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German Technical Cooperation



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Public transport demonstration route in Surabaya

Transport Planning and Physical Improvements

May 2000, Surabaya



GTZ's Sustainable Urban Transport Project (SUTP) in Surabaya aims to work with related agencies and the people of Surabaya to devise and implement policies toward environmentally, economically, and socially sustainable transport in the city.

This will result in a range of "local" economic (enhanced investment climate), social (poverty reduction) and environmental (cleaner air) benefits, and will also contribute to a stabilisation of "global" carbon dioxide emissions from Surabaya's transport sector. The project is hoped to provide a model of how to reduce such emissions from the transport sector in large cities in developing countries.

GTZ SUTP has embarked on an integrated program, including – working closely with the City Government – development of sustainable transport policies, design and implementation of a public awareness campaign, technical measures to reduce vehicle emissions, enhanced air quality management capability, adoption of appropriate fiscal instruments and transport demand management measures, improvement of conditions for non-motorized transport and pedestrians, elaboration of an effective inspection & maintenance and roadworthiness program, promotion of the use of CNG, a public transport demonstration route including regulatory and institutional reforms to be applied nationally if successful, and dissemination of international experiences.

GTZ SUTP commenced in Surabaya in 1998 and is due to finish in 2001.



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Gordon Neilson, May 2000

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1. INTRODUCTION

1.1 Background

1.1.1 GTZ are currently undertaking the Sustainable Urban Transportation Project (SUTP) in Surabaya, which is concerned with a wide range of issues relating to establishing a sustainable urban transportation system in Surabaya, with special emphasis on reduction of pollutant emissions. As one aspect of this larger project, the Surabaya Municipal Government (SMG) agreed that a public transport pilot corridor project designed to demonstrate how to improve the efficiency and attractiveness of public buses should be undertaken. GTZ accordingly commissioned two public transport specialists to advise on the development of a concept and implementation plan for the pilot corridor project.

1.1.2 The tasks involved in preparing this plan were divided between two public transport specialists, one specializing in policy, legal and institutional matters and the other concerned with transport planning and physical aspects. Both specialists spent 15 working days on the project.

1.2 Goal of the Consultant Mission

1.2.1 The goal of the consultant mission was stated to be the preparation of a concept for a corridor pilot project to demonstrate how an integrated package of legal and institutional, operational and low cost infrastructure improvements can significantly enhance the efficiency as well as attractiveness of public transport service delivery. In the event, the work was taken beyond the concept stage to include more operational analysis and an implementation plan.

1.2.2 This report is concerned with operational and infrastructure improvements as specified in the TOR. Specific tasks included (a) defining the pilot route and any necessary physical improvements, and (b) determining the monitoring and reporting requirements. In addition the report documents the results of surveys that were conducted to establish current operating conditions, identifies existing problems and comments on the need for strong local political support to achieve worthwhile improvements.

1.2.3 A copy of the Terms of Reference for the mission are contained in Annex A.

1.2.4 In the course of the mission it became apparent that a number of basic prerequisites for the introduction of a pilot route were not in place. Firstly there was no precedent for the award of a route licence to one company to operate a route according to specified performance measures. Currently all routes have specific buses licensed to specific routes as specified in the Route Licence and Control Card and in most cases a number of different companies hold licences for any one route. During the period of the mission it was not clear how to go about the issuing of a route licence which replaced the reference to a Control Card with specified performance measures. [Post Mission Note: Subsequent discussions between GTZ and the Directorate General for Land Transport (DGLT) indicated that the preferred option was to prepare a special decree for the pilot project to issue such a licence.]

1.2.5 Secondly the authority for licensing buses to routes which extend outside Surabaya city limits, which is almost all of them, falls under DLLAJ I – the provincial transport authority. The interest in introducing the pilot route originated from Surabaya itself which controls the city transport authority, DLLAJ II. Thus if the selected pilot route were to extend beyond

Surabaya city limits, under current legislation it would have to be licensed by DLLAJ I. In principle this seems wrong and this is especially true if the authority to grant the licence carries with it the responsibility to monitor the new service to ensure it meets the needs of Surabaya residents. It would appear that either the responsibility should be transferred to DLLAJ II or else to some new body with representation from government at Levels I and II. [Post Mission Note: Following the meeting with DGLT it was agreed that a special decree should be prepared to modify Article 45 (2) (b) of KM 84/99 in the case of Surabaya to state that the licensing authority for city bus services be shifted to DLLAJ II.]

- 1.2.6 Thirdly it was suggested that the proposed pilot route be located in the existing north – south corridor from Purabaya terminal in the south to Tanjung Perak in the north. From Wonokromo to Jl. Tambaan this route travels on roads which up to now have been the exclusive domain of Damri, the state-owned bus operator and the largest operator in Surabaya. It was not clear whether or not other companies would be allowed to operate on these roads and therefore whether a route on this corridor could be put out to open tender. [Post Mission Note: At the meeting with DGLT it was stated that the Damri preferential treatment no longer applies.]
- 1.2.7 As a result of the above issues, the emphasis of the mission was shifted somewhat during the mission. Firstly considerable survey work was carried out to establish bus service quality and ridership patterns along the corridor. Bus speed surveys were also done to establish the need for bus priority measures.
- 1.2.8 Secondly, as it was clear that the introduction of such a fundamental change in the way that bus services were operated in Surabaya could not be achieved without strong political commitment, great efforts were made to secure a meeting with the Planning Development Committee D of Surabaya Council to seek their endorsement and active support. It was believed that without this commitment for change, the pilot route was most unlikely to be implemented. [Post Mission Note: Following a presentation from GTZ SUTP the City Council agreed on 28 March to form a committee particularly dealing with transportation issues in Surabaya.]
- 1.2.9 Since there were many issues which remained outstanding, less emphasis was placed on detailed design issues such as bus stops and shelters, bus priority lanes etc. pending agreement on the procedures and the freedom to tender a route traversing roads previously deemed the exclusive domain of Damri. On the other hand more emphasis was placed on making improvements to existing bus services. These included the award of a route licence to Damri for one of its routes on which it is the only operator. This should not be controversial as it would not involve any changes on the street but would be a valuable first step towards reform. Secondly, along the N – S corridor, improvements which could benefit both the existing services and the pilot route in due course were identified in principle.
- 1.3 Objectives of this Report
- 1.3.1 The objectives of this report are to document the work done during the mission highlighting the steps which appear to be necessary to move towards a fundamental change in the provision of bus services in Surabaya and the introduction of a pilot route to test the new procedures.

1.4 Organisation of Report

- 1.4.1 The report is divided into eight chapters. Chapter 2 summarises the current transport situation in Surabaya and Chapter 3 outlines the survey programme. Chapter 4 documents the problems which are apparent in the provision of public transport today and comments on the likely future situation.
- 1.4.2 Chapter 5 discusses the proposed Pilot Bus Route and provides details of the routing, terminal points, indicative fare levels, ridership, etc.
- 1.4.3 Chapters 6 and 7 are concerned with improvements to the existing bus services from the point of view of policy and physical measures respectively.
- 1.4.4 Chapter 8 discusses the monitoring programme that should be undertaken to ensure compliance with the terms of any tender conditions.

2. CURRENT SITUATION

2.1 Introduction

2.1.1 In the 1990 census, Surabaya had a reported population of around 2.47 million. Assuming the growth rate as in the Surabaya population register between 1991 and 1998, the population in 1998 can be estimated as about 2.63 million.

2.1.2 From the “Surabaya in Figures” Handbook 1998, the number of cars and vans registered was as shown in Table 2.1. The table also shows data from 1976 from an earlier report by the UK Transport and Research Laboratory and it can be seen that there has been a substantial increase in both cars and motorcycles over the 22 year period. In fact the current private vehicle ownership rate, including cars and motorcycles, is about 319 per 1000 population. This is a relatively high rate of private vehicle ownership (though the rate of ownership of cars is still relatively low, at around 68 per 1000 people) and indicates that the majority of households in Surabaya have a private vehicle available to them for travel. This clearly has a major bearing on the total demand for public transport.

Table 2.1: Vehicle Registrations and Rates per 1000 Population

	1976	1998	
	Nos.	Nos.	Change
Population (m)	2.30	2.63	
Private Transport			
Cars and Vans	32,200	168,568	
M/C	128,800	670,374	
Total Private	161,000	838,942	
Private /1000 pop.	70	319	+455%

Notes: 1. Source of 1976 data is TRRL Supplementary Report 659. Population figures may not be directly comparable with 1998 as area definition not known. 1998 population taken as 1990 census + 8.3% growth taken from the population register.
2. 1998 vehicle figures from “Surabaya in Figures”, 1998

2.1.3 Fixed route public transport in Surabaya is provided by two modes as follows:

- Buses – supplied by the state owned organisation Damri and by 32 other private operators. Buses generally have total seated capacities of between 50 to 60 since all are 3+2 seating layout. With standees, loadings of up to 100 can be accommodated. These operate on routes which are licensed by the relevant authority, either DLLAJ I (for routes crossing outside the municipal boundary) or DLLAJ II (for routes wholly within the municipality).
- Angkots – supplied by over 1000 private operators. These are small vans with seated capacity of 10 to 15 passengers. Standing is only possible for small children. Routes within Surabaya are approved by DLLAJ II.

2.1.4 Flexible public transport services are supplied by taxis and becaks or pedicabs (see Photo 2.1).

Photo 2.1: DLLAJD figures indicate there are currently around 40,000 becaks in Surabaya.



