

Internal technical report

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**PERFORMANCE MEASURES USED IN TRANSIT CONTRACTS:
REVIEW OF EVIDENCE**

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ABSTRACT

This report has summarised the work undertaken at QUT as part of a research project sponsored by the Federal Transit Administration in the US. The project was administered by the US Transportation Research Board of the National Research Council, under TCRP Project G-6: 'A Guidebook for Developing a Transit Performance-Measurement System'. Kittelson and Associates Inc. acted as the principal investigators and other participants included Urbitran Inc., LKC Consulting Services, MORPACE International, Inc. and Yuko Nakanishi.

The stated objective of this research is:

'to produce a practical, user-friendly guidebook that will assist transit system managers in developing a performance-measurement system that uses traditional and nontraditional performance indicators and measures to address customer-oriented and community issues.'

As well as an extensive literature review, a total of 19 transit planning agencies and operators were interviewed for the overall project, regarding the performance measures currently in use. The results are available in the form of several project reports, which are currently in draft form, including:

- TCRP G-6: A guidebook for developing a transit performance measurement system: Literature Review, September 2001;
- TCRP G-6: A guidebook for developing a transit performance measurement system: Interim Report, December 2001; and
- TCRP G-6: A guidebook for developing a transit performance measurement system: Performance measure summary, December 2001.

As part of the team working on the project QUT reviewed a number of existing transit performance based contracts in several countries. This report deals with the review of evidence from agencies and operators.

The summary provided here is based on documents obtained from agencies and operators, as well as on personal communication with a number of individuals in 12 organisations in Australia, US, UK, Norway and South Africa.

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1. BACKGROUND

This report provides a summary of the research undertaken by the QUT Transport Consortium in 2001, as part of a US Academy of Sciences sponsored research project. The Transit Co-Operative Research Project: 'A Guidebook for Developing a Transit Performance-Measurement System' was awarded to Kittelson & Associates, Inc. as lead consultants for a total of \$A600 K.

The stated objective of this research is:

'to produce a practical, user-friendly guidebook that will assist transit system managers in developing a performance-measurement system that uses traditional and nontraditional performance indicators and measures to address customer-oriented and community issues. The guidebook will provide a menu of performance indicators and measures, describe how to select and implement the most appropriate performance indicators and measures, and explain how to incorporate the indicators and measures in the decision-making process to monitor and improve service.'

As part of the team working on the project QUT reviewed a number of existing transit performance based contracts in several countries. In addition, a literature review was carried out on the use of performance measures in contracts between planning agency and transit operators. This report deals with the review of evidence from agencies and operators.

The summary provided here is based on documents obtained from agencies and operators, as well as on personal communication with a number of individuals in some of the following organisations:

- Queensland Transport
- Department of Infrastructure, Victoria
- Transperth, Western Australia
- Department of Transport, Western Australia
- Strategic Rail Authority, UK
- Association of Train Operating Companies (ATOC), UK
- TAS Partnership Limited, UK
- Institute of Transport Economics, Oslo, Norway
- UITP (International Association of Public Transport)
- Regional Transportation Commission (RTC) Nevada, US
- KCRC, Hong Kong
- South Africa Department of Transport, South Africa

2. PERFORMANCE MEASURES USED: SUMMARIES

2.1 QUEENSLAND TRANSPORT – BUSES AND FERRIES

Source: Personal Communication with Mr Colin Jennings, Queensland Transport, Brisbane, Queensland, Australia.

Transit Systems: Bus and Ferry Service Operators, all privately owned providers, with the exception of Brisbane Transport, which is owned and operated by the Brisbane City Council.

Transit Modes Considered: Urban fixed-route bus and ferry.

Performance Measures Identified:

- *Community-based:* public transport user perceptions of the service quality.
- *Transit availability:* Mobility and access measures: route coverage (operators in non-urban centres and towns have to ensure that 85% of the population within the contract area is within 400 metres of a bus route. In urban centres 95% of the population must be within 400 metres of a bus route); spread and frequency of timetabled bus hours.
- *Comfort & convenience:* service quality (that is, friendliness of drivers, cleanliness of buses, assistance with problems/complaints, etc.).
- *Economics/productivity:* patronage and farebox revenue (both collected monthly); total kilometres and total revenue kilometres; and costs.
- *Speed & delay:* on time running.

