

Self-Service Fare Collection: Getting There from Here

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For many years, conventional wisdom in the transit industry has been that self-service fare collection (SSFC) may be fine in Europe, but "it won't work here." Meanwhile, SSFC has spread to the extent that it has become almost universal in western Europe (outside Britain). At the same time, the concept is being applied in increasingly diversified forms to meet the different requirements of individual transit agencies or to conform to the constraints of local social or legal requirements. This diversification is important because it reemphasizes that SSFC is a concept of fare collection rather than a system based on a particular type of equipment or operating configuration, which is particularly relevant when considering SSFC in the U.S. context. This paper describes how Tri-Met decided to switch to SSFC and will institute it on its 600-bus system in the fall of 1982.

During this same period, conditions in North American transit have changed. High-technology fare collection systems have proved costly and not particularly reliable, and there is a growing need to operate the new articulated buses and light rail vehicles more efficiently. There are problems with fare equity, revenue loss, and dollar bills clogging fareboxes. Intermodal transfers, the control of revenue loss, and the need to improve passenger convenience have become important transit goals. Together, these factors have begun to put pressure on North American transit agencies to search for better ways to collect fares and to reexamine ways to avoid the constraints imposed by traditional farebox and barrier-type systems. Tri-Met, the transit agency for Portland, Oregon, is no exception.

DEVELOPMENT OF THE SELF-SERVICE FARE COLLECTION PROGRAM

Selection of LRT

In August 1978 the Tri-Met Board adopted a plan to build Tri-Met's first light rail transit (LRT) line in the Banfield Corridor. Implicit in that decision was that the LRT would use self-service for fare collection. During the subsequent preliminary engineering, the advantages of SSFC were reaffirmed and documented. In particular, SSFC was estimated to save approximately \$1.1 million in system capital costs and some \$400 000 annually in operating costs, compared with the use of the traditional farebox collection system. Barrier fare collection is not practical on Tri-Met's LRT.

1979 Fare Policy Study

In 1979, as part of the preparation of a 5-year Transit Development Plan, Tri-Met staff performed a fare policy study to investigate future fare collection options. The main focus of that study was whether to proceed with the SSFC recommendation and, if so, when and how. Options examined included adoption of SSFC on the light rail only, adoption of SSFC systemwide, and continuation of the traditional system of fare collection without any SSFC. Particular effort was focused on problem areas, such as how to phase in a fare collection change on an existing transit system, enforcement, and the avoidance of undue legal or financial risk.

Among the main conclusions of the fare policy study were the following:

1. The present method of fare collection would increasingly impede smooth, efficient transit operations during the coming decade. There is no such thing as a perfect system of fare collection. The choice lies between a succession of palliative measures that can, at best, relieve the most pressing problems associated with today's fare collection or, alternatively, a bold move requiring substantial effort and perhaps some risk to reform the fare collection system to best match and exploit the changes that will be taking place in Tri-Met's operations by adopting self-service fare collection.

2. A phase-in plan can be devised for introducing SSFC a few lines at a time in such a way that legal and financial risks can be minimized. Incremental phase-in of SSFC is frequently used in Europe, particularly in France. Legal risk is minimized because the system could still revert to the present system of fare collection overnight in the event of a challenge, and financial risk is minimized because only a small percentage of the system is initially exposed to an increased risk of fare evasion.

3. Self-service fare collection can substantially improve existing bus operations, particularly on the new articulated buses; therefore, if it is to be implemented at all it should be implemented as soon as possible. Early implementation would also enable Tri-Met to thoroughly shake down the system and address problems before LRT construction was completed. The risk of designing LRT around SSFC was thereby eliminated.

4. UMTA was interested in supporting a demonstration of SSFC, and Tri-Met could become a leading candidate for demonstration funding.

On the basis of this study, self-service fare collection was incorporated into the 5-year Transit Development Plan, and applications for funding SSFC were initiated.

Organization

With the partial approval of project funding in September 1980, the project moved into the implementation phase. Because SSFC affects every facet of a transit agency, it was first necessary to establish an interdepartmental committee charged with overseeing all aspects of the work, representing the interests of each department, and making recommendations where appropriate on technical details of the project. Subcommittees were assigned to cover details in the following areas: fare structure; fare and schedule outlets; on-board equipment and retrofit of rear doors; legal concerns; fare inspection; records, billing and collection; operations; public information; and evaluation study.