2.2 Bus Services

- 2.2.1 The current situation concerning bus routes which are actually in operation is not entirely clear. Routes which have buses allocated to them are some 11 regular routes and eight patas (express) routes, seven of which have air conditioned variants. These routes have a total of 418 buses licensed to serve on specific routes and some 45 buses licensed to act as spares.
- 2.2.2 In practice however few routes had anything other than a token service. Only three routes had better than a 10 minute peak period service (Routes F, P1 and P5), six routes had between 10 to 20 minute service (Routes D, E2, P2, P4, P6 and P8) and the remainder had only intermittent departures.
- 2.2.3 Surabaya has a very strong north – south axis running from Purabaya / Bungurasih in the south through the new central business district to the old CBD and port area of Tanjung Perak in the north, as shown in Figure 2.1. The airline distance is around 16km. This is the major bus corridor in Surabaya and as such was selected as the location of the pilot project. In the E-W direction the main north-south corridor lies between Jl. Ngagel / Kusuma Bangsa / Sido Topo Lor in the east and Jls. Diponegoro / Pasar Kembang / Raya Arjuno / Semarang in the west. These are minor public transport routes, however, as the majority of traffic is carried on Jl. Ahmad Yani / Raya Darmo / and then via the one-way system in the city centre through to Tanjung Perak.

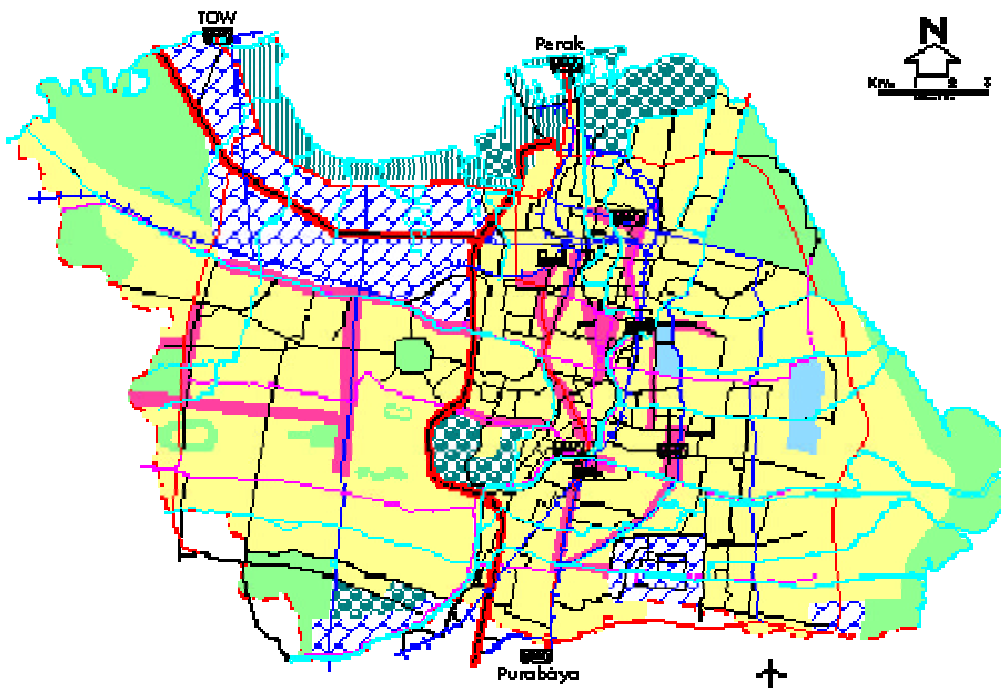


Figure 2.1: The North – south corridor in the Surabaya Municipality

Source: DGLT, at www.dglt.org

2.3 Angkot Routes

2.3.1 There are currently 59 angkot routes operating within Surabaya with a total of 4684 licensed angkots allocated to them. Most of these routes have a E – W pattern and usually travel on the N – S corridor for only short distances. For longer journeys they act as feeders to the bus routes. However from observation it appeared that many feeder trips from the kampongs are made on becaks as the roads or paths within the kampongs are too narrow for any other form of transport.

2.4 Terminals

2.4.1 All bus services operate between a relatively small number of terminals. Off-street terminals are Purabaya, Tanjung Perak, Tambak Oso Wilangun, Joyoboyo and Bratang. Jembatan Merah and Semut Rail Station terminals are essentially on-street “shadow” terminals. External routes run to the off-street terminal in Sidoarjo.

2.4.2 Of major interest to this study as potential terminating points for the pilot route on the N-S corridor are Purabaya, Perak and Jembatan Merah.

2.4.3 Jembatan Merah acts as the terminal point for one existing route, No. F1. There is minimal space for any additional routes especially as a result of the current non-scheduled operating practice which causes large numbers of buses to have to queue at the terminus waiting their turn to leave.

2.4.4 Tanjung Perak acts as the terminus for six existing routes, all of which are currently licensed only to Damri. From survey results it would appear however that route B is no longer operated and route C had only two observed departures in the 3-hour am peak. In practice the four remaining routes can be considered as two routes with a/c and non-a/c variants, i.e., P1 / PAC1 and P4 / PAC4. The terminal is sufficiently large for each route to have a separate departure lane. It would appear that there are no delays occurring at Perak terminal and that it could accommodate another route.

2.4.5 Purabaya is the major southern terminal for Surabaya and is located just outside the Surabaya city limit in Sidoarjo Municipality. It has two areas, one large area for long distance buses and another smaller area for city buses. In total, 24 city bus routes are scheduled to operate from Purabaya but on the survey days, departures were only observed for 19 routes.

2.4.6 Purabaya city bus terminal has four double width bays under cover. In addition there is one triple and one double bay which are not under cover and a movement lane beyond through which all city buses exit the terminal. Only the bays under cover are used for boarding at present.

2.4.7 The width of the double bays appears to be about 5.5m to 6m as it is just possible for two buses to pass with their wing mirrors inches apart. Buses are boarded in both of the lanes which effectively blocks any movement through the bay. Where only two routes are boarding per double bay the system does not delay buses but where two or more routes board in the same lane then delays can and do occur.

3. SURVEY PROGRAMME AND RESULTS

3.1 Introduction

3.1.1 In order to establish some factual basis for the pilot project it was decided to undertake a number of surveys of travel characteristics along the corridor.

3.2 Surveys Conducted

3.2.1 The following surveys were conducted, all of which were carried out for three time periods, i.e., 6 – 9 am morning peak, 3 – 5 pm evening peak and at least two interpeak hours:

- **Boarding and alighting surveys on Route P1**
- **Bus running time surveys, also on Route P1**
- **Survey of all city buses departing Purabaya terminal**
- **Counts of cars and vans, motorcycles, angkots and buses on a three road E – W screenline consisting of Pasar Kembang, Jl. Urip Sumoharjo and Jl. Sumatra.**

3.3 Results

3.3.1 The full results of the surveys are available on diskette at the SUTP office in Surabaya (sutp@sutp.org) and a summary of the results together with the survey forms is given in Annex B. A sample page of the Purabaya terminal survey showing the detail of the data collected is included in Annex B. Anyone wishing to undertake further analysis of the data may do so using the electronic version in Surabaya.

3.3.2 The key results are referenced at appropriate sections in the text of the relevant chapters.

4. PROBLEM IDENTIFICATION

4.1 Introduction

4.1.1 The objective of introducing a pilot programme is usually to test out proposed new procedures for any given task or process. In the present situation this suggests that changes are to be made to the current procedures involved in the supply of public transport. Changes are usually introduced to solve problems with existing procedures and it is essential to be clear about the problems before designing the remedial measures to be taken.

4.1.2 Problems which current users of the bus system face can be sub-divided into three principal categories:

- Problems with delivery of bus services – many routes not operating, lack of regular and predictable departures on routes which are in operation, insufficient route capacity, cramped seating conditions, poor quality of bus ride, poor appearance of buses inside and out.
- Problems of physical infrastructure – no shelter from rain while waiting for buses, few bus stops and no information, almost no pedestrian facilities such as signalised pedestrian crossings or mid-street pedestrian island refuges despite many very wide one-way roads with relatively high speed traffic, poor sidewalk condition for walking, obstructions on sidewalk from hawkers, etc. Conditions for passengers at Purabaya terminal are appalling.
- Problems of bus routing – One way street system is not public transport user-friendly and makes short journeys against the system very difficult – e.g., from the Westin Hotel to Plaza BRI. Almost all routes are N – S in orientation leaving the E – W movements to be catered for by angkots.

4.1.3 Bus speeds at present do not appear to be a problem but if the predicted increase in private cars and vans transpires, problems will arise in the near future and bus lanes, already notionally in place, will need to be strictly adhered to.

4.1.4 While it is reported that the recent financial crisis has had a strong negative impact on bus services, the underlying cause of these problems would appear to be the absence of any division of government with the specific responsibility to ensure the provision of proper and efficient bus services within Surabaya. In order to achieve any lasting improvements, there is a need for strong political commitment to improve public transport. The impending increases in traffic congestion and deteriorations in air quality as a result of increased use of private cars may be sufficient to generate political interest in this issue. The decline in the supply of bus services over the past seven years can be seen from the comparison of observed departures from Purabaya terminal in the recent surveys and in 1993. The overall reduction in service has been 34% with the regular routes suffering a 66% decline in bus departures as shown in Table 4.1.

Table 4.1 Departures by route and time from Purabaya Terminus, January 2000, and Comparison with 1993 surveys.