Comments

A survey is undertaken within each contract area every two and a half years, corresponding to the mid-term review and contract renewal periods. This survey asks each respondent questions under the following broad headings:

'Use of transport'

- regular use of transport services
- total use of transport services
- frequency of bus travel
- purpose of bus travel
- reasons for not using the bus to travel to work
- times of bus travel (that is, when did they travel)
- reasons for infrequent use of bus services
- likelihood of increased bus use.

'Public transport performance'

- how well run and reliable is the bus service
- how well co-ordinated is the bus service
- whether or not the service met the transport need of the consumer.

'bus service performance'

- personal safety when using the bus service
- general level of service standards
- accessibility of bus services
- affordability of using buses.

'Bus operator performance'

- how community minded is the company
- whether the company is open to suggestions or views from consumers
- the overall standard of the service.

2.2 QUEENSLAND TRANSPORT – RAIL

Source: Personal Communication with Mr Chris Nash, Queensland Transport, Brisbane, Queensland, Australia.

Transit Systems: CityTrain and TravelTrain services (QR)

Transit Modes Considered: Commuter rail.

Performance Measures Identified:

- *Community-based:* customer satisfaction survey.
- *Comfort & convenience:* special services; safety and security (number of incidents involving passengers; number of incidents of vandalism and graffiti on train)
- *Service delivery:* Reliability – the scheduled and unscheduled services that were cancelled (by corridor); number of services scheduled.
- *Service offered/utilization:* Number of journeys (by origins, destinations, day of week, line section, ticket and passenger types); train kilometres (by line section); passenger loading factors (by corridor); Boardings and alightings (by station peak times).
- *Economics/productivity:* revenue (by line section, ticket and passenger type)
- *Speed & delay:* On-Time (% services within 3 min and 59 sec of scheduled arrival; by corridor and time of day)

2.3 DEPARTMENT OF INFRASTRUCTURE, VICTORIA

Source: Track Record - Quarterly Performance Bulletin, Edition 6 (January-March 2001). Department of Infrastructure, Melbourne, Victoria, Australia, www.doi.gov.au, June 2001. Performance information for Victoria's train, tram and bus services.

Transit Systems: Private sector companies operating the transit in Victoria: MetroLink Pty Ltd (trams), Connex Trains Melbourne, National Express Group Australia (trains), National Bus Company, Melbourne Bus Link.

Transit Modes Considered: Urban fixed-route bus; light rail and commuter rail.

Performance Measures Identified:

- *Community-based:* Customer satisfaction – monthly surveys of users and non-users are conducted rating a number of aspects of transit, also compiled to an overall Customer Satisfaction Index.
- *Service delivery:* Reliability – the proportion of scheduled services that were cancelled [except 1 tram operator: ratio kms traveled to kms scheduled]. (threshold for compensation: % ran: 80% for trams and 92% for buses and trains).
- *Speed & delay:* Punctuality - on time performance, measured at end of journey for buses and trains, trams measured at 4th monitoring point of 5 along route; train or tram on time if <59 secs before and <5 min 59 secs after scheduled time; buses <2 min early or 5 mins late (threshold for compensation: % on time 95-96%).

Comments:

The franchise agreements and bus contracts, managed by the Director of Public Transport in the Department of Infrastructure, set out the overall levels of service required from each operator, tickets to be offered, maximum ticket charges and other performance standards.

Delays, cancellations and other service failures are recorded then measured to the nearest 60 seconds and weighted according to the number of people estimated to be traveling on the tram or train in the time period, day of week and direction of travel. This gives passenger weighted minutes of delay, which are checked against performance targets set in the franchise agreements and determines whether a bonus or penalty is applicable. If an operator does not meet minimum service level requirements, compensation (usually in the form of complimentary tickets) must be provided to customers holding valid periodical tickets of ≥ 4 weeks who traveled on the service concerned. If the operator falls below minimum service requirements, provisions in the franchise agreements trigger a ‘call in’, in which the operator explains and submits plans to the Director of Public transport for improvement.