This structure has provided a forum for the discussion and analysis aspects of the project affecting several departments and has enabled the work to proceed with a high degree of interdepartmental cooperation.

Preliminary Plan

The plan to introduce self-service envisaged a succession of phases. In the initial phase limited self-service (with drivers continuing to monitor fares and therefore requiring front door entry) would be used to minimize changes in passengers' habits and the risk of fare evasion. Once this system had become established, successive phases would provide a gradual transition to full self-service, under which entry and exit would be permitted through all doors of the vehicles. Both driver-monitored and full self-

service would have the following features:

- Passengers would be required by local ordinance to possess a valid ticket or pass when traveling on Tri-Met vehicles.
- Passengers traveling without a pass would complete their fare transaction immediately on boarding either by paying a cash fare and obtaining a receipt or by validating a multi-ride ticket.
- The farebox would be retained for fare payment since it exists and is fairly efficient, but the percentage of passengers using the farebox would be reduced in order to avoid issuance of excessive numbers of fare receipts. This would be achieved by selling discounted multi-ride tickets off the vehicle. These tickets require validation at the start of a trip.
- Fare collection would be enforced by fare inspectors who would check tickets on a random basis and collect surcharge fares from passengers traveling without a valid ticket or pass.

Final Implementation Plan

As the project implementation proceeded, Tri-Met management became increasingly comfortable with the concept of self-service fare collection and questioned whether the additional steps inherent in the phased approach were necessary. After extended debate, it was concluded that the greater simplicity of a single one-time switch to systemwide full self-service more than outweighed the benefits of the more cautious phased-in approach. Accordingly, the original plan was revised to provide for full systemwide conversion to self-service without interim phases. This change had no effect on the on-board equipment, which was required for either driver-monitored or full self-service, but it does require an additional outlay in fare inspection. On the other hand, the benefits anticipated for full SSFC will, accordingly, be realized sooner.

Fare Structure Revision

One consequence of self-service fare collection is the opportunity to revise the fare structure. Since the revision of a fare structure, particularly changing of fare zones, is a complex marketing undertaking, there are advantages in combining it with the change to SSFC. The two major issues were (a) how to structure the methods of payment to reduce farebox use, and (b) what zone adjustments, if any, should be made.

Reduction of farebox use is an essential feature of SSFC since reduction of boarding times cannot be achieved if too many passengers continue to use the farebox. Accordingly, two alternative methods of payment, both of which avoid driver interface, are offered: a 10-ride multi-ride ticket, good for an indefinite time period, which requires validation with date, time, and zone for each trip; and passes, similar to those in use now, which are good for an unlimited number of trips over a fixed time period. Tri-Met adopted a target of 15 percent farebox use, 30 percent multi-ride ticket use, and 55 percent pass use. To encourage a switch to this fare structure, the cash fare will be raised, thereby increasing the discounts for the alternative methods of payment.

Tri-Met at present operates a 3-zone fare system, charging 2 different zone fares. Some routes are more than 20 miles long, and the public at various hearings has repeatedly requested that Tri-Met introduce additional fare zones to avoid having short-distance riders subsidize the longer trips.

Because with SSFC the on-board fare collection equipment will provide an automatic record of the zone in which all passengers board the bus, the present restriction on the number of fare zones (delays to service and enforceability)

is removed. With no restriction on the number of fare zones, Tri-Met had to decide how many zones best met its policy and revenue needs. Alternative circumferential and cellular zone systems were studied, and it was concluded that, although the cellular system was the fairest, since all fares were closely related to distance, Tri-Met had insufficient crosstown ridership to justify the increased complexity. In addition, any fare benefits to crosstown riders arising from a circumferential fare zone system were supportive of the agency's goal of diverting trips from radial to crosstown trips wherever applicable. Accordingly, a 5-zone system with 3 zone fares was recommended.

Project Schedule and Status

As the project proceeded to implementation, the start-up date was postponed from March to September 1982 to better coordinate with service improvements. Start-up was scheduled for September 5, 1982.

As of March 1982 all of the on-board equipment (validators and ticket dispensers) had been ordered, and delivery, installation, and testing had begun. Work was also starting on the modification of bus rear doors to enable passengers to board through either door. The selection and training of fare inspectors was in progress, and the supporting fare ordinances had been drafted.