Route Number	Departures observed in January / February 2000								1993	2000/1993	
	06:00 - 08:59		09:00 - 10.30		13:00 - 14:59		15:00 - 16:59		06:00 - 08:59		
	Total	Average per hour	Total	Average per hour	Total	Average per hour	Total	Average per hour	Ave. Headway	Average departures per hour	Percent change from 1993
A1	0	0.0	-	-	-	-	-	-	45	1.3	-100%
A2	4	1.3	2	1.3	3	1.5	1	0.5	14	2.6	-49%
B	0	0.0	-	-	-	-	-	-	23	2.6	-100%
C	2	0.7	-	-	-	-	-	-	18	3.3	-80%
D	14	4.7	6	1.3	5	2.5	7	3.5	7	8.6	-46%
E	0	0.0	-	-	-	-	-	-	5	12.0	-100%
E1	6	2.0	7	4.7	5	2.5	6	3.0	7	8.6	-77%
E2	9	3.0	4	2.7	2	1.0	3	1.5	n/s	n/s	
F	26	8.7	12	8.0	11	5.5	15	7.5	3	20.0	-57%
G	2	0.7	-	-	-	-	-	-	18	3.3	-80%
Sub total	63.0	21.0	31.0	18.0	26.0	13.0	32.0	16.0		62.4	-66%
P1	44	14.7	24	16.0	30	15.0	29	14.5	3	20.0	-27%
P2	9	3.0	4	2.7	4	2.0	4	2.0	15	4.0	-25%
P4	19	3.0	13	8.7	8	4.0	12	6.0	11	5.5	-45%
P5	20	6.7	10	6.7	8	4.0	10	5.0	13	4.6	44%
P6	8	2.7	1	0.7	2	1.0	5	2.5			
P7	2	0.7	-	-	1	0.5	-	-			
P8	14	4.7	10	6.7	4	2.0	4	2.0			
Sub total	116	35.3	62	41.3	57	28.5	64	32.0		34.1	4%
PAC1	10	3.3	6	4.0	4	2.0	4	2.0			
PAC2	3	1.0	2	1.3	1	0.5	1	0.5			
PAC4	6	2.0	-	-	2	1.0	2	1.0			
PAC5	2	0.7	1	0.7	1	0.5	1	0.5			
PAC6	1	0.3	2	1.3	2	1.0	2	1.0			
Sub total	22	7.3	11	7.3	10	5.0	10	5.0	0	0	
TOTAL	201.0	63.7	104.0	66.7	93.0	46.5	106.0	53.0	0.0	96.4	-34%

4.2 Delivery of Bus Services

- 4.2.1 Despite there being 33 bus owning companies with a total of 409 buses licensed operate on some 27 routes (excluding another 45 spare buses not allocated to specific routes), in fact it would appear that there are far fewer buses in actual service.
- 4.2.2 Of the 27 routes, 13 are operated exclusively by Damri, two are operated exclusively by buses owned by individual private companies (eight buses on Route G by Mitra Abadi and one bus on Route PAC3 by Robana), six routes are operated by a mix of Damri and private owners and the remaining six routes are operated with buses owned by a mix of private owners. There are an additional 11 routes with no bus licences issued.
- 4.2.3 Most private buses are rented to individual drivers on a daily basis under the *setoran* system. No scheduling of these buses is done and as a result on all routes, other than the exclusive Damri routes, the drivers simply drive to the terminus at the start of the day, (or well before it) and take their place in the queue for departure. Since there is apparently no avoiding the terminus, it is clearly in an individual driver's interest to wait at the terminus for a longer rather than shorter period as he can a) get more passengers at the terminus and b) more passengers at the bus stops on route due to the longer gap between his bus and the one in front. Departure times from termini are determined partly by the driver and partly by "co-ordinators" providing informal terminus control. Although in theory the control card which each bus must carry should contain the schedule for that specific bus, in practice this is not done.
- 4.2.4 Since the award of a licence to an individual company does not carry any obligation to provide service, there is no way of knowing how many buses will turn up for any route on any given day. The corollary of this is that the licensing officials at DLLAJ I and DLLAJ II have no cause to check on the numbers of buses since they are not responsible for the service level on any route. In fact, no one appears to be responsible for the service on a mixed operation route. Even on the routes operated entirely by buses belonging to Damri, while Damri might take on this responsibility, it is a matter of choice – not obligation.
- 4.2.5 This licensing approach is the fundamental problem of bus services in Surabaya and results in extremely poor service on many routes and no service at all on others. If there is to be any improvement in bus services the licensing approach must be changed to give one operator the responsibility for a defined level of service on a specific route.
- 4.2.6 As seen from the survey results, while some routes were operated well, e.g., Damri Route P1, many other routes were operated very badly or not at all. Table 4.2 shows that of the 17 routes supposed to operate from Purabaya terminal, three did not operate at all and seven had less than 4 departures per hour. In fact, only two routes, Nos. P1 and F, could really be said to have frequencies worthy of urban routes.

Table 4.2: Observed departures at Purabaya terminal

No. of Departures in peak hour	Bus Routes by Nos. of Departures								
	nil	<2	2 - 4	4 - 6	6 - 8	8 - 10	10 - 12	12 - 14	>14
Regular Routes	A1 B E	A2 C G	E1 E2	D		F			
Patas and Patas A/C Routes		P7	P 6 PAC 6	P 2 PAC 2 P4 PAC 4 P8	P 5 PAC 5				P 1 PAC 1

4.2.7 Examining the performance of Route F in more detail shows that even this route is actually providing a very poor service. Figure 4.1 shows the actual departures over the morning peak period and it can be seen that there was one gap in service of 33 minutes, two of over 13 minutes and nine buses leaving within three minutes of each other. Under ideal circumstances all buses would have departed at 7-minute intervals. Anyone who was required to arrive at work on time would surely be forced to consider an alternative means of travel.

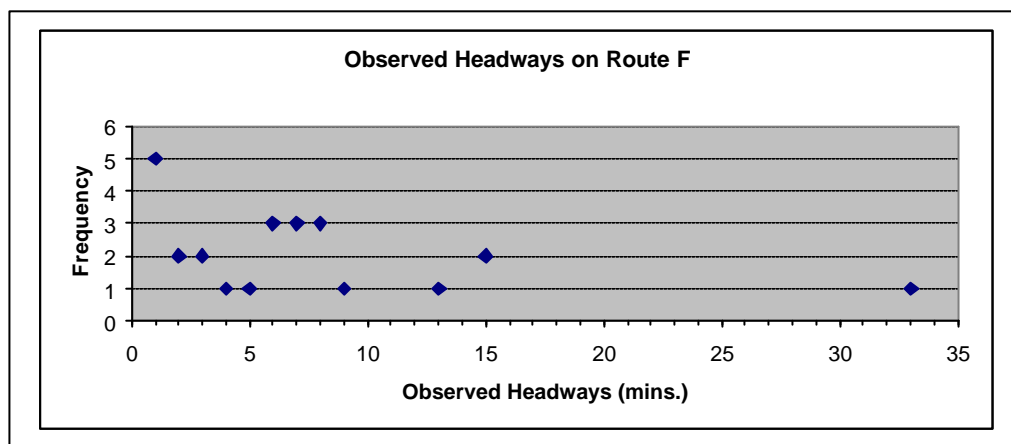


Figure 4.1: Observed headways on Route F, (6am to 9am)

4.2.8 Two principal reasons were given for the general poor performance. For the regular routes, owners maintained that the fares were too low. The buses were not attractive to drivers to rent compared to the patas routes. The owners, faced with greatly increased spares parts costs were cannibalising the buses on the regular routes to provide spares for buses on the relatively more profitable patas routes. It was observed that on the regular routes that were being operated, the conductors were charging Rp 500 rather than the official fare of Rp 300.

4.2.9 On other routes where some service was being offered the problem was a combination of fares being low so that drivers did not want to leave the terminal without a reasonable base load and secondly of congestion in the terminus at Purabaya. It was stated that on occasions buses queuing to access the loading bays on one route blocked buses on other routes accessing their loading bays. With no clear channel to leave the buses are trapped. In the

time available it was not possible to study this in detail but from observation there were large numbers of buses waiting to gain access to the loading bays.

- 4.2.10 The result is long layover times in the termini especially Purabaya and Tambak Oso Wilangun. This is inefficient as it means more buses are allocated to a route than necessary. As a result the costs are higher and thus the fares are higher than they should be. If the desire of the government is to have a bus service for its residents at the lowest reasonable cost this problem should be resolved.

4.3 Problems of Physical Infrastructure

- 4.3.1 Given the complex operating system where more than one company operates on individual routes, the shortage of terminus capacity at Purabaya is a major problem.

- 4.3.2 The conditions at this terminal are extremely bad. The passenger islands are covered in oil and grease and the bus bays are caked thick with grease and filth. Standing water forms in pools long after rain has ceased and these can be up to 3 – 4 cm deep in many places. Litter is everywhere. There is no forced ventilation system and the air quality is appalling as might be expected from the poor condition of engines on most buses. In addition to the generally poor environment, the presence of a multitude of individuals hanging around, some cajoling passengers onto buses, others with no obvious constructive role to play contributes to the totally unpleasant experience. It is hard to find words strong enough to criticise the management and maintenance of this facility.

4.4 Problems with the Bus Route Network

- 4.4.1 As noted earlier the bus route network is limited and really only serves the two major roads in the N – S corridor, i.e., Raya Darmo and Pasar Kembang, the toll road and the E – W connection to Tambak Oso Wilangun. The local services are provided by angkots. While clearly the bus network is far from comprehensive, the total package of bus plus angkot routes does provide reasonable city-wide coverage.

- 4.4.2 The main problem, not only for bus but also for angkot passengers, is the extensive use of one-way roads in Surabaya. These result in journeys against the flow being very complicated especially for those who are unable to walk longer distances. To travel between the Westin Hotel and Plaza BRI would either require a long walk from the hotel to Jl. Tunjungan followed by a bus journey or alternately taking two buses, first northbound and then southbound down the corridor. This makes the use of public transport very unattractive. Similar problems exist on Kenjeran, Mustopo and the Kedungdoro corridor as a result of the one-way nature of Jl. Blauran. Many more examples could be given.

- 4.4.3 One-way systems are very public transport unfriendly and any serious effort to increase the use of public transport in Surabaya would have to either reconsider the one-way traffic management system or introduce contra-flow bus lanes on all the major one-way roads. At present this would be difficult on the narrower sections especially where there is a large amount of frontage activity and/or street vendors and hawkers. Examples are southbound on Jl. Kr Gantung and the sections of the corridor in both directions outside Tunjungan Plaza where the road narrows to two effective lanes as a result of vendors and pedestrians forced to walk on the road due to the sidewalk being blocked by stalls. Nonetheless, on many sections contra flow bus lanes appear possible in traffic engineering terms but would require greatly improved enforcement of traffic rules by the police to be effective.