Monthly surveys of users and non-users are conducted, with respondents rating a number of aspects of transit (satisfied to dissatisfied): Service Delivery, Information Services, Stations/stops, Passenger comfort, Staff service, Value for money, Ticketing and Personal safety. This information is presented for each aspect and also compiled into an overall Customer Satisfaction Index.

2.4 TRANSPERTH

Source: Personal Communication with Mr Ian Vinicombe, Transperth, Perth, Western Australia.

Transit Systems: Trains: Westrail, Ferries: Perth Water Transit, Buses: CGEA Connex, Southern Coast Transit, Path Transit, Swan Transit.

Transit Modes Considered: Urban fixed-route bus; commuter rail and ferry.

Performance Measures Identified:

- *Community-based:* Affordability - Average concession fare as a proportion of the single pension per day; Proportion of service km provided by wheelchair-accessible vehicles; Proportion of train stations providing unaided access to people in wheelchairs; Passenger information (proportion of incoming calls answered); Customer complaints/compliments
- *Comfort & convenience:* Bus fleet presentation (the number of instances where the bus or the driver does not conform to specified standards).
- *Economics/productivity:* Total boardings including transfers; initial boardings (number of journeys commencing on each mode and recorded electronically); Initial boardings per service km and per capita; cost per 1000 passenger place km; Proportion of the Transperth bus fleet conforming to ECE emission standards.
- *Speed & delay:* On-time running – proportion of services running within five minutes of the scheduled time.

2.5 TRANSPORT, WESTERN AUSTRALIA

Source: Annual Report 1999-2000, Transport (Western Australia), Perth, Western Australia, Australia, 2000. <http://www.dot.wa.gov.au/annualrep/index9900.html>

Transit Systems: public transport operators under Transperth, which is managed by Transport (Western Australia)

Transit Modes Considered: Urban fixed-route bus; commuter rail and ferry.

Performance Measures Identified:

- *Community-based:* Stakeholder and customer satisfaction survey (telephone survey ranking of poor to excellent for aspects of the transit system).
- *Comfort & convenience:* Percentage of service kilometres by wheelchair accessible vehicles; wheelchair accessible train stations in total number of stations.
- *Service delivery:* Transperth bus fleet conforming to ECE emission standards.
- *Service offered/utilization:* Total boardings.
- *Economics/productivity:* Percentage of household income spent on transport; average Concession fare as a proportion of the single pension per day.

Comments:

Performance indicators are divided into the following objectives: integration, safety, accessibility, environmental sustainability, efficiency and effective revenue collection.

2.6 UITP (INTERNATIONAL ASSOCIATION OF PUBLIC TRANSPORT)

Source: Incentive Agreements in Bus Public Transport. UITP (International Association of Public Transport), Belgique, <http://www.uitp.com>, 2000. Main report from a study into the incentive agreements between transit operators and authorities in Europe.

Transit Systems: bus operators throughout Europe, with case studies of operators in the UK, Norway, France, Switzerland, Denmark and Sweden.

Transit Modes Considered: Urban fixed-route bus.

Comments:

The study found that initiatives regarding incentives agreements are only in a limited number of countries in Europe: Norway, Sweden, UK, Switzerland, France and Denmark. The main conclusions were:

- As much as possible, the contract should lead to a consistency of the interests of the transit authority and those of the operators through a proper distribution of rights and responsibilities.
- A tendered gross-cost contract with incentives based on perceived customer satisfaction or tendered net-cost contract with some regulation to ensure fulfillment for the public good are both suitable solutions. The difference between net-cost and gross-cost is which party bears the risk, with the risk in net-cost borne by the operator.
- It is important to ensure that the contract creates long term self interest in the quality of transit on the part of the operators. If not, tendering will lead to a decreasing quality with less patronage in the long term.
- The specific type of contract should be chosen after careful consideration of the goals of the public transport system and should reflect the long-term development of the bus operation industry.
- Renewal of contracts is a crucial issue which has not been satisfactorily resolved.