Plans have been developed for a major public information program including training for all Tri-Met staff and operating personnel, as well as the riding and non-riding public.

REASONS FOR SELF-SERVICE FARE COLLECTION

Much of the early impetus for the SSFC program came from the LRT project. However, as understanding of SSFC at Tri-Met increased, it became possible to develop projections for the economic impact of SSFC on both light rail and bus operations. A better appreciation of the pervasive and generally beneficial effect of SSFC throughout the system also began to emerge.

The kinds of benefits were identified—nonquantifiable benefits, such as increased passenger convenience, reduced driver stress and work load, or improved system security; and quantifiable benefits, such as savings in bus-hours or new revenue to which a dollar amount can be attached. Some of these benefits require additional action by Tri-Met beyond the implementation of self-service, such as the procurement of future buses with double doors, the re-scheduling of lines to capture time savings, and the deployment of high-capacity equipment on lines where this equipment is warranted. The principal benefits that Tri-Met expects to derive from SSFC are summarized below.

Speed-Up of Existing Bus Operations

Part of the SSFC program calls for retrofitting the rear doors of buses to permit passengers to enter through them. This will reduce the time required to load, particularly at busy stops such as transit centers and during the peak period. Retrofitting for rear boarding will provide 2-door streams on standard buses, enabling them to better match the loading speed of the 5-door-stream articulated buses.

Effective Operation of Articulated Buses

Self-service fare collection enables Tri-Met to derive the fullest benefit from its investment in articulated buses. For instance, on the Mall, the traffic signals operate on a progression. If a bus can load fast, it can travel down the Mall catching each of the traffic signals. However, if the loading time is more than about 15 seconds, the bus will miss each signal. Thus, a few seconds' increase in loading time is multiplied several times by the delay at each traffic signal. If the articulated buses are operated without self-service, they not only will accelerate slower,

a characteristic of these vehicles, but also will load slower. In doing so, they will also delay all other buses using the Mall, leading to a substantial loss in total system capacity. With self-service, however, the articulated buses will load faster than the standard buses, and Mall capacity will be preserved and probably increased.

In addition, self-service permits the effective deployment of articulated buses on the heaviest inner-city routes. Such routes, generally characterized by large numbers of passengers loading and unloading, are traditionally considered unsuited for articulated buses in the United States because they are used without SSFC. However, these routes are also those on which the improved productivity and greater schedule reliability can be deployed to the greatest economic benefit.

Improved Schedule Adherence and System Productivity

A bus running late will pick up an additional passenger load. This in turn will make the bus later still, thereby destabilizing service (bunching). With SSFC and boarding through all doors, late buses will not incur the same proportionate delay, and so there will be less tendency for buses to bunch. In addition, the greatest effect of faster operation of both articulated and standard buses will occur during the peak periods when present loading delays are most noticeable. If buses can be operated faster during peak periods, the capacity of the system is increased. Since the total fleet is sized for the peak hour, an increase in fleet capacity during the peak would permit the same passenger load to be carried by fewer vehicles, with a net capital and operating savings.

Effective Operation of LRT

The LRT plan is based on the use of trains of large (88-ft) vehicles, loading from the street. Each 2-car train has 16 door streams. Erecting fare barriers at on-street stations would be expensive and in any case unacceptable. Farebox fare collection would be so slow that each trip would take several minutes longer. Zone fares would be impractical. More cars would be required to maintain system capacity, and operators would be required on trailing cars for the sole purpose of collecting fares. Not surprisingly, SSFC has been adopted on the new LRT systems in Edmonton, Calgary, and San Diego, as well as on all LRT systems in Europe.

Expense of Farebox Replacement

When Tri-Met's zone 3 fare reaches \$1.00 later this year, the ability of fareboxes to accept dollar bills will become a major problem. Not only do Tri-Met's existing farebox vaults have a capacity of only about 60 dollar bills, but the bills have a tendency to jam the farebox. Torn bills are sometimes presented, resulting in lost revenue and increased money-room costs. Self-service fare collection, by reducing the percentage of fares paid into the farebox to less than one-third of their present volume, will enable the existing fareboxes to continue in service and the drivers to deal with the bill problem by requiring bills to be presented unfolded, if necessary, without significant delay to service. Recent experience by other properties that have replaced their fareboxes with electronic fareboxes capable of accommodating dollar bills has shown that the capital costs incurred by Tri-Met in switching to self-service are no greater than the costs other properties are incurring by replacing their fareboxes and vaults.