- 4.4.4 With the possible exception of Route P1 all buses in the peak period appeared to be filled to about 80 to 90% load, i.e., fully seated and about 20 - 30 standees before leaving Purabaya terminal. Thus clearly the terminal is a major interchange location with passengers from long distance buses transferring onto the city buses and vice versa. However by filling the buses at the terminus, there is clearly minimal space left for any passengers along the route. This must be regarded as a highly unsatisfactory situation if the city buses are expected to play any serious role in the carriage of passengers within Surabaya.
- 4.4.5 The development of the bus and angkot route networks is a key issue that must be addressed. If the owners and operators can be shown solid commitment by the government to increase public transport usage and to ensure its financial viability, then it may be much easier to secure the operators agreement to route and service changes. In an expanding situation it should be possible to accommodate all the existing players. The operators would of course have to accept that standards would have to rise and that any operators not willing or able to co-operate could not expect to participate in future.

5. PROPOSED DEMONSTRATION PROJECT

5.1 Overview

5.1.1 As commented above, from the discussions held with various government officials it seems rather premature to be discussing details of a pilot project when there is no clear agreement on how the existing public transport system should be improved – or even if it should be improved. The point of a pilot programme is to test out a proposal for a new general procedure.

5.1.2 For this reason it is suggested the project should, in the immediate future, focus its efforts on:

- Garnering political support for fundamental change in the provision of public transport
- ensuring the establishment of an executive body or standing committee to be responsible for the provision of improved public transport in Surabaya
- the issuing of a performance based route licence to Damri on one of its exclusive routes
- exploring ways of consolidating the multi-operator routes so that one legal body could be given a route licence and be responsible for the service on the route.

5.1.3 Tendering out a new route could be done after the creation of the first route licence to Damri but as a trial before the consolidation of the existing multi-operator licensed routes. The pilot route should therefore be mostly concerned with the tendering process as the actual form of the route licence and its performance stipulations should have been established with the Damri licence.

5.1.4 One of the key reasons for conducting a pilot tendering project is to test out a procedure which the Tendering Authority, TA, hopes to use on a more widespread basis if the trial is successful. It is important therefore to have a good understanding of what the tendering authority is seeking to do in the longer term.

5.1.5 If the TA is seeking to invite companies from outside Surabaya e.g., long distance operators such as Akas or Tjipto from East Java, general transport companies such as Bluebird or Steady Safe from Jakarta or even bus operators from outside Indonesia, this needs to be made clear. If large companies are involved they have the resources to operate major routes and can take initial losses while they build up their business. If the TA is only thinking of the existing operators in Surabaya then it would seem that the tender would have to be very small scale as otherwise these operators would not have the resources to operate the route.

5.1.6 For the present it will be assumed that the TA is seeking to improve the quality of bus service and is therefore intending to invite major players in the bus business, both nationally and internationally, to bid. This makes the effort more worthwhile and gives greatest flexibility in the choice of demonstration route.

5.2 Choice of Demonstration Route

5.2.1 Changing any established procedure usually suggests that those responsible for the product or service, or those using the product or service, are dissatisfied with it. In which case the objective of introducing change is to remove those aspects of the product or service which are

unsatisfactory whilst retaining the aspects which are satisfactory. In this case the TA must make clear which aspects of the bus service they want to change before the tender documents can be drawn up. As noted above, one of the worst aspects of the bus service in Surabaya is the conditions at Purabaya terminal and therefore one aspect of the tender process may be to ensure that any new route did not suffer from the same problems in whatever terminals it uses.

- 5.2.2 It has been reported that many proposals to introduce new bus routes have been blocked by protests from angkot owners and drivers associations. While this is clearly a problem that must be dealt with in the longer term, the demonstration project may not be the place to try it. It may therefore be advisable to avoid the predominantly E - W movements which are now provided by angkots in Surabaya. The E - W movement would also be rather uncharted territory as far as bus operations are concerned and for both these reasons it is probably best to stick to the N - S corridor for the pilot route.
- 5.2.3 In the longer term however it would seem that there are opportunities for bus services especially in the new and wide roads to the east of town. A policy statement on the respective role of buses and angkots throughout Surabaya would seem to be called for and this should be accompanied by a ruling on the size and quality of vehicles to be used for both bus and angkot routes. This should then be followed up with specific route proposals for buses and angkots which could be the subject of future tendering exercises.
- 5.2.4 It was noted earlier that almost all the buses departing from Purabaya terminal were virtually full on departure. While there is no passenger survey data to confirm this it would seem from observation that most people transfer from long distance buses to the city buses. This would suggest that there is a significant demand for services which operate directly from the south of Purabaya to Surabaya city centre. If the transfer at Purabaya could be avoided passengers could save perhaps 10 to 15 minutes in time and avoid having to deal with the unpleasant conditions at Purabaya.
- 5.2.5 From discussions with Damri staff, private operators and some existing bus passengers, it would appear that the a/c buses are generally accepted as better and worth the premium fare. This is probably more true on longer journeys than short although the issue of affordability, i.e., the ability to pay for the premium on a daily basis if it is more than a few hundred rupiah must be confirmed.
- 5.2.6 It was noted earlier that only Damri buses currently operate on the N-S corridor from Wonokromo to Tembaan. This effectively precludes private operators from offering service to the majority of the city centre. It would seem however that this is not a firm regulation with legal status but rather a matter for the Surabaya City Council to determine whether or not other operators can use these streets. It has been assumed for the purposes of selecting a pilot route that this restriction could be lifted, in whole or in part. [Post Mission Note: At the meeting with DGLT referred to earlier it was asserted that this restriction is no longer in effect.]
- 5.2.7 If for any reason restrictions are considered necessary, then possibly restrictions on picking up passengers could be applied.
- 5.2.8 If the Surabaya authorities are reluctant to lift the restriction then perhaps an alternative route could be operated from Gresik direct to Surabaya city centre as the situation which occurs at Tambak Oso Wilangun terminal with large numbers of passengers transferring

from long distance buses to city buses is similar to that at Purabaya. Although Tambak Oso Wilangun terminal is better than Purabaya in almost every respect, passengers would still be able to save considerable time by avoiding this terminal and travelling straight into the city centre.

- 5.2.9 It would seem however that the ideal pilot route would be an air-conditioned service from Perak in the north to a terminal south of Purabaya. One option would be for the route to go to Sidoarjo Bus Terminal which is some 15 km south of Purabaya. Alternatively, and possibly preferably, the route could have its own land for a southern terminus point which would be fully under the control and management of the company operating the route. In this case the terminal could be closer to Sidoarjo town centre. For the present it will be assumed that the service will terminate at Sidoarjo Terminal.
- 5.2.10 An added advantage to this choice of route is that it already exists on paper as proposed Route PAC 12. This is also the alignment of the proposed busway as set out in SUD Policy 2018. Thus it would seem that the corridor has been identified as having sufficient demand for a busway or even a rail system. Route PAC12 would clearly be a first step in establishing a service linking all points on the corridor and if allied with physical improvements such as bus priorities, marked bus stops with large shelters, better pedestrian facilities including protected, signalised road crossings with adjacent bus stops, better sidewalk conditions, etc. then a significant advance in public transport provision could be achieved.

5.3 Current Supply and Demand

- 5.3.1 In the short timescale of the study it has not been possible to carry out a full demand assessment. Surveys were however carried out at three locations in the corridor to establish N – S flows on buses, angkots and private vehicles. The results are as given in Table 5.1 for the morning peak in the northbound direction.

Table 5.1: Screenline survey results summary

	Average hourly flows northbound for period 6am to 9am							
	Pasar Kembang		Sumoharjo		Sumatra		Total	
	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.
Buses	10	563	28	1971	2	107	40	2641
Angkots	364	1968	184	2554	161	1472	709	5994
Cars and Vans	634	951	2634	3951	1682	2523	4950	7425
Motorcycles	3016	3318	5242	5766	3118	3430	11376	12514
Total		6800		14242		7532		28574

Note: Assumed car and van occupancy =1.5, assumed m/c occupancy =1.1.

- 5.3.2 Details of the bus services were also surveyed and the results are given in Table 5.2. Full results are contained in Annex B.

Table 5.2: Bus screenline survey results (one way northbound)

Pasar Kembang			Urip Sumoharjo			Sumatra		
Route No	Buses (6-9am)	Buses per hour	Route No	Buses (6-9am)	Buses per hour	Route No	Buses (6-9am)	Buses per hour
F	11	3.7	C	2	0.7	A	6	2.0
F1	16	5.3	E	7	2.4			
P6	1	0.3	E2	10	3.3			
P4	1	0.3	P1	40	13.3			
			P2	13	4.3			
			P3	0	0			
			P4	1	0.3			
			PAC1	11	3.7			
			PAC2	1	0.3			

5.4 Proposed Route and Demand Estimates

- 5.4.1 The route proposed for the pilot project runs from Sidoarjo in the south to Tanjung Perak in the north. From the results given above it can be seen that currently public transport carries about 30% of the passengers across the screenline in the morning peak period, about 70% of which are carried on angkots. Without a more detailed survey of origins and destinations it is not possible to make any detailed assessment of the demand for the proposed service. There are however a number of pointers which enable some approximate estimates to be made.
- 5.4.2 The first is the very high proportion of passengers on the buses which board at Purabaya terminal. From the surveys on Route P1 it was seen that about 35% of the total boardings on the route were made at the terminal. This clearly indicates that a considerable number of passengers are coming from areas south of Purabaya. The second pointer is the high number of motorcycle users in the corridor. While the motorcycle offers very convenient travel in terms of speed and cost, it does not offer a particularly safe or comfortable journey. As the volumes of traffic increase causing the motorcyclist to feel increasingly exposed to danger and the expectations of the population rise, especially among office and professional staff, the relative attractiveness of an air conditioned bus is likely to increase. It will be essential however that the service is reliable, affordable and comfortable.
- 5.4.3 In the period 6am to 9am, Route P1 currently attracted 35% of its total boardings from Purabaya terminal. In the peak one hour (7 - 8 am) a total of 682 passengers boarded P1 at Purabaya and in the same period the total maximum load was 1344. Since there were 16 departures this gives an average load at Purabaya of 43 passengers per bus and a maximum load of 84 passengers per bus. If the new service could attract 25% of the people who board Route P1 at the terminus, this would result in a ridership of 170 at Purabaya and if the same relationship to the maximum load holds then the maximum load should be about 340.
- 5.4.4 It is likely that Route PAC1 has similar characteristics to P1 but with passengers who are even more likely to switch to a new a/c service. Under current operations, there are about four P1 departures for every one of PAC1. So it can be assumed that the ridership abstracted

from PAC1 would be about 25% of that abstracted from Route P1, i.e., 85 passengers per hour. This gives a total maximum load per hour from P1 and PAC 1 of $340 + 85 = 425$.