Incentives used by the various agencies are summarized below.

London, UK

- Cost reductions made by operator are shared between transit authority and operator.
- Quality indicators, punctuality, performance etc, are used in the evaluation of new bids
- Cancelled journeys create financial sanctions.
- Three warnings with a year or persistence failure causes the cancellation of the contract.

Manchester, UK

- Point System: 5-50 points for each non-fulfillment, including bus standard, cleanliness, comfort, punctuality, reliability and conduct of drivers.
- More than 100 points per year causes cancellation of contract.
- Penalties, either cancellation of contract or accumulating penalty points for cancelled journeys.

Oslo, Norway

- Previously used efficiency agreements, since 1998 quality incentives with bonus and penalties (for cancelled journeys and regularity).
- Operator receives a percentage of revenue, a cash payment paid on buses and a fixed subsidy (which declines each year due to improved efficiency).

Oppland, Norway

- Quality: bonus of 2% maximum related to passenger survey, with penalties for poor performance.
- Revenue: Passengers increase 5% or 6% generate 1% or 2% bonus respectively
- Negotiated:
- Revenue: additional revenue above a certain level is divided between transit authority and operator.
- Efficiency: fixed cost reduction set each year.
- Quality incentive: bonus of 2% maximum related to passenger survey, with penalties for poor performance.

Malmö, Sweden

- Quality: based on passenger survey according to 5 quality indicators.
- Bonus if every indicator is above a certain level, to a maximum of 5% of revenue. Penalties: maximum 2.5% of costs.
- Quality incentives: prolongation of contracts up to 2 years if performance sufficient.
- Revenue/Passenger Incentive: bonus and penalties that are percentages of the revenue generated.

Gothenburg, Sweden

- Revenue Incentive of 25% generated in operator vehicles (electronic ticketing).
- Environmental Incentive: bonuses when buses have pollution levels less than those stipulated in the contract.
- Non fulfillment of contract causes cancellation of contract after a number of warnings.

Helsingborg, Sweden

- Threatened Competition: in the case of low performance (quality, patronage etc) new operators are likely to take over. No new tendering rounds are automatically enforced.
- Quality Incentive: passenger surveys, with quality below certain levels during three periods causing cancellation of contract and no bonuses or penalties.
- Termination of contract in the case of continuously decreasing patronage.
- Minor restrictions on bus production, service, fares, passenger increase, quality and common elaboration of traffic/market plan.

Zurich, Switzerland

- Total budget achieved, bonus to operators.
- Incentive pool of 2% of contracted cost, depending on general situation of bus transport and individual success of operator, with the pool increasing with the number of bus operators.
- Maximum part of pool is based on market share and score on quality index (based on passenger questionnaires regarding punctuality and service).

Copenhagen, Denmark

- Quality incentive: up to 5% bonus for good performance with penalties for poor quality to maximum of 1% of contract amount.
- Penalties for cancelled journeys and breaches of contract.
- Non fulfillment of contract causes cancellation of contract after a number of warnings.

Lille, France

- Quality incentive: penalties for non fulfillment of quality incentives based on the degree of contractual non fulfillment.
- Revenue/Patronage Incentive: Bonus for output exceeding transport objective else penalties applied.

Lyon, France

- Quality incentive: penalties if a number of quality indicators not filled.
- Revenue/patronage incentive: Bonus for output exceeding transport objective or else penalties are applied.
- 60% of all routes must be certified by 2004 in a national standard system.

2.7 REGIONAL TRANSPORTATION COMMISSION OF NEVADA

Source: Contract for Citizens Area Transit System: Fixed Route Transit Services. Regional Transportation Commission (RTC), Las Vegas, Nevada, US.

Transit Systems: Bus Service Operators

Transit Modes Considered: Urban fixed-route bus

Performance Measures Identified: (minimum levels)

- *Community-based:* number of complaints (maximum 10 complaints per 1000 passengers).
- *Transit availability:* percentage revenue vehicles available for service at all times (80%)
- *Service offered/utilization:* trip completion: incomplete if:
 - started more than 20 minutes late;
 - entire run 30 minutes late;

- service not operated;
- misses a stop or does not complete run (99%).
- *Economics/productivity*: Farebox revenue.
- *Speed & delay*: on time performance: with on time defined as zero minutes early and no more than 10 minutes late (95%).

