CONCLUSION

From the environmental point of view, the possible introduction of trolley bus systems in larger cities would have important positive effects. Trolley buses provide an alternative to the conventional diesel bus. The use of electric traction in public transportation can contribute to policies that aim at the substitution of individual transportation with public transportation in urban areas--an important strategy for reducing air pollution in those areas. It is with this background that the transportation community has to evaluate the possible profitability of trolley bus systems.

The negative effects of trolley bus systems in the form of visual intrusion by the catenary have been debated for many years. In light of current knowledge about the environmental impact of diesel emissions, it might be expected that the significance of these negative aspects on the use of trolley buses in larger cities will be small when compared with the positive aspects of trolley buses in the eyes of a well-informed public.

Trolley Bus Operations

L.A. Lawrence

Edmonton is a city of interesting contrasts. brief history of the city will aid in understanding how it came to be one of the select group of North American cities operating trolley coaches. As a place, Edmonton is senior to most U.S. and Canadian cities, having been founded in 1795 as a fur trading post. As a city, however, Edmonton belongs to the 20th century. In 1983 Edmonton Transit will be celebrating its 75th anniversary. The city skipped the horse-car and cable-car periods, but by the 1911 census it had a population of 30,479 who made use of 17 streetcars. The operation began under municipal ownership and has continued as a city department to this day. Although its history has included many ups and downs, the department avoided the damaging sequence of crisis after crisis that stifled longrange thinking in the privately owned public transit systems.

Edmonton's contrasts include geographical factors. Although it appears to be a typical prairie city in most respects, it has a deep river valley cutting through its center. This is at exactly the point where streetcars and the early motor buses would be most heavily loaded on lines linking residential areas with the central business district across the river. The inauguration of trolley coach service in 1939 introduced a route that tackled the big grades directly, eliminating the circuitous route used by streetcars.

Some of the cities represented at this conference also introduced trackless trolley operations in the 1930s and Edmonton's civic administration was impressed by these. A specific report on Portland influenced the decision on trolley coach service, according to Tom Schwartzkopf, who is coauthoring a book on Edmonton's trolleys. Despite the interest in U.S. systems, however, Edmonton still was a part of the British Empire and its initial trolley coaches were British.

During the war, the original trolley coaches and the American Mack and Pullmans, which supplemented them, proved to be reliable performers. Canada's own industrial strength was also growing. In the post-war period, replacement of the streetcars continued with the most successful series of trolley coaches ever built--the Canadian Car and Foundry Brill. In its post-war peak in 1964, Edmonton operated 100 trolley coaches. The last Brills ordered in 1954 were literally that, because no more trolley coaches were turned out by that firm.

During the 1950s and early 1960s, Edmontonians were preoccupied with the automobile. However because the city itself was growing, Edmonton Transit did not experience severe cutbacks. It gradually spread itself over the area with motor-bus feeder lines.

It is hard to put a label on the 1960s. Although that decade was full of crashing final curtains in the U.S. transit industry, the scene in Canada was mixed.

On the one hand, there were people who wanted to imitate the decisions being made in the United States. The new look diesel was on the streets in Edmonton, with the front that drivers loved, a back that equipment people loved, and passenger facilities tossed in as an afterthought.

But Canada was not the United States, and there was no Interstate freeway money to influence the city's decisionmaking process. Groups opposed to freeway construction carried more weight in that environment. Post-war immigration combined with Edmonton's position on the trans-polar air routes kept decisionmakers open to European influences. The development of integrated rail bus operations in Toronto and Cleveland interested transit officials. And the most important step was taken when the right men, ideas, and technology were brought together. In annexing the town of Jasper Place, Edmonton implied that it would offer that sprawling low-density suburb the same level of transit service enjoyed by city residents. How could that be done without great expense?

The timed transfer concept has been and will be discussed in other forums. I will be brief in describing what happened. An existing trolley coach route was extended to a terminal built beside the Jasper Place Town Hall. Motor-bus feeder routes were timed to meet both trolleys and each other. And in peak hours, the heaviest trips were extended to downtown as expresses. This put each bus mode into the range in which it could perform best. Trolleys covered the stop-and-go main line operation to lower the distributed capital cost of the electrical system. It fits our system's need to be a good neighbor in areas where main lines cut through residential areas and hospital grounds. Glenora, the most affluent inner-city residential neighborhood in Edmonton, is served quietly and efficiently by our main line to Jasper Place.

Diesel buses perform well in express operations, where their engines can run at a fairly constant speed. Their noise levels are not as severe a problem on routes served infrequently, or where latenight service and Sunday service are not offered. Feeder routes sometimes have the potential to use smaller buses as well, but traffic has grown on most of these lines to the point where the use of 40-ft buses is necessary.

The timed transfer concept has also allowed us to run a fairly simple system from the customer's standpoint. The traditional North American radial system often makes the outlying express route points difficult to reach from intermediate areas. This presents planners with a choice of adding stops to expresses, running expresses and locals over the same route, or just writing off the people who want to reach points in the part of the older city that falls between downtown and the suburbs. This area contains many trip generators, and in the concept employed in Edmonton, these points are accessible via transfer at the outlying transit centers. If it is necessary for an inner-city route to wander around in order to tap an industrial area, for example, it is not necessary for the residents of outlying areas to join its slow trip.