- 5.4.5 The turnover ratio on P1 over the three hour peak was about 1.5, i.e., total boardings were 50% more than the total maximum load. Thus the total boardings in the peak hour on the new route could be expected to be about 640 passengers.
- 5.4.6 From the survey on Jl. Urip Sumoharjo, Routes P1 and PAC1 accounted for 1170 passengers per hour, or for about 60% of the total bus passengers across the screenline, with the remaining routes carrying around 800 passengers per hour. If it is assumed that the new route could attract say 5% from these other routes this would indicate an increase in the maximum load to 465.
- 5.4.7 If it is assumed that the buses to be used in the new route are full size single deck buses with about 45 seated and 30 standing capacity, the number of departures would need to be 6.2 per hour. For the current purposes it will therefore be assumed that the new service should start with a 10 minute peak frequency.
- 5.4.8 If the basic boardings abstracted from P1 and PAC 1 are increased in the same proportion as the maximum load as a result of the additional ridership from other bus routes in the corridor, then the total ridership should be around 700 passengers per hour. If it is further assumed that the one way peak factor is 15% this would result in a total daily, two-way ridership of about 9300 passengers per day.
- 5.4.9 Note that this estimate does not assume any diversion from motorcycle users. If the service is attractive and the quality of the other bus routes in the network improves then it is likely that the new route could attract people from motorcycles, especially those travelling longer distances.

5.5 Route and Service Details

5.5.1 The proposed alignment for the pilot route is as follows:

Sidoarjo to Tanjung Perak: Distance 33.3 km
Sidoarjo Terminal, etc.....

Tanjung Perak to Sidoarjo: Distance 34.3 km
Perak Bus Terminal, etc.....

[But see comment on availability of suitable space and financial terms at existing terminals in para. 5.8.2]

On the basis of a full size single deck bus, capacity 75 passengers:

Provisional Service Details:	at least:
From 5:30 am to 9:00 am	every 10 minutes
From 9:00 am to 15:00 pm	every 15 minutes
From 15:00 pm to 19:00 pm	every 10 minutes
From 19:00 pm to 21:00pm	every 15 minutes
From 19:00 pm to 22:00pm	every 20 minutes

Estimated peak period journey speed 20kph

Estimated one way journey time	
Sidoarjo to Perak	100 mins
Perak to Sidoarjo	103 mins

Estimated layover 10 mins per trip

Estimated round trip journey time 223 mins

Peak Vehicle Requirement 23 buses

All vehicles must be air conditioned

Minimum capacity in peak one hour	450 places per hour per direction
Minimum seat width	40 cm (to be confirmed)
Minimum seat pitch	70 cm (to be confirmed)
Minimum aisle width	60 cm (to be confirmed)
Standing passenger allowance	6 persons per sq.m. of approved area

Fare to be specified by bidders

Service Quality: In order maintain a satisfactory level of comfort, buses shall not carry more than the legal limit of seated and standing passengers. Equally, passengers waiting for service at bus stops should not be left behind on a regular basis at any time of day.

5.6 Operating Costs

5.6.1 No attempt has been made to estimate operating costs with any precision. Table 5.3 gives an indication of the likely order of magnitude of costs excluding taxes and any costs which may be levied of a non-productive nature.

Table 5.3 Indicative Bus Operating Costs

Assumptions

Capital cost of new bus	1050	Rp (m)
Capital cost of second hand a/c bus	420	Rp (m)
Return on depreciated asset value	18%	
Depreciation Period for 2nd hand bus	10	years
Availability rate	85%	
Staffing Ratios		
Drivers per bus	2.3	
Conductors per bus	2.3	
Other traffic staff per bus	0.2	
Maintenance staff per bus	0.6	
Management / admin	0.4	
Total	5.8	
Average Monthly Wage	0.5	Rp (m)
Welfare and retirement etc	20%	on wages
Km per bus per day incl. 5% dead km	277	
Fuel consumption	50	litres /100 km
Cost of fuel	550	Rp / litre
Cost of oil and lubricants	5%	on fuel costs
Cost of spares and consumables incl. tyres etc	5%	of new capital value of bus
Depot, Terminal and Office Rental Charges	50,000	Rp
Other overhead costs per bus per day	50,000	Rp
Operating Costs per bus per day		
Staff costs incl. welfare	0.116	
Fuel and oil	0.080	
Spare parts	0.144	
Bus depreciation	0.135	
Return on Investment	0.122	
Depot and Office	0.050	
Other overheads	<u>0.050</u>	
Total	<u>0.698</u>	

5.6.2 The above figures are in reasonable accord with estimates made by a World Bank study in August 1999 prices and give a simplified breakdown of the total costs. Given a cost of about Rp 700,000 per bus per day and a predicted daily ridership of about 390 passengers per day, the average fare must be about Rp 1800 to make the desired return.

5.7 Fares

- 5.7.1 Fares are to be decided by the tenderer. However if the ridership distribution is as shown in Table 5.4 with the fare structure given in Table 5.5 then an average fare of around Rp 1900 should result.**

Table 5.4: Assumed ridership distribution

From To	Zone 1	Zone 2	Zone 3	Zone 4
Zone 1	10%	20%	10%	5%
Zone 2		5%	20%	5%
Zone 3			15%	5%
Zone 4				5%

Zone 1 Sidoarjo to Purabaya

Zone 2 Purabaya to Wonokromo

Zone 3 Wonokromo to Tembaan

Zone 4 Tembaan to Perak

Table 5.5: Indicative fare structure and levels

From To	Zone 1	Zone 2	Zone 3	Zone 4
Zone 1	1,500	2,000	2,500	3,000
Zone 2		1,500	2,000	2,500
Zone 3			1,500	2,000
Zone 4				1,000

- 5.7.2 Market research would be required to examine other fare options and to determine whether or not there was sufficient demand for the service at the level of fares required.**

5.8 Terminal Points

- 5.8.1 The service will require an unobstructed passage through both the terminals. At Tanjung Perak there would appear to be no particular problem. Sidoarjo Terminal is already fairly busy. Discussions should be held at the earliest possible date with the authorities controlling both terminals to establish whether or not the route can be accommodated with an unobstructed lane and with departures totally under the control of the bus operator. The terminal operator may charge a fixed monthly rental for the use of the exclusive bay and any facilities which the bus operator may wish to provide, such as a controller's kiosk, drivers' reserved waiting area, and so on. No charges on any other basis shall be levied.**

- 5.8.2 If space cannot be identified which meets these requirements or if the basis of charging is unacceptable to the terminal owners then the operator must identify alternative terminal space as part of their bid.**

5.9 Bus Stops

- 5.9.1** Bus stops should be located at approximately 500m intervals in the section south of Surabaya city limits and at approximately 300m intervals within the city. Entrances to kampong areas where waiting passengers normally gather should be formalised as bus stops. Bus stops should also be located near each pedestrian overpass. All stops should have adequate shelters and information on the routing and frequency of the pilot route. The operator may be required to provide shelters at each stop under the terms of the route licence. In this case it may be worthwhile in the tender documents to specify the locations where the bus operator has the right and the obligation to erect, or have erected, shelters to a design mutually acceptable to the city, the operator and his advertising agency.
- 5.9.2** Under current procedures shelters are provided by the Public Works Department of Surabaya. There may be some merit in examining alternative ways of providing shelters which can also ensure good maintenance. This is discussed further in Chapter 7.

6. IMPROVEMENTS TO EXISTING SERVICE – POLITICAL COMMITMENT AND STRATEGY

6.1 Introduction

6.1.1 As commented earlier, the current regulatory arrangements for public transport in Surabaya are very convoluted. This appears to have created a situation in which it is not clear exactly who has responsibility to ensure the provision of a proper and efficient public transport service in Surabaya and its surrounding districts. It is strongly suggested that Surabaya Municipal Government, the Level II agency, takes the leadership role in these matters as the problem is essentially an urban problem. Where possible it should be given the necessary powers to implement changes on all matters which are primarily city issues. Where these powers cannot be assigned to the city, the relevant authorities in the respective jurisdictions should co-operate under the leadership of Surabaya city officials.

6.2 Strategy

6.2.1 Surabaya Municipal Government (SMG) must look to the future and have a clear vision as to the sort of city they want and what the transport system should look like. The city is in a process of spreading out, with new developments tending to be located in the outer areas. If a dispersed model of urban development is followed, population densities will decline which tends to favour private as opposed to public transport. Public transport needs high demand corridors to justify high frequency service. It is possible to plan on the North American model where transport is almost exclusively made on private vehicles and public transport is only provided for those members of society who, for whatever reason, do not or cannot drive. Apart from being inequitable, this option would involve vast expenditures on roads, car parks, and associated infrastructure, and it is in any case highly likely that the unfettered growth in private cars would far outstrip the provision of public roads. A recent World Bank study indicated that it would cost US\$4.2 billion (as well as considerable social and environmental costs) to build sufficient roads to keep traffic speeds in 2010 at 1995 levels. This study moreover acknowledged that even if this amount were expended, it would only be a temporary fix, as the new roads would in turn generate their own traffic and quickly become congested.