Comments:

Revenue incentive: operator receives 35% of amount that actual farebox revenues exceeds a base daily revenue for a given section. Penalties imposed for not meeting the minimum (or maximum) levels for all the performance measures listed above.

2.8 STRATEGIC RAIL AUTHORITY, UK

Sources: (a) On Track, Edition 3 (15 Oct - 31 March 2001).

Strategic Rail Authority, UK, <http://www.sra.gov.uk/sra/ontrack/Default.htm>, June 2001. Public Information on the UK Rail Operators performance;

(b) Source: Quarterly Bulletin, Edition 3 (17 Oct 1999 – 8 Jan 2000). Strategic Rail Authority, UK, <http://www.sra.gov.uk>, March, 2000. Public information on the UK rail operators performance.

Transit Systems: 25 train operating companies (TOCs) in the UK.

Transit Modes Considered: Commuter rail.

Performance Measures Identified:

- *Community-based*: National passenger survey on 12 aspects of train travel; complaints per 100,000 passenger journeys; response to complaints within target and within 20 working days; actions to improve service to customers (outside franchise agreement).
- *Economics/productivity*: the incentive payments/penalties for each TOC (based on punctuality, short formations, timetable changes – see comments below for more details); subsidy per passenger mile.
- *Speed & delay*: Percentage of trains 0-5 mins late (includes early trains), 5-10 mins, 10-15 mins, 15-20, over 20 and cancelled (if run less than half of route) – measured at final destination.

Comments:

There are 3 types of incentive payments/penalties for each TOC. One is based on punctuality in which lateness and cancellations are compared to the benchmark figure, (which is the annual performance in the pre-franchise period in most cases), if the performance is better than the benchmark, the SRA pays the operator, else the operator pays the SRA. Short formation incentive payments apply to peak services in London and some other cities based on cancellation changes to the train plan showing the capacity to be delivered. Timetable change incentive payments penalise operators who change the timetable from the printed version.

Passenger complaints data divided into a number of categories: train service performance; fares, retailing and refunds; quality on train; information at station and on trains; complaints handling; staff conduct and availability; station quality; other; safety and security; NRES; timetable and connection issues; special needs; and praise comments.

National passenger survey divided into the following aspects:

1. Overall satisfaction with the journey
2. Trains arrive and depart on time
3. Frequency of trains
4. Price/value for money of tickets
5. Information provided at stations about trains times/platforms
6. Upkeep and repair of the train
7. Speed of the journey
8. Having a seat
9. Train connections
10. Comfort of the seating area
11. being able to buy a ticket easily and quickly
12. Providing an appropriate environment for people to catch their train
13. Provision of information if there are any delays
14. Passengers concerns with personal security
15. Satisfaction with the way in which any recent complaints or claims made for compensation were handled.

Each route group is assigned a grade for punctuality, another for reliability, and an overall grade which is the lower of the two [see Table for grades]. Whole operator performance is graded in the same way by aggregating performance across the total number of that operator's trains which are covered by the charter. Some route groups are excluded from the grading tables as they operate to tighter punctuality standards than the other route groups.

Grade	% Punctuality	% Reliability
A	95 to 100	99.5 to 100
B	90 to 94.9	99 to 99.4
C	85 to 89.9	98.5 to 98.9
D	80 to 84.9	98 to 98.4
E	79.9 or less	97.9 or less

Generally, statistics are based on all trains from Monday to Saturday. However, some London commuter operators measure all trains Monday to Friday, and there are other exceptions. The franchise agreements require that all operators must carry out at least one customer satisfaction survey every six months.

2.9 TAS PARTNERSHIP LIMITED

Source: Quality Bus Partnerships (QBP) - Good Practice Guide, TAS Partnership Limited; Department of Environment, Transport and the Regions, UK. <http://www.tas-passtrans.co.uk/qbp-gpg.htm>, 2001. Developed to assist local authorities and bus operators in implementing Quality Bus Partnerships. The guide is being produced and published by TAS, but has been written on behalf of and approved by the Department of Environment, Transport and the Regions, UK.