Increased Fare Equity

As fares increase, Tri-Met, like most properties operating over a large geographical area, is finding it desirable to make the fare more closely reflect the length of trip. This can only be achieved by use of a zonal fare system. In 1978 Tri-Met switched from a flat fare to a 2-fare zone

structure. However, under increasing fiscal pressure, this is not proving sufficient. Although the fare for the long-distance trips on the system is still less than it was 10 years ago, the fare for short trips is so high as to discourage ridership. This position can be rectified only by adding one or more additional fare zones. SSFC provides an effective way to control zones on a multi-zone system without resorting to a hat check system and the delays such a system cause to service. Moreover, by selectively increasing zone fares to what the market will bear, transit revenue can be increased with little loss of ridership.

Fare Evasion Control

The potential for fare evasion is widely quoted as a reason for not adopting SSFC. However, Tri-Met currently experiences forged passes as well as passengers who refuse to pay, who short-change the farebox, and who override the zones. Drivers can do little to control these abuses. Although opportunities for certain types of fare evasion are increased under SSFC, other types of fare evasion, particularly forged passes, short-changing, and zone overriding can be effectively controlled by fare inspectors. After 1 year of SSFC operation, Edmonton reports a fare evasion level of around 1 percent. Not only is SSFC expected to reduce revenue loss from fare evasion on Tri-Met, but some additional revenue will be generated from the surcharge paid by passengers found traveling without proof of payment. Moreover, the system is partly self-stabilizing, since the greater the revenue loss from fare evasion, the greater the potential revenue from surcharge fares.

Improved System Security

The presence of radio-equipped fare inspectors traveling at random on the system will provide a measure of visible and real support to drivers and will enhance passengers' perception of transit system security.

Convenience for Passengers

The new fare structure will open up new and more convenient ways to pay fares. The new multi-ride ticket, for up to 10 rides, will permit passengers to travel without needing the exact fare for each trip. Moreover, pass holders, who will make up more than 50 percent of Tri-Met's passengers, will no longer have to dig for their pass each time they board a transit vehicle. Except when requested by fare inspectors, pass holders will carry their passes just as automobile drivers currently carry their driver's license.

Reduced Cash-Handling Costs

The extensive adoption of prepayment of fares (targeted at 85 percent under SSFC) is expected to reduce money-room and cash-transfer costs and related security requirements.

Reduced Driver Risks

SSFC will provide clearer definition of the driver's role with regard to fare collection by reducing and redefining tasks and responsibilities. The driver will no longer be required to try to extract a fare from a reluctant passenger or to argue over cash or transfers. Fare disputes are the most common source of passenger and driver friction today.

Improved Passenger Comfort

Passenger comfort will be improved because multi-door loading will provide better passenger distribution on the vehicle. Passengers may enter and leave through any door, thereby being exposed to less bunching and jostling on the

vehicle. Overall, the passenger's perception of transit service is likely to be enhanced.

COSTS

An economic analysis was developed to estimate the costs and benefits of those aspects of SSFC for which such estimates can be made.¹ Estimates were developed for three different years—1983, 1985, and 1990—for a transit fleet expected to grow as follows:

	Number of Vehicles		
	1983	1985	1990
Standard bus	500	700	800
Articulated bus	87	125	250
Light rail vehicle	0	26	68

Operating Cost and Revenue Comparisons

The cost of operating SSFC can be determined with considerable accuracy since implementation is well advanced and all major expenditures are budgeted. By far the largest operating cost is fare inspection, for which 50 fare inspectors are budgeted. Other costs include transit police support, administration, marketing, and equipment maintenance.

Operating costs are not expected to increase in proportion to system ridership, since less inspection effort per passenger is anticipated as passengers get used to self-service. The major dollar benefit attributable to SSFC lies in the reduction in the number of vehicles required to provide an equivalent level of service capacity compared with operation without SSFC. These benefits will occur primarily on the most heavily used lines, and particularly during peak periods. Improvement in system efficiency during peak periods is particularly significant since the transit fleet is sized to provide the necessary peak capacity. Any vehicle savings occurring in the peak period are, therefore, potential savings in the total fleet size.