6.2.2 The alternative is to model Surabaya more along the lines of high-density Asian cities such as Singapore, Hong Kong and Seoul, which have succeeded in restraining private vehicle use, promoting use of public transport, and maintaining a significant role for non-motorised modes including pedestrians. Public transport plays a major role in these cities in the overall provision of transport.

6.2.3 The model to be followed is something the Surabaya Municipal Government must decide. The study team's recommendation would be that the pressures to build more and more roads should be resisted and that every effort should be made to promote the use of public transport by all levels of society. The unrestrained purchase and use of private transport will inevitably result in severe and prolonged traffic congestion, ever worsening air quality and other environmental damage. Public transport must be made more attractive and Municipal Government must guarantee its dependability as the availability of an attractive public transport system is an essential pre-requisite for any restraint on the use of private vehicles, the need for which would seem inevitable if road speeds are to be maintained.

- 6.2.4 Thus the present system where no-one has the responsibility to ensure the provision of a decent bus service must change. DLLAJ I or II, whichever takes responsibility for bus services after the changes specified in the new decentralisation legislation are put into effect, must either deregulate bus services (which it is assumed will not be done) or plan and regulate them properly. To do this they need to have the staff and the skills to monitor public transport performance. If the bus service being provided to the public is not acceptable then they must be in a position to make changes. In this case it is clear that the procedure whereby a variety of companies hold licences entitling them to have specific buses provide service on specified routes must cease and each route should have one operator who is responsible ensuring a satisfactory service.
- 6.2.5 This requires a fundamental change to the licensing procedures in that an operator, i.e., an individual, a company, a consortium or some other legally accountable body, must be the licence holder. The vehicle based licensing system must be terminated.
- 6.2.6 The operator of the route would be required to provide a “satisfactory” service and this could involve defining a number of key service parameters which could include the following:
- Departure times of the first and last buses from each terminus
 - minimum number of buses in service during the peak hours
 - capacity of the buses to be used
 - headways to be provided by time of day
 - minimum peak hour capacity to be offered by direction
 - total daily trips
 - maximum peak occupancy
 - vehicle specifications including engine position, seating standards, availability of a/c, floor height, maximum legal capacity including standees, aisle width, cabin height and number of doors.
- 6.2.7 All these measures relate to the quality of service as seen by the passenger. The precise conditions may be altered by mutual agreement between the operator and the licensing authority in line with altering circumstances This is very important. As the objective is to increase the number of passengers on the routes it is essential that either more buses are added or larger buses are employed as the passenger numbers increase. While the operator should be free to add buses as long as the minimum conditions are met the licensing authority should also retain the right to ask for improved service if it believes that the operator is not responding adequately to increased demand.
- 6.2.8 While the above measures are concerned with the obligations of the operator, it is important that the agreement makes it clear that fares, if controlled by the regulator, must be allowed to rise such that the operator can cover all his legitimate operating costs including depreciation and interest charges and also have a reasonable return on his investment.
- 6.2.9 The operator must also be required to report performance to the regulating authority on a regular basis. Information that should be supplied is detailed in Chapter 8. The agreement between the operator and the regulator must contain some provisions for the regulator to take action against the operator if the service is not being provided as specified. Ideally this

should be incremental such that first offences receive small fines while persistent and serious breaches of the agreement can result in the loss of the route.

- 6.2.10 No special licence shall be required for the bus and no payment other than the normal vehicle registration fee shall be required. Every effort will be made by the Government to ensure that the cost of the service is kept to a minimum. Taxation on the provision of normal public transport service should be kept to an absolute minimum.
- 6.2.11 Having agreed that the new system will license operators to routes, the next step is to decide how to determine which operator should receive which route licence.
- 6.2.12 In recent years in many countries, some form of tendering has become the favoured approach to this problem. Tendering can take a number of forms and each city should custom design its own approach to make sure that the unique characteristics or peculiarities of the bus system are adequately dealt with. However the basic principle is the same in all cases. Bidders are informed as to the conditions of the tender which usually fall into one of two approaches.
- 6.2.13 The first approach is when the service is very tightly specified and all bidders are expected to submit bids providing the service exactly as specified. The selection criteria to decide the winner is usually heavily based on the fare to be charged but may also include an assessment of the management ability of the tenderer, the extent to which all components of his bid are under his control (such as ownership of all the buses and drivers in employment), financial strength, past record in supplying bus services, and so on.
- 6.2.14 The second approach is to leave the conditions open and ask bidders to propose a service quality and fare which they think would be best for the route in question. This is a much more difficult bid from the point of view of the tendering authority as they have to compare between say, new buses at a high fare or older buses at a lower fare, a/c buses at higher fares or non-a/c buses at lower fares, smaller buses at higher frequencies and higher fares or larger buses at lower frequencies and lower fares, etc. To perform this selection properly the tendering authority must be fully conversant with public opinion and understand both the current views and the trends in expectations of the public.
- 6.2.15 If the fares are also fixed, then the latter process is somewhat simplified as the operators will be more constrained in their proposals. However difficult choices might still have to be made, such as, for example, a choice between smaller, non-a/c buses at higher frequencies or larger, a/c buses at lower frequencies. In either of the above cases, the tendering authority should try to establish the likely level of demand for the route and also conduct some market research into public preferences for trade-offs between fares and higher frequencies, better buses, provision of a/c, and other variables.

7. IMPROVEMENTS TO EXISTING SERVICE – PHYSICAL MEASURES

7.1 Introduction

7.1.1 A commitment to improve public transport is not simply about buying new buses, although this is very important. It requires the authorities to take the widest possible view of the entire public transport system from the standpoint of the user. So while bus quality, fare, frequencies and other aspects of the bus service itself are clearly critically important, some factors which are not under the control of the bus operator are also very important. These include pedestrian facilities, bus stops and shelters, bus terminal facilities and bus priority measures.

7.1.2 Since the vast majority of the current bus service is along the N – S corridor, any measures proposed herein to improve the existing services will also improve matters for passengers on the pilot route. Each of the above factors is discussed in turn below

7.2 Pedestrian Facilities

7.2.1 Since all public transport passengers are pedestrians for some part of their journeys, pedestrian facilities are a fundamental part of the public transport system. Broadly speaking they can be divided into two types:

- Footpaths along the side of the roads
- pedestrian road crossing facilities.

Footpaths

7.2.2 Footpaths in Surabaya, where they exist at all, are generally very poor and often downright dangerous. The footpaths along many streets in the city centre, despite having significant pedestrian traffic, are narrow, uneven and in many cases have the concrete flagstones covering the surface sewers missing or unstable. If buses are to be more widely used and as traffic levels increase, it will become more important for buses to observe bus stops and as a result passengers will be forced to walk slightly longer distances. Thus improved standards for footpaths must constitute one part of any programme to encourage increased use of public transport.

7.2.3 In addition to better physical design of footpaths it will be important to keep the footpaths clear of hawkers and cooked food stalls, etc. At present the double deterrent to walking is the condition of the footpaths where they exist and the presence of hawkers which often necessitates pedestrians having to walk on the road itself.

Pedestrian Crossings

7.2.4 Public transport users need to cross the roads more frequently than private transport users. In the case of routes on the main N – S corridor this often involves an unprotected crossing of three, four or even five lanes of relatively fast moving traffic. Even in locations where there are signalised pedestrian crossings e.g., on Jl Emb. Malang, these are generally ignored by motorcyclists and often even by car drivers. There is therefore a need to improve public education and also a need for stricter enforcement.

- 7.2.5 There is a need for a code of practice which specifies the frequency of pedestrian crossings, either at-grade or grade-separated and links these in some way to the provision of bus stops. Currently the practice appears to be that people wait near the pedestrian overpasses which therefore serve as bus stops, whether marked as a bus stop or not. Ideally all bus stops should have a protected road crossing close by.
- 7.2.6 In the longer term, signalised pedestrian crossings should be provided as part of an ATC system. In the short term a programme should be drawn up of the most heavily used road crossings or crossings with high priority e.g., at schools, etc. and low cost measures introduced as soon as possible. These could include pavement markings to signify a pedestrian crossing, central island pedestrian refuges in roads more than three lanes wide, isolated signal controlled pedestrian crossings, etc. Driver education campaigns and increased police enforcement of existing crossings would also help. If the law does not make it mandatory for all drivers to stop when a pedestrian is on a marked crossing then the law should be changed to bring it into line with normal international practice.
- 7.2.7 It is suggested that a modest programme be drawn up to repair the footpaths and introduce protected pedestrian crossings in some heavily trafficked areas, e.g., outside Tunjungan Plaza. These should be pilot programmes, essential aspects of which will be to repave footpaths ensuring proper cover and clearing of open drains, removal of electricity poles and other obstructions from the centre of the footpaths, removal of foodstalls and other hawkers - especially from narrow sections which require pedestrians to walk on the road. Once improved, provision must be made for regular and effective maintenance of the footpaths and co-ordination between government departments to ensure that the problems do not reappear, e.g., constant enforcement of hawker bans. The ability to cross the street in safety is a key element of a public transport policy. Crossings must be designed and installed at all bus stops and the police must enforce driving laws which oblige motorists to stop for pedestrians at crossings.