Transit Systems: bus operators.

Transit Modes Considered: Urban fixed-route bus.

Comments:

Monitoring of QBPs should be conducted to:

- determine when, whether, or by what degree the objectives of the QBP have been met;
- demonstrate to partners that the QBP process is, or is not, likely to deliver its objectives at intervals during the process;
- demonstrate the impact of the QBP on other objectives and policies;
- develop or alter the strategy, or the mix of components adopted following the implementation of a scheme, but prior to the development of further schemes.

Monitoring seeks constantly to test that the resources being applied to the QBP by the partners are delivering the objectives envisaged. Items to be monitored should directly relate to one of three categories:

- QBP's objectives - this in turn should dictate that targets are monitored;
- impact of the QBP on other objectives and policies;
- performance of individual components within QBP schemes.

Individual items to be monitored should represent the best balance of:

- those items which best determine outcomes;
- those items which are easiest to determine (require the lowest level of additional resources);
- the extent to which partners need to monitor, why should monitoring be conducted.

Partners should therefore seek to make the best use of data they already collect. This might include:

- electronic ticket machine data (for monitoring patronage, revenue and indicative journey time changes);
- local authority traffic counts (for an indication of reduction of non-bus trips - changes to mode split which might indicate a mode shift). Traffic counts are only likely to be appropriate for a large scheme (probably with a spend greater than £5m) where significant changes are anticipated.

Normally, additional surveys will need to be undertaken. Monitoring should be conducted jointly by all partners, with information and results shared. Protocols for data sharing between partners must be agreed before the start of monitoring.

2.10 INCENTIVE CONTRACTS IN NORWEGIAN LOCAL PUBLIC TRANSPORT

Source: The Hordaland Model, Carlquist, E. (2001). Institute of Transport Economics, Oslo, 2001

Transit Systems Evaluated: 3 bus operators in Hordaland, Norway.

Transit Modes Considered: Urban fixed-route bus.

Comments:

The performance based incentive contracts implemented in Hordaland, Norway for bus operators in the year 2000 is described in this paper. From focusing very strongly on cost reductions, the operator is becoming more market oriented. The year 2000 was a transitional phase, with only some elements of the performance contract being implemented. For example, a patronage-based incentive component initially suggested by the Institute of Transport Economics, was not implemented. The bonus system should be initiated in 2001, based on customer satisfaction (30%), reliability (10%), punctuality (10%) and passenger trips (50%).

In the contract suggested by the Institute of Transport Economics, the entire subsidy amount was to be performance-based, with specified rates for subsidies per route kilometre, vehicle hour for peak hours and off-peak, and an additional amount per passenger in peak hours. These rates would vary among the operators, depending on the proportion of urban versus rural mileage, with a ceiling for the total amount.

The authorities define a framework for the minimum quality of service, with regard to fares and accessibility. In the suggested contract, if customer satisfaction falls below 90 % of the target level, based on a customer satisfaction survey, the authority can put the contract out for tender.

Using the assumption of only one performance item for simplicity (the Hordaland model has three), actual vehicle kilometres produced (VKM) and one rate (RATE), i.e. Norwegian Kroner per vehicle kilometre. The subsidy is subject to budgetary constraints, and thus cannot exceed a predetermined level. A fixed deduction (FD) is defined in the base year (2000) and is subtracted to yield the subsidy (S), giving:

$$S_t = (\text{RATE} * \text{VKM}_t) - \text{FD}$$

The estimated subsidy for year 2000 is given by:

$$S_{2000} = (\text{RATE} * \text{VKM}_{2000}) - \text{FD}$$

As year 2000 is the starting point of the contract, the fixed deduction for the subsequent years (FD') depends on the actual mileage level in 2000:

$$FD' = (\text{RATE} * \text{VKM}_{2000}) - S_{2000}.$$

Therefore, the subsidy for 2001 is a function of vehicle kilometres produced:

$$S_{2001} = (\text{RATE} * \text{VKM}_{2001}) - FD'$$

Not only ticket revenues, but also the subsidy level, depends on performance, i.e. vehicle kilometres in this simplified example. Therefore the profits (π) are co-determined by different performance-based factors, namely ticket revenues (I), subsidies (S) and costs (C). Ticket revenue is the product of fares (P) and demand (X), and demand is a function of vehicle kilometres (mileage production) and fares.