We see the trolley coach offering a part of our complete system. Its attributes give it a solid place on the main lines and in the most densely populated parts of Edmonton. We see it as a forerunner of light rail transit (LRT) service in these corridors. Trolley coaches will not be replaced by LRT lines, however, where local stopping services are necessary. In coordination with LRT, trolley coach operations will enable us to meet our 1984 goal of carrying 27 percent of our passengers with electric power.

FUTURE OF TROLLEY COACH OPERATIONS

Many people are aware of our 1973 decision to continue trolley operations. This was followed by the purchase of 37 Flyer E-800s, which used recycled electrical components from older buses. We went through a difficult period with those buses, and it took 3 years to get them all into service. At the same time, maintenance of the Brill fleet was curtailed in anticipation of their retirement. This caused us to stop and take stock of the situation.

The eventual result of this experience was our order for 100 Brown Boveri-equipped GMC trolley coaches. These buses were designed with input from all parts of Edmonton Transit, incorporating many features that were intended to overcome operator objections to the Flyers.

The feedback from operators and passengers is generally good. Chopper-controlled motors provide a smooth operation. Electric heat is great in the winter, and twin-roof vent hatches have kept interior temperatures comfortable in the summer. The appearance of a new-look bus with trolley poles did cause some double takes at first, but most Edmontonians do not realize that these vehicles are unique. They just want the service to function smoothly and with some comfort. Although it looks a bit racy, with the black bumpers, dark standee windows, and raised roof hatches, service is why they are standing out on those corners.

What are we offering the people standing on those corners? Trolley coach operation will expand to use the existing overhead again. From 1979 through 1981, the 37 Flyers turned up here and there, covering 88 runs that were scheduled as trolleys. We needed 100 to provide spares. By the end of 1982, we will have enough trolleys to cover every run. In addition, we have a backlog of minor overhead extensions that will require additional vehicles. One of these extensions is due to open in late 1982, and will extend our Route 3 through an industrial area from the apartment house district it now serves to the original Jasper Place Centre. This and the other extensions involve routes that are under trolley overhead a substantial part of the time.

We are working to upgrade the overhead. Our lines are constructed and maintained by Edmonton Power, the city-owned utility. During the period in which trolley coach operations were being curtailed, valuable skills were lost with personnel retirements, and many flaws developed in the overhead. Other problems were caused by the growth of traffic on city streets, and the growth in length of the buses themselves, with switches and some curves remaining in outdated locations. Perhaps the single step most appreciated by operating personnel and least noticed by the public was the switch to K&M elastic suspension overhead. Along with induction control switches, the new overhead system has been nicknamed speed wire by operators. Trolley coaches are controlled so that they cannot literally speed, but the time and inconvenience wasted on lost poles have been reduced.

As trolley operation becomes more common, we will also be working to upgrade the personnel operating them. We have a commercially made training film, based on the Flyer E-800, which gives beginning operators some background on the trolley coach system. We are working to develop better information on the condition of the overhead network. We are working to upgrade the service control on our system, so that disruptions are handled more easily. The overhead program includes some additional switches and short links to allow a variety of situations to be met. The best upgrading is already under way--that is, having a fleet big enough so that a run scheduled to have trolleys can be expected to have them assigned. Operators who want to drive trolley coaches will sign on those runs, and the experience level will improve.

We have examples of operators suddenly finding themselves in a trolley coach 2 or 3 years after their training period. This leads to sloppy or awkward operation and also prevents overhead problems from being promptly identified.

When the overhead extension projects are completed, we will be able to use all of our 137 trolley coaches. At that point, we expect to look at cost-comparison studies, our operating experience, and our ridership levels on other routes to determine any future expansion of the system. The system of diesel lines that we operate over the original Low Level Bridge trolley coach route is based on the criteria set in the 1973 Edmonton Transit study by Robert Clark and similar criteria developed by the San Francisco Municipal Railway's Carl Natvig in 1979. I would like to see continued extensions where traffic warrants them. In the mid-1980s, one of every six buses in Edmonton Transit's fleet will be a trolley coach. When I began work as a transit operator in the 1950s, trolleys formed the majority of our vehicles.

SOME OFT-HEARD WORDS

The trolley coach is inflexible! This is probably the number one chant. It means almost anything that the speaker cares to imply. Let us just imagine for a moment that the wires disappeared from Edmonton overnight. The next morning buses would still be making their way along the same heavily paved streets, stopping at the same shelters and concrete bus pads. Everything is running along, just slower, more noisily, and with a bit of smoke. But down the street a woman is coming. She lives in a little cul-de-sac area that faces an uphill walk to the bus. It is a quiet area, where people have been walking uphill since streetcar days. This morning is no exception, but something is different.

