

REPUBLIC OF INDONESIA

**THE MEDAN AREA TRANSPORTATION STUDY**

**FINAL REPORT**

**ON**

**SHORT TERM IMPROVEMENTS**

**APPENDIX**

OCTOBER 1980

**JAPAN INTERNATIONAL COOPERATION AGENCY**

International Development Cooperation

International Development Cooperation

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## P R E F A C E

**This Appendix contains official comments made by the Government of Indonesia at the Joint Meeting between the Indonesian side and the Japanese side held on July 16 - 18, 1980 on the Final Report on Short-Term Improvements of Medan Area Transportation Study and their answers made by the JICA Study Team.**

**The JICA Study Team intends that this Appendix constitute a part of the Final Report on Short-Term Improvements already submitted.**



## 1. Necessary Number of Buses to be Assigned in 1985

"The Report contains the number of buses to be assigned in 1985 to the newly proposed circulating bus route in Table 8.1.16 but does not contain any description on the necessary total number of buses for the Medan Area in 1985. It is requested to calculate the total number of city buses to be assigned for the transportation of the share of bus in the urban transport of Medan Area in 1985."

A. The necessary total