$$\pi = I + S - C$$

where $C = f(\text{VKM}, \dots)$ and $I = P * X$ and $X = g(\text{VKM}, P, \dots)$. Given the “right” incentive (RATE), the operator will decide on a fare level (P) and production (VKM) at a level which maximises profits and maximises social welfare, given the budgetary constraints of the county council.

2.11 KCRC (KOWLOON-CANTON RAILWAY CORPORATION)

Source: Public Information Documents and Personnel Communication with Dr Siu Lok Kee, New Technology and Systems Planning Manager, Kowloon-Canton Railway Corporation (KCR), Hong Kong

Transit Systems: Commuter rail.

Comments:

KCR has two main operating Divisions, namely:

- KCR East Rail which carried 800,000 passengers perday in 2000 (links Hong Kong with Mainland China and also serves the New Territories within Hong Kong); and
- KCR Light Rail operating in the North West New Territories (32 kms; 57 stops and 320,000 passengers per day in 2000. Some bus services are also run in conjunction with light rail services.

KCR publishes separate targets for the two operations, as well as the performance measures achieved in the previous year.

Tables 1,2 and 3 reflect performance and targets for 2000.

Table 1: KCR 2000 Performance and Targets – Light Rail (2000)

Performance Measure	Target	Actual Performance (2000)
Service delivery	99%	99.9%
Punctuality	99%	99.39%
Service reliability: Kms run per failure	> 80000	89300
Service reliability: time affected by failure	< 35 mins.	19.07 mins.
Availability of ticket vending machines	99%	99.86%
Availability of Octopus equipment (smart cards)	99%	99.97%
Cleanliness: inside cleaned daily	99%	100%
Cleanliness: outside cleaned every 2 days	99%	100%
Cleanliness: Platform cleaned daily	99%	100%
No. service disruption over 20 mins.	Minimal	1
Passengers/public injured per million pass. Carried	Minimal	0.23
Response to passenger enquiries		
Phone (within 2 working days)	99%	100%
Letter (within 6 working days)	99%	100%

Table 2: KCR 2000 Performance and Targets – Bus Services (2000)

Performance Measure	Target	Actual Performance (2000)
Service delivery	99%	99.29%
Service reliability: Kms run per failure	> 65000	90400
Cleanliness: inside cleaned daily	99%	100%
Cleanliness: outside cleaned daily	99%	100%

Table 3: KCR 2000 Performance and Targets – East Rail (2000)

Performance Measure	Target	Actual Performance (2000)
Service delivery	99%	99.9%
Punctuality	99%	99.6%
Availability of ticket vending machines	99%	99.6%
Availability of train information displays	99%	100%
Availability of add value machines	99%	99.8%
Availability of enquiry processors	99%	100%
Availability of first class processors	99%	100%
Availability of fare collection gates	99%	99.9%
Availability of escalators	99%	99.9%
Cleanliness: external train washing	99%	99.6%
No. service disruption over 20 mins. (p.a.)	Minimal	4
On-train air-conditioning failures per month	< 3	2.5
Response to passenger enquiries		
Phone (within 2 working days)	99%	100%
Letter (within 6 working days)	99%	100%

2.12 SOUTH AFRICA DEPARTMENT OF TRANSPORT

Source: Contract Documents for Provision of Public Transport Services; South Africa Department of Transport, South Africa.

Transit Systems: bus operators.

Transit Modes: Urban fixed-route bus.