7.3 Bus Stops and Shelters

- 7.3.1 As noted earlier, buses tend to stop almost anywhere upon demand. While this is good for the passenger since it minimises walking distances, it only works where the drivers have a vested interest in maximising the number of passengers e.g., the *setoran* system, where the number of on-route boardings and alightings are relatively small and where traffic volumes are well below the capacity of the road network. All these factors currently apply in Surabaya but as traffic levels approach saturation for the road network, buses stopping at any location will become increasingly unacceptable. Similarly if passenger volumes on the buses increase then there will be a need to have passengers form into groups for boarding and alighting in order not to have the bus stopping and starting all the time.
- 7.3.2 There are already guidelines for bus stops and bus bays which appear reasonable. However it is difficult to mark out a bus stop if there is no clear delineation between the road and the footpath and if hawkers can take over large sections of the nearside lane of the road carriageway. So the provision of bus stops and carriageway markings should be done in conjunction with an upgrading of the pedestrian footpaths in the vicinity.
- 7.3.3 Given the climatic conditions in Surabaya where a substantial part of the year is hot with Bright sunshine and the remainder is subject to torrential rain, shelters for waiting passengers are clearly of great benefit. At present the number of shelters along the corridor is clearly inadequate. In addition the shelters are not well maintained nor are they particularly well

designed from the point of view of maintainability. Posters stuck to the pillars cannot be cleanly removed and therefore leave the shelter looking unsightly. While the shelters are effective protection against sun and rain, they are not the most aesthetically attractive and have not been designed to maximise income from advertising.

- 7.3.4 In many cities today, advertising companies agree to build a certain number of shelters in agreed locations to mutually agreed designs. The company in return gets the right to sell advertising space on the shelter for a certain period of time. The advertising company must maintain the whole shelter in good order and must also provide some space for bus service information.
- 7.3.5 This has proved an effective way of having shelters constructed at no cost to the city and at the same time ensuring that the shelters are well maintained - no-one will advertise if the shelter looks bad!
- 7.3.6 While ideally the shelter construction programme should be prepared in conjunction with the sidewalk and bus stop improvement programme, it is possible that an early start could be made by DLLAJ II. They should identify locations for new shelters and invite bids from advertising agencies with relevant experience for the construction and maintenance of shelters. Depending on the numbers and locations of the shelters, there could also be some payment to the city. However if a limited number of shelters are highly profitable it is suggested that the advertising agency be required to build additional shelters in less valuable sites which can provide benefits to bus passengers and which may be cross-subsidised by the more valuable sites. The terms of the agreement must specify both the appearance and locations of the shelters and also quantified maintenance standards, especially with respect to vandalism.
- 7.4 Purabaya terminal
- 7.4.1 As noted in Chapter 4, conditions at the city bus terminal at Purabaya are appalling by any standards. There are two basic problems – the large numbers of buses queuing cause blockages in the loading bays and the maintenance standards of the terminal operator are unbelievably low.
- 7.4.2 The multi-owner, rental-driver arrangement on most routes results in the absence of any single responsible agency to regulate the route. As there is no schedule, the whole system operates on a first-in first-out basis. For various reasons most routes have more buses licensed than necessary, even for peak hour service. As a result on many routes there are large numbers of buses queuing up for their turn to board at the loading bay. This causes blockages and queues from one route prevent buses from other routes accessing their bays. If a route licence were to be awarded to one operator he would schedule the buses such that they only spent the minimum time in the terminal. So not only would the irregular service pattern be resolved with the granting of a route licence, the problems of blockage at Purabaya would also be solved.
- 7.4.3 After the award of a route licence to one operator, each route should be allocated one bay which must have independent access and egress. In fact even with the present bay arrangement, while not very satisfactory, buses on the busier routes should be able to enter and leave without interference. The problem arises in the stacking area behind the loading bays where the surplus of buses can block access to many bays. Even under the present system, with minimal cooperation it should be possible for arriving buses on routes with long

lay-overs to be given a time to report back for loading. This would avoid the need to queue ahead of the loading bays.

- 7.4.4 Other improvements which could also be made at present would be to restrict the amount of time a bus spends on the stand. In most countries, passengers queue up for their bus and then board quickly when the bus arrives. Buses should not spend more than 3 or 4 minutes loading at the stand. This is especially so if engines are kept running as the air quality at the stands is also appalling.
- 7.4.5 It is not clear how the environmental problems can be solved. The pools of standing water can only be avoided through rebuilding the bays with proper crossfall and drainage. The air quality problems could be alleviated by a combination of measures including restricting the time on the stand, switching off engines and some form of extractor fans.
- 7.4.6 The general filth, grime and litter is perhaps more difficult to solve. Presumably the current terminal management has the ability to clean the grease from the ground and also to collect litter but simply does not bother to do so. Getting the terminal management to care is probably the most difficult task. If they wanted to impose higher standards there are a number of ways of achieving these. One way would be to do the work themselves. Alternatively if under the new route licence system companies had bays allocated to them, the companies could be held responsible for the cleanliness of their areas and this could be written into the agreement allocating them the space.
- 7.4.7 If charges for terminal usage must be levied, it is highly recommended that companies be charged a fixed rent for the bays they are allocated and additional rent for any kiosks or office space they occupy. This should be paid on a monthly basis to the terminal management by the operating company. Neither the driver nor conductor should be involved in any cash transactions whatsoever in the terminal.
- 7.4.8 If the funds were available, it is recommended that the city bus terminal be demolished and redesigned. In addition to designing the crossfall properly to assist drainage, the double width bays should be made 7m to 7.5m wide to enable buses to pull out from behind another bus at a reasonably sharp angle and still be able to pass the stationary bus. The current bays are too narrow for this manoeuvre. The covered area should be extended outwards to provide a roof over six loading bays rather than four at present and the covered area should be extended lengthwise to enable boarding to be carried out at two boarding points per bay. This would provide more than adequate capacity especially if it is combined with the new route licence.

7.5 Bus Priorities

7.5.1 As noted in Chapter 3, speed surveys were carried out on Route P1 for three time periods, viz. morning peak, off peak and evening peak. The results for the whole period of the survey are shown in Figures 7.1 and 7.2 for the northbound and southbound directions respectively.