Operating cost savings on the light rail system are particularly dramatic and are expected to exceed the savings in bus operations by 1990. The reason for this lies with the nature of LRT operations. Specifically,

- Operation of LRT with the traditional system of fare collection would require a driver on the

trailing car of a 2-car train solely to collect fares.

- Operation of LRT with the traditional system of fare collection would increase dwell times at stations and thus require two additional train sets to maintain equivalent service capacity.
- This additional equipment would require additional maintenance personnel.

Along with most transit agencies, Tri-Met experiences considerable lost time and expense due to driver absenteeism. Tri-Met expects SSFC to be a factor in reducing driver job stress, and hence absenteeism.

SSFC is expected to generate some additional revenue. One source of anticipated additional revenue is the reduction of fare evasion because fare inspectors are present. In addition, increasing the number of fare zones enables Tri-Met to increase fare revenue without increasing the base fare. Thus, for any given base fare, a fare structure including multiple zones collected by self-service will have a higher level of revenue.

Passengers riding the transit system without a ticket will be charged a surcharge fare of \$20 by fare inspectors. Tri-Met expects to generate significant new revenue from this source, even after allowing for administrative expenses and uncollectable surcharge fares.

The net operating cost savings attributable to SSFC are summarized in Table 1. All estimates are in constant 1982 dollars.

Capital Cost Comparisons

The capital costs of introducing SSFC are accurately determinable since procurement of most of the capital equipment is in progress. Equipment requirements include the on-board equipment such as validators and ticket dispensers, the retrofitting of rear doors of buses to permit passengers to enter through either door, and the purchase of a small number of vending machines to sell tickets at key points on the transit system.

Just as SSFC will reduce the transit system operating costs by enabling fewer buses to provide the same amount of service capacity, so too will SSFC reduce Tri-Met's fleet requirement—both buses and light rail. In addition, the adoption of SSFC will enable Tri-Met to avoid replacing its existing fareboxes with new fareboxes able to accept dollar bills and count the large number of coins now required to make up a transit fare.

Table 1. Net systemwide operating cost savings from SSFC (\$ in thousands).

Source	Year		
	1983	1985	1990
Fare inspection	(1696)	(1846)	(1846)
Administration	(470)	(470)	(470)
Other	(75)	(100)	(150)
Subtotal, costs	(2241)	(2416)	(2466)
Bus operation	1000	1405	1789
LRT operation	--	910	2080
Absenteeism	375	400	500
Reduced fare evasion	180	240	290
Zone fare revenue increase	1800	2400	2900
Surcharge fares	1000	1100	1200
Total	2114	4039	6293

The balance of capital costs and savings attributable to SSFC are shown in Table 2.

EQUIPMENT

On-Board Equipment

The major capital expense incurred by Tri-Met's SSFC project is the requirement for equipment on every bus to provide passengers with accurate and readily verified proof-of-payment. To achieve this, each bus must have a set of equipment consisting of three electronically integrated units. Particular importance is attached to procuring state-of-the-art equipment similar to that used in other systems. The three units are shown in Figures 1 through 3 and are described below.

The bus driver will be provided with a controller attached to the dash (Figure 1). This unit consists of a small box that displays the time and enables the driver to insert the zone number in which the vehicle is traveling into the fare-collection equipment. The only requirement this equipment places on the driver is to ensure that the zone displayed on the controller is always the zone in which the vehicle is traveling. The controller also contains a built-in warning system to alert the driver to equipment malfunction. All bus-stop signs show their zone.

To enable multi-ride ticket users to validate their tickets, every bus will be equipped with a validator attached to the stanchion behind the driver's seat (Figure 2). This unit will identify multi-ride tickets and stamp the date, time, and zone on the ticket. This information is obtained by the validator from the controller. The driver may change the zone remotely through the controller. At the same moment a small piece of the ticket, representing one ride, is clipped off. Validators are a widely used device and found on almost all European surface transit systems. Articulated buses will have three validators, one at each door. Light rail vehicles will have four validators.

To provide passengers using the farebox with a receipt, a receipt dispenser will be installed on all buses adjacent to the farebox (Figure 3). This unit contains components identical to the validator and a paper ticket dispensing unit in addition. When a passenger pays a fare into the farebox, the driver provides a receipt for this fare by pressing a single button mounted on the controller. The dispenser then prints a ticket containing the date, time,

zone boarded, and fare paid—in effect, an electronically printed transfer.