Performance Measures Identified:

- *Comfort & convenience:* Failing to display correct destinations, correct duty boards or to display any destinations or duty; failing to pick up or set down passengers at authorised stops; vehicles in an unsatisfactory condition; Deviating from routes.
- *Service delivery:* Vehicle breakdowns.
- *Economics/productivity:* Number of passengers using cash tickets; number of passengers using multi-journey tickets; total passenger trips; total income cash; total MJT income; total income from ticket sales.
- *Speed & delay:* trips that depart late or early; failing to provide specified trips.

Action which incur penalties are described in Table 4. Note that ‘the amount that the Employer would have paid for the trip concerned’ is called Employer Cost.

Table 4. Penalties Incurred: South Africa

Action	Penalty
<i>Failing to provide specified trips</i>	40% Employer Cost, revenue kilometres not paid.
<i>Providing trips that depart late or early</i> <ul style="list-style-type: none"> • between 6 and 15 minutes late from the departure point. • > 15 minutes late from the departure point or any transfer point • > 30 minutes late from the departure point or any transfer point early. 	<ul style="list-style-type: none"> • 25% Employer Cost, revenue kilometres will be paid. • 40% Employer Cost, revenue kilometres will be paid. • the trip will be deemed not to have been operated, no penalty or revenue kilometres 40% Employer Cost, revenue kilometres will be paid.
<i>Vehicle breakdowns</i> If the Operator does not provide a replacement vehicle for breakdowns (i) at the starting point of a route or within an 8 kilometre radius within 30 minutes; (ii) else within 45 minutes.	Replacement vehicle not within required time: 40% Employer Cost, revenue kilometres will be paid. No replacement vehicle provided, penalties will be imposed for a trip not provided. >2% vehicle breakdowns per month incur R200,00 per breakdown over 2%.
<i>Failing to display</i> <ul style="list-style-type: none"> • correct destinations • correct duty boards • to display any destinations or duty boards at all 	R200,00 R60,00 2 weekdays to remedy the situation, whereafter a R200,00 per bus per day.
<i>Failing to pick up or set down passengers at authorised stops</i>	R60,00 except capacity of the vehicle would have been exceeded.
<i>Vehicles in an unsatisfactory condition</i> <ul style="list-style-type: none"> • dirty on the outside or inside • not in a good state of repair or with a leaking roof, broken windows or in an unhygienic • missing, broken or wet seats • broken or missing doors 	2 weekdays to remedy (except dirty buses) >14 days, withdraw the bus. R30,00 per bus R120,00 per bus R30,00 per bus R120,00 per bus
<i>Deviating from routes</i>	R100,00, approved revenue kilometres paid.
<i>Failing to provide the right type, quality and age of vehicles</i>	5% of the total amount payable of the relevant month's payment certificate will be withheld on a <i>pro rata</i> basis. Non compliance 3 months from the date that the monies were withheld, forfeit monies.
<i>Failing to install or to have operational EE and failing to provide specified information</i>	failure to complete stages within the time, 3% of the gross certificate value payable, withheld for 3 months then forfeited.
<i>Failing to implement the "RD-Proposal"</i>	3% of the gross certificate value payable, withheld for 3 months then forfeited.
<i>Failing to subcontract</i> <ul style="list-style-type: none"> • within specified time • 1 year 	5% of the gross certificate value payable, 10% of the gross certificate value payable, withheld for 3 months then forfeited.

3. CONCLUDING REMARKS

This report has summarised the work undertaken at QUT as part of a research project sponsored by the Federal Transit Administration in the US. The project was administered by the US Transportation Research Board of the National Research Council, under TCRP Project G-6. Kittelson and Associates Inc. acted as the principal investigators and other participants included Urbitran Inc., LKC Consulting Services, MORPACE International, Inc. and Yuko Nakanishi.

As well as an extensive literature review, a total of 19 transit planning agencies and operators were interviewed regarding the performance measures currently in use. The results are available in the form of several project reports, which are currently in draft form, including:

- TCRP G-6: A guidebook for developing a transit performance measurement system: Literature Review, September 2001;
- TCRP G-6: A guidebook for developing a transit performance measurement system: Interim Report, December 2001; and
- TCRP G-6: A guidebook for developing a transit performance measurement system: Performance measure summary, December 2001.

All reports can be viewed from the following website: www.Kittelson.com

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