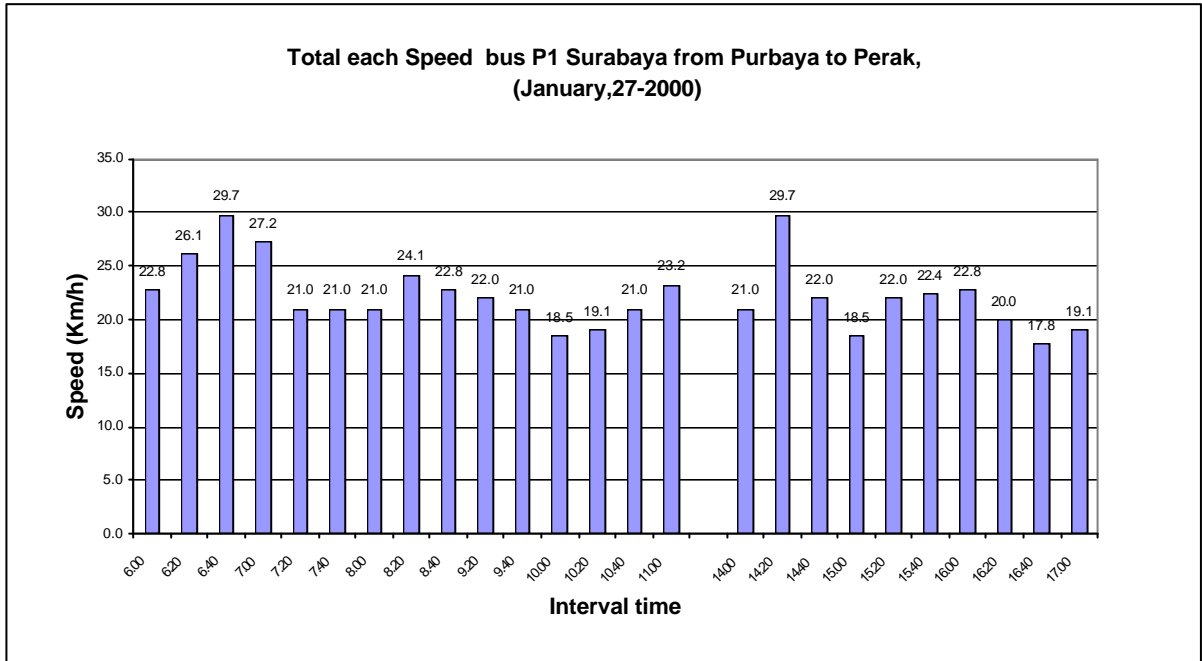


Figure 7.1: Average journey speed by time of day: Route P1 northbound

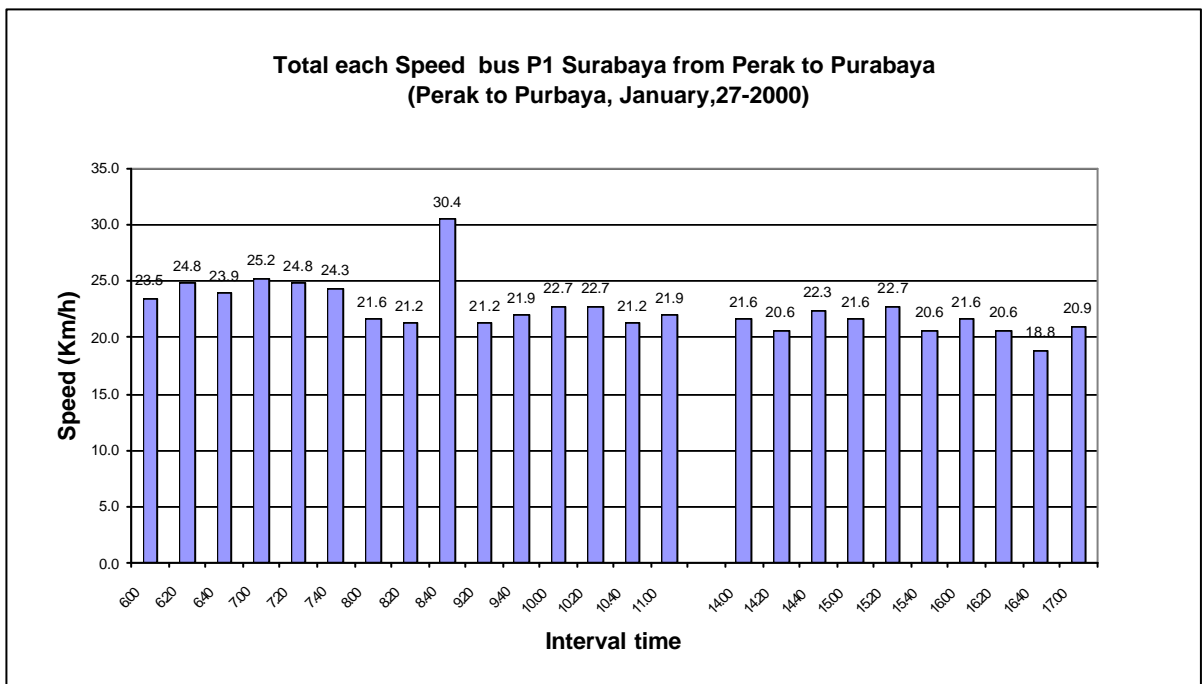


Figure 7.2: Average journey speed by time of day: Route P1 southbound

- 7.5.2 As can be seen most trips in the morning peak period maintained speeds from 22 kph to 25 kph; speeds which most urban bus operators would be delighted to achieve and which compare well with speeds achieved on exclusive busways. Speeds were maintained at this level pretty much throughout the day but began to drop towards 5 pm. It is possible that speeds after 5 pm are lower but it was believed that this was after the public transport peak.
- 7.5.3 The surveys were also analysed by road section and the results of the worst time period – evening peak from Purabaya – are shown in Figure 7.3. The section locations are given in the survey forms in Annex B.

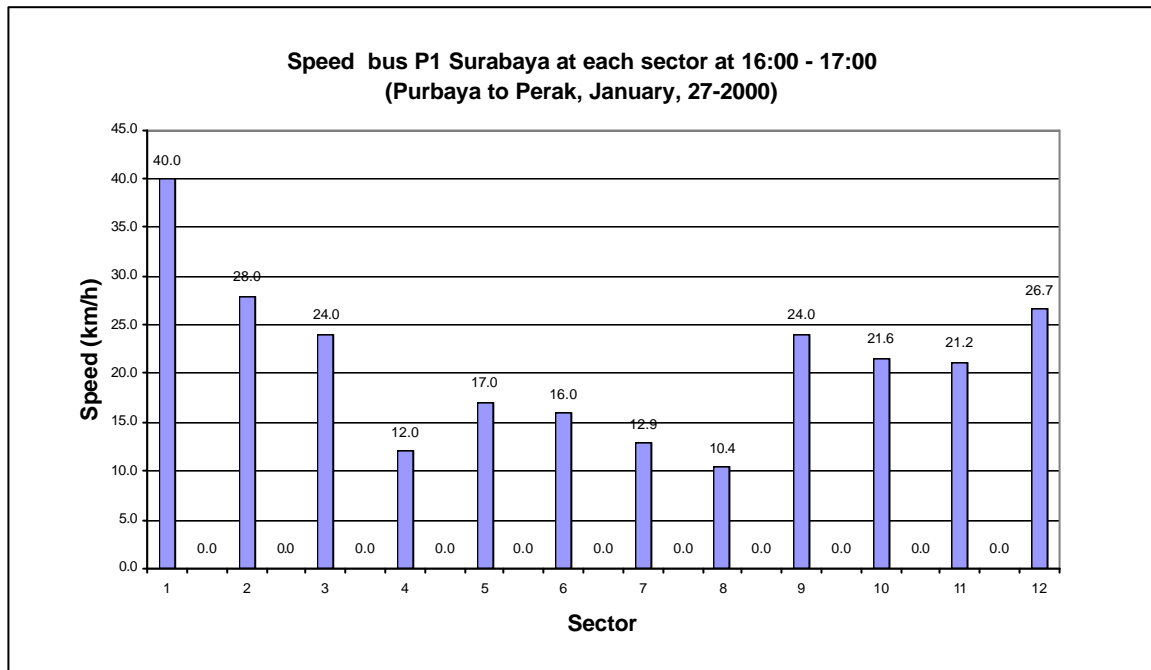


Figure 7.3: Bus speed by road section

- 7.5.4 As can be seen, even at the worst time the speeds for almost all sections are reasonable. It was therefore concluded that there was no pressing urgency to introduce any bus priority measures beyond those already in place, i.e., the double width lane reserved for buses, angkots and motorcycles on part of the corridor. However if the predicted increase in private car traffic transpires then conditions could worsen quite rapidly.
- 7.5.5 The slowest sections of road were
- Northbound:
- N-1: Tunjungan Plaza to Praban
 - N-2: Margorejo to Wonokromo
- Southbound:
- S-1: Plaza BRI to Sutomo
 - S-2: Sudirman to Plaza BRI
 - S-3: Wonokromo to Margorejo.

- 7.5.6 For section N-1, if the traffic levels increase and traffic begins to back up from the junction at Praban on a consistent and regular basis, then bus priority could be achieved by restricting the flow of general traffic on Embong Malang by introducing a bus lane there and allowing buses to by-pass any queues. This should reduce any delays to buses but not reduce the capacity of the Blauran / Praban junction.
- 7.5.7 For section N-2, the approach to Wonokromo is three wide lanes and again a wide, say 7m, bus lane (i.e., for buses, angkots and possibly also motorcycles) plus two regular lanes for general traffic should give the bus adequate priority.
- 7.5.8 For S-1 and 2, from Sudirman to Sutomo, there are two problems. The first is the evening market activity at the southern end of Sudirman which effectively reduces the available road width to about 2.5 lanes. The second problem is the signalised junction at Sutomo. The first problem should be addressed by restricting market activity from the edge of the road and by organising or, better still, eliminating the parking immediately beyond the market. More space should be allocated for bus and angkot boarding and alighting. The approach to the junction is three lane and a bus and angkot lane could be introduced with a reasonable setback to ensure capacity was not lost.
- 7.5.9 For S-3, the problem appears to be the slow left turn movement from Jl. Ahmad Yani to Margorejo and the south to north U-turn a short distance south on Jl. Ahmad Yani. This results in both the innermost and outermost lanes moving slowly and causing a general reduction in speeds. The solution to this problem would seem to be either to improve the road quality for the start of Jl. Margorejo and let traffic travel faster and / or move the U-turn either upstream or downstream of the junction.

8. MONITORING AND REPORTING

8.1 Objectives

8.1.1 The objectives of a monitoring programme are to enable the government department responsible for the provision of bus service to be aware of the service actually being provided and to determine whether or not it meets the predetermined standards set out in the tend conditions.

8.2 Statistics to be Reported

8.2.1 The statistics which should be reported are as follows

On a Monthly Basis

- a. Ridership on a day by day basis
- b. Number of Lost Trips by reason by day
 - i. Vehicle shortage
 - ii. Traffic congestion
 - iii. Staff shortage
 - iv. Traffic accident
 - v. Breakdown
 - vi. Other
- c. No of accidents by category
- d. Average vehicle availability
- e. Kilometres operated by day

On a semi-annual or annual basis

- a) Average Fare paid
- b) Peak period loading statistics
- c) Average waiting times
- d) Complaints about service

8.2.2 The key measure from the point of view of the regulatory authority is lost trips which measures the deviation from the approved schedule of service. This measure, coupled with the loading and waiting time figures, should give sufficient information to judge whether or not the service is being supplied in a satisfactory fashion.

8.2.3 The ridership information is necessary to assist in planning and the fare information is useful to help understand the financial position of the operator. This should be monitored by the government so that the implications for fares increases can be recognised in advance.

8.3 Survey Programme

8.3.1 An initial survey would be required to determine the ridership, overcrowding (if any) and the average fare paid. The procedure would be to count the passengers on and off by stop or route section and by fare paid. If there is a stage fare system in operation as set out in Chapter 5 this would involve conductors issuing tickets and so the number of passengers by fare type should be known from the conductors' returns. The passenger surveys would reveal the loadings at each stop and whether or not the bus was full and / or left passengers behind at bus stops due to lack of capacity. Surveying one bus every 15 to 20 minutes should be an adequate sample.

- 8.3.2 Once the average fare paid has been established it should be possible to calculate the daily ridership by dividing the daily revenue by the average fare.
- 8.3.3 Waiting time surveys are difficult on corridors where passengers have a choice of route. Actual measurements are only necessary when passengers are left behind at stops; otherwise it can be assumed that the average waiting time is half the headway.
- 8.3.4 All the other items on the reporting list are statistics that the bus operator would maintain a record of in any event and thus can be provided to government without any difficulty.
- 8.4 Complaints
- 8.4.1 There should be two formal channels for complaint. The first and the preferred channel should be to the bus company itself. The company should be contactable by phone, fax or e-mail to receive complaints or suggestions and this would normally be the same numbers for information on bus services. The company should keep records by nature of the complaint.
- 8.4.2 In the event that a complaint is against a member of staff, procedures must be set up to give the staff member a fair hearing. In many bus companies, verified passenger complaints against drivers or conductors will result in their losing their Good Service Bonus. Bonuses such as these are used to encourage good service by front line staff and take the place of a revenue-related wages structure.
- 8.4.3 The second channel should be a hotline / e-mail link at the government agency responsible for transport and this should take complaints not only about public transport services but also about traffic congestion and other non-public transport related issues. This channel should be concerned more with complaints about routing, fares or other issues not directly under the control of the bus company.