In March 1981 Tri-Met awarded a contract to supply this equipment to a joint venture of CAMP of France and Vultron of Michigan. The contract provides for the supply and installation of 874 controllers, 1198 validators, and 904 dispensers. The design of this equipment is based on similar units supplied by CAMP to a number of European transit agencies, modified where necessary for use in the United States.

Following the testing of pre-production units and completion of pre-acceptance tests, the contractor will commence delivery and installation on all Tri-Met buses.

Vending Machines

The Tri-Met SSFC program also calls for the experimental introduction of machines to sell multi-ride tickets. These vending machines will supplement Tri-Met's extensive retail outlet network, which is currently the main method of ticket distribution. These machines are proposed to accept only credit cards and to print multi-ride tickets from blank paper stock. If such machines can be procured, they will have the advantage of containing neither money nor tickets, which will considerably simplify their servicing and security and remove the incentive for break-ins.

Further expansion of Tri-Met's ticket-vending system will be heavily dependent on the experience with the initial procurement.

Retrofit of Rear Doors

Since a major benefit of SSFC is all-door boarding, a further task is to retrofit about 560 of Tri-Met's existing buses to permit rear-door boarding. On retrofitted buses the rear doors will be directly controlled by drivers. All future buses will be purchased already equipped for all-door boarding.

Future Bus Procurement

In addition to the need for rear-door boarding, SSFC will also require increased door capacity if the full economic benefits are to be realized. A number of factors affect the desirable number of doors on U.S. transit buses used with self-service. These include the traffic-signal charac-

Table 2. Net saving in systemwide capital needs from SSFC (\$ in thousands).

Source	Period		
	1981-82	1983-85	1986-90
On-board equipment (validators, etc.)	(2950)	(900)	(1700)
Rear door modifications	(250)	--	--
Vending machines	--	(1030)	(800)
Subtotal, costs	(3200)	(1930)	(2500)
Bus fleet reduction	3000	1400	1500
LRT fleet reduction	--	4000	2000
Farebox replacement	2450	460	450
Subtotal, reduced capital requirements	5450	5860	3950
Net reduction in capital needs	2250	3930	1450

Figure 1. Controller.

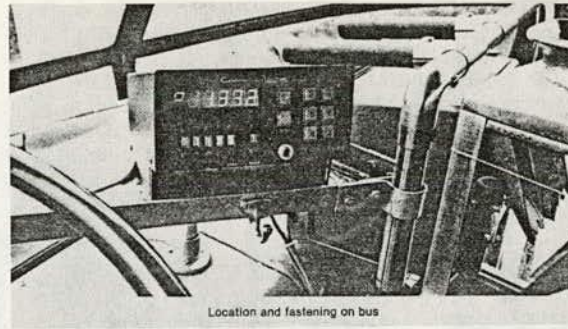
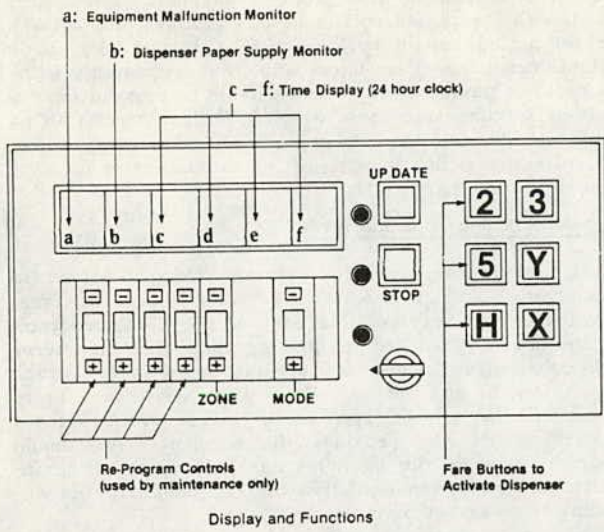
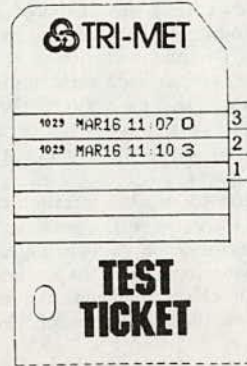


Figure 2. Validator.



Multi-Ride Ticket showing validation (Machine #, Date, Time, Zone Boarded)

Figure 3. Dispenser.