"The buses are flexible now!" she whispers to herself, as she skips back down the hill to call her Alderman with the suggestion that some, not all, of those frequent buses swing into her neighborhood. She is not greedy; she just wants a few trips. And how can her Alderman disagree? Out past the end of the line, a corporation is building a new office building. It is within walking distance of the former trolley line, but it would draw higher rental income if the bus went right to the door. Unfortunately, only some trips can be extended to the building because the others have had all their layovers soaked up going down into that woman's culde-sac. Within a decade, bus operators will be walking out to their diesels carrying armloads of dash cards. Route brochures will be littered with fascinating footnotes. Special interest groups will be temporarily pleased, but operating costs will climb as buses roll through back lanes and driveways looking for passengers. Additional street paving will be required, and the shelters will have to be moved around.

The most important consideration is the effects on patronage. The passenger from outlying areas will find the circuitous routing past the new office building or past the woman's house unattractive. They will either quit riding or demand direct operation of their feeder routes to downtown. Either revenue will be lost or operating costs will go up. Flexibility has a price, which system after system in North America has paid without realizing it.

The routes on which trolley coaches are operated are main lines where the travel desire has remained constant over a long period. This allows the full use of the capital investment involved, and, in turn, the capital invested acts as a balancing factor to offset short-term action. If necessary, detours can be arranged for major construction projects, and in Edmonton most major projects occur during summer months when there is a surplus of diesels from university-oriented routes.

Breakdowns present a more serious case for the use of the term inflexibility. Breakdowns that affect the power supply will affect any number of buses, whereas diesel buses fail individually. The detailed study done for Edmonton Transit by Robert Clark in 1973 showed less than one power breakdown per 100,000 miles operated on a system using many recycled components.

The restoration of trolley operation in the last few months has been accompanied by several overhead problems, likely a result of long periods of inactivity. As work continues on the power system we expect those problems to recede.

We do have difficulties with overloaded trucks. Edmonton is the base for shipping into the northern territories and the economic boom brought marginal companies and marginal drivers into the trucking industry. We take action to recover costs from these firms, but as long as truckers are romanticized as bold men of action we will have to deal with the occasional irresponsible operator.

The overheight truck is a universal phenomenon, however. A colleague of mine has noticed scarred traffic lights and pedestrian overpasses in our sister city of Calgary, which has no trolley bus operations.

When we were making a study of new buses we considered battery or auxiliary gasoline-engine operation. However, examination of the weight penalty and cost that we would incur for the few occasions where this would be a factor led to the conclusion that we were better off without the auxiliary power. Dwelling on inflexibility in breakdown or detour situations stems from looking at a few specific incidents rather than at the overall picture.

The lack of short-term flexibility does require extra work in operations, but it appears also to offer higher patronage levels. Patrons have a sickening feeling when they discover they have been left standing at a bus stop that has been bypassed due to a detour, or worse yet, left standing by an operator who decided to save some time by cutting off part of the route.

Trolley coach operation requires team work to overcome the other problem that hides under the

inflexibility label. There is a tendency of diesel bus operators to regard themselves as being their own little transit system. Time and time again I have heard senior men talking about the feeling of teamwork and cooperation that they experienced with fellow operators, which included working together to share a load when traffic disrupted service, courtesies to each other in traffic, and sharing information about almost anything. Railway operations demand this relationship. Without it, customers quickly turn away. Motor-bus operations should involve the same cooperation, but a feeling of anonymity appears to strike some people when they sense that diesel engine revving up. Yes, they can now pass another bus, and they will from time to time. But too often, the passing comes after the lead bus in a jam has collected all the passengers. Block traffic to let another bus out of a side street? With that diesel engine finally wound up it is awfully hard to come back down to earth. Instructors say to take it easy on curves? The slower the diesel driver takes the curves, the harder it is to get going again, so passengers better learn to hang tight. I am talking about a minority of operators here, but it can affect everyone. If anyone doubts that this is true, consider the style of small suburban lines that sprang up as all-motor-bus operations.

Does that style of operation meet customer needs? It may take care of some immediate problems at best, but it leads to a gnawing uncertainty about the dependability of transit service and the quality of people who operate it. On the other hand, the trolley system introduces a clear requirement for team work, just as rail operation does. The operator is literally wired into the system, and can drop out if necessary, but cannot operate with disregard for others.

Instead of seeing the trolley coach as an obstacle to a self-centered form of transit operation that has come to be the norm, in the process of meeting trolley system requirements we can attain and develop that sense of shared purpose recalled by the older operators. We cannot do this without also keeping in mind the reasons for operating trolley coaches--foremost among them the passenger on that corner. Imagine that it is not August but January. Imagine that it is 20°, 30°, or 40° below zero on either temperature scale. You are standing in a bus shelter and it does not matter what time it is, because it is dark most of the time in January. Within a minute or two you hear a faint laser sound twanging over the wires and then the crunching sound of braking tires on frozen roadway. Climb inside an Edmonton Transit bus that is big and warm and friendly and you are on your way directly to a thousand places, smoothly and quietly. A Hollywood director would have to shoot over and over again to achieve that effect. We are expected to do that successfully every day, and with teamwork in the operations section and cooperation from other sections and departments we can do it.

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