

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-gauge 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 unserved 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 motor-coach 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 Kamloops, 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 motor-coach 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.

REFERENCES

1. IBI Group. Red Arrow Bus Passenger Survey. Transportation Services Branch, Alberta Economic Development, Edmonton, 1980, pp. 47-48.
2. B.E. Sullivan. An Analysis of the Demand for the Supply of Rural Public Transportation: The Case of Alberta. Stanford Univ., Stanford, CA, Ph.D. dissertation, 1974.
3. A Study of Bus Transportation for Saskatchewan. R.J. Genereaux and Associates, Regina, Saskatchewan, 1974.
4. Transport Canada. Profile of the Transportation Disadvantaged in a Rural Area of Southwestern Ontario. Urban Transportation Research Branch, Montreal, Quebec, TP 1967, 1979.
5. E. Darwin. The Unmet Mobility Needs of Rural Canadians. Carleton Univ., Ottawa, Ontario, M.A. thesis, 1979.
6. Data Base Study for the Identification and Quantification of Transportation Handicapped Persons in Canada. Urban Transportation Research Branch, Transport Canada, Montreal, Quebec, TP 2084, 1979.
7. D. Langille. The Impact of Transportation Barriers on the Intra-Urban Mobility of the Elderly. Univ. of Guelph, Guelph, Ontario, M.A. thesis, 1978.
8. P.P. Dawes and B.E. Sullivan. Universe of Bus and Motorcoach Companies: A List of Carriers. Canadian Transport Commission, Ottawa, Ontario, Res. Rept., 1972.
9. Z. Haritos. Transport Costs and Revenues in Canada. Journal of Transport Economics and Policy, Vol. 9, No. 1, Jan. 1975, pp. 16-33.
10. B.E. Sullivan and R.R. Piper. Transportation and Economic Development: The Growing Significance of the Transport Subsidy Issue. Organization for Economic Cooperation and Development/U.S. Department of Transportation International Symposium on Surface Transportation Performance, Washington, DC, May 1981.
11. B.E. Sullivan. Institutional Arrangements and Public Transit Performance: The Public Marketing Agency Approach. Transit Journal, Vol. 6, No. 1, Winter 1980, pp. 55-70.
12. Midwestern Ontario: Bruce Peninsula Public Transport Study. Canadian Transport Commission, Ottawa, Ontario, Vols. 1-3, 1974.
13. The Mobility Club Concept in Rural Areas: A Demonstration Project in Huron County. Urban Transportation Research Branch, Transport Canada, Montreal, Quebec, TP 2646, 1980.
14. W.F. Johnson and L.A. McCoomb. Car and Van-

- pooling in Canada: Its Immediate Past and Prospects for the Future. Presented at Roads and Transportation Assn. of Canada Annual Conference, Regina, Saskatchewan, 1979.
15. W.W. McAulay and B.E. Sullivan. Para-Transit: A Preliminary Look at Service Types and Applications, with Particular Reference to British Columbia. Bureau of Transit Services, British Columbia Ministry of Municipal Affairs and Housing, Vancouver and Victoria, 1978.
16. Rural Passenger Transportation: Recent Canadian Experience. Canada Ministry of State for Urban Affairs, Ottawa, Ontario, 1978.

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 km² of nationwide area (3 miles/4 miles²). 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