Ticket from Dispenser showing validation (Machine #, Date, Time, Zone Boarded, Fare Category, Zones Paid)

teristics in the city served, the line characteristics in terms of percentage of schedule time required for boarding passengers, and the type of vehicle mix used. To match the loading speed of a 60-ft, 3-double-door articulated bus, a 40-ft standard bus requires 2 double doors. It is anticipated that all future Tri-Met procurements for standard buses will require at least 2 double doors to match the triple double doors on articulated buses. Tri-Met's 88-ft-long light rail vehicles will be equipped with 4 double doors on each side.

DESCRIPTION OF OPERATION

This section provides an overview of the key features of the system that Tri-Met implements on September 5, 1982. From that date, a "proof-of-payment" ordinance requires all passengers using the transit system to have a valid ticket or pass and provides for the inspection of tickets and the charging of surcharge fares to passengers traveling without tickets. A second ordinance provides a new fare structure for concurrent implementation.

Proof-of-payment will normally consist of one of the following:

- A ticket printed on board by the dispenser in exchange for cash deposited in the farebox. The dispenser is activated by the driver and issues a ticket similar in concept to transfers, which will no longer be necessary and will be discontinued.
- A multi-ride ticket, a new method of payment requiring purchase of a 10-ride card ticket. To reduce farebox use the cost per ride on a multi-ride ticket will be less than the cash fare. Passengers using multi-ride tickets must validate the ticket at the beginning of each trip using the validator installed on all buses.
- Passes, which will continue to be used in much the same manner as today. Pass use will continue to be encouraged by maintaining or increasing the existing discount. Pass users will experience little change other than the increased convenience of not having to show their passes each time they board the bus.

As a result of the proof-of-payment ordinance and the new ticketing system, most passengers no longer need to deal with the driver and consequently may board through any door. Major operating improvements are expected during peak periods, particularly with articulated buses.

An extensive information and marketing effort includes not only the training of all agency employees but also an information program for schools, special groups, and the general public. All buses require new signing to provide information concerning fare collection, and modifications are required to all of Tri-Met's 7000 bus stops.

Some 50 full- and part-time fare inspectors will be hired to check tickets. Passengers traveling without proof of payment will be charged a \$20 surcharge fare. This may be collected by the fare inspector, in which case a receipt is issued that is valid as proof of payment, or it may be

paid later, in which case a "Notice to Pay" will be issued. The notice is also valid as proof of payment. Passengers who ignore the notice will incur late charges, and after a certain period unpaid notices will be turned over to a collection agency. Passengers who travel repeatedly without proof of payment may also be liable to prosecution for theft of service, an offense which in Oregon carries a fine of up to \$500. A computerized system of records, billing, and collection (RBC) is being set up to administer the fare inspection records.

Regional Transit Coordination

Tri-Met at present provides service linking Portland to Vancouver, Washington, where Columbia Transit (C-Tran) provides transit service. As part of the SSFC program, Tri-Met and C-Tran are integrating their fare structures with coordinated zones, and mutual acceptance of each other's tickets and passes. Passengers are thus able to travel on the transit systems in either state without concern as to who provides the service. An annual contract between the agencies enables any resulting inequity in fare revenue distribution to be corrected according to an agreed formula.

Light Rail

Tri-Met's light rail system was both the initial impetus behind the SSFC program and will be the ultimate beneficiary. It can be readily appreciated that if the SSFC system can be successfully deployed on the buses in 1982, its extension to LRT in 1984 or 1985 will present no major problems. Nonetheless, certain modifications are required to respond to the different operating environment of the LRT. Specifically,

- Cash fares will be collected only off the vehicle using vending machines. It is not practical to extend the farebox and dispenser system of cash fare collection to light rail because of the major increase in dwell time that would result.
- Each car will be equipped with a modified controller in each cab and four validators. The use of on-board validators will be consistent with the rest of the Tri-Met system and also provides an additional convenience incentive to passengers to use multi-ride tickets. Single-ride ticket-vending machines will be provided at all stations, and multi-ride vending machines will be provided at key stations. It is intended that, to the extent possible, all passengers will have access to a multi-ride ticket vending machine at one end of their trip.

All fare regulations, tickets, and fares will be freely interchangeable between the bus and LRT lines, and there will be no barriers or gates anywhere on the system.

REFERENCE

1. Economic Impact of Self-Service Fare Collection. Tri-Met, Portland, Oregon, January 1982.