Transit Dependency Criterion.** Services failing the preceding criteria must have a user group more than 17.6% of whom do not have an automobile available. If transit dependents constitute less than 17.6% of the riders, consider the:

**Community Welfare Criterion.** Services failing the preceding criteria should serve a community in which households with no automobile available constitute more than 5.9% of total households. Services not meeting this final standard would be considered candidates for possible elimination or re-design to improve their performance.

Evaluation of the transit routes in this community by this method is shown in Table 3. Comparing all route operating ratios to the standard of 3.31 reveals five routes -- F, G, I, L and P -- which exceed this level and are thus candidates for further examination. On the second measure, effectiveness, we find that Route G exceeds the standard and thus should be retained. The other four routes fail this test as well and must be scrutinized further.

Both Routes F and L carry a higher proportion of the system's passengers than the threshold of 2.9%. Routes I and P just fail this test, and also fall below the standard for usage by the transit dependent. Again on the criterion of community welfare, these two routes are deficient. Thus, from a group of five routes with unsatisfactory financial performance, three were found to be contributing sufficiently to the community's benefit to warrant their retention. Only

two routes were identified as candidates for abandonment or significant revision. Subsequent detailed analysis of each of these routes led to their major redesign in order to improve their operating characteristics.

Figure 1. Sequential Evaluation of Transit Routes.

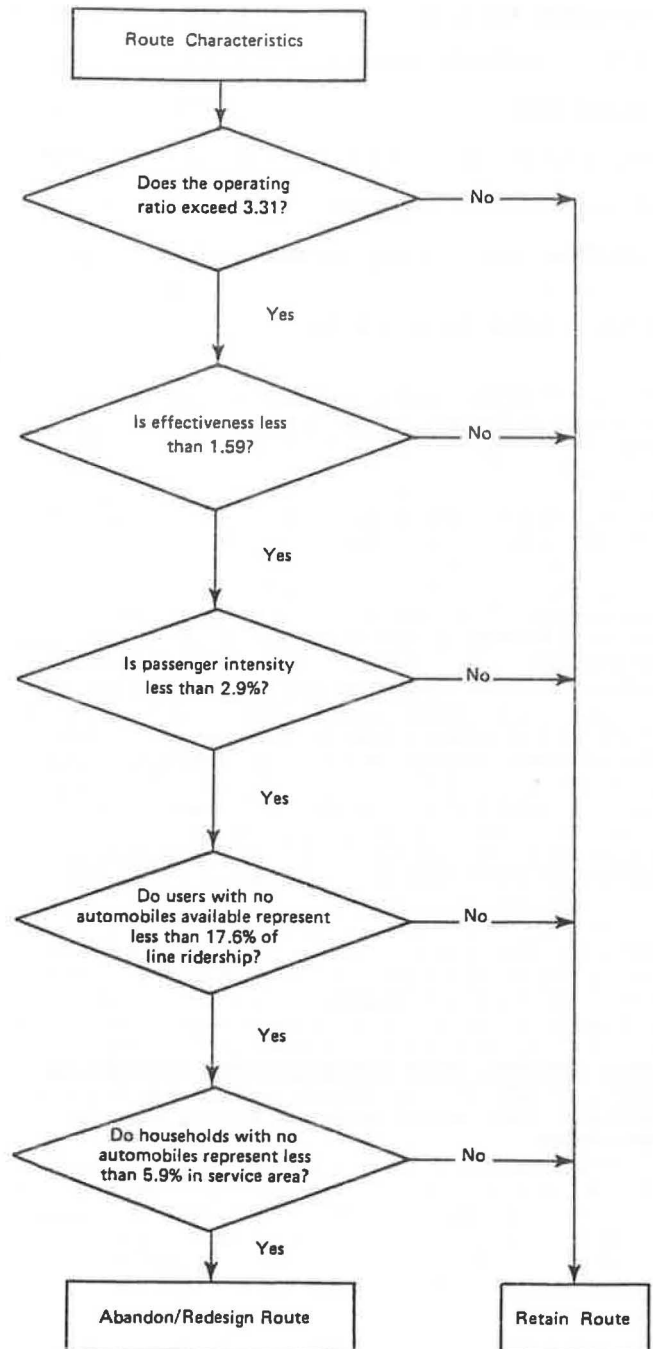


Table 2. Characteristics of Transit Routes (Sample System)

Characteristics Routes	Fiscal Operating Ratio	Passenger Market		Captive Riders	Community Welfare
		Effectiveness	Intensity	% Users With No Automobile	% House- holds With No Automobile
A	2.13	2.28	5.7	57.9	19.3
B	0.99	4.66	14.5	25.1	8.4
C	2.55	2.19	6.6	24.7	8.2
D	2.26	2.12	6.5	58.0	19.3
E	1.83	3.65	6.4	34.1	11.4
F	3.35	1.59	4.9	12.1	4.0
G	3.37	2.08	1.1	25.6	8.5
H	2.45	2.03	3.9	25.0	8.3
I	5.12	0.94	2.9	14.1	4.7
J	1.56	3.70	10.6	25.6	8.5
K	2.50	2.15	8.1	58.0	19.3
L	3.68	1.13	3.7	18.2	6.1
M	1.78	3.25	2.6	8.8	2.9
N	2.65	1.60	1.3	8.8	2.9
O	1.45	3.56	17.4	44.5	14.8
P	3.31	1.32	2.9	8.6	2.9
Q	1.51	2.82	0.6	17.6	5.9
Threshold Value	3.31	1.59	2.9 %	17.6 %	5.9 %

### Conclusions

This procedure represents a rational attempt to identify those routes which constitute atypical demands on transit system resources without commensurate returns in terms of community service. In addition to fiscal criteria, the technique gives consideration to passenger service and community welfare factors -- elements which should be contemplated prior to decisions relating to service abandonment. By quantifying the policy considerations which apply, a rigorous algorithm is developed to guide the decision process.

### References

1. American Public Transit Association, Transit Fact Book 1976-77, American Public Transit Association.
2. See, for example, John S. Niklaus, Criteria Used by Transit Operators and Planning Agencies in Selected Cities to Expand Service to Newly Developing Areas, Tulane University-Urban Studies Center (New Orleans: no date).
3. Massachusetts Bay Transportation Authority, Service Policy for Surface Public Transportation (Boston: Massachusetts Bay Transportation Authority, December 30, 1975).

Table 3. Application of Evaluation Method.

Characteristics Routes	Fiscal	Passenger Market		Captive Riders	Community Welfare
	Operating Ratio	Effectiveness	Intensity	% Users With No Automobile	% House- holds With No Automobile
A	2.13				
B	0.99				
C	2.55				
D	2.26				
E	1.83				
F	3.35	1.59	4.9		
G	3.37	2.08			
H	2.45				
I	5.12	0.94	2.9	14.1	4.7
J	1.56				
K	2.50				
L	3.68	1.13	3.7		
M	1.78				
N	2.65				
O	1.45				
P	3.31	1.32	2.9	8.6	2.9
Q	1.51				
Threshold Value	3.31	1.59	2.9	17.6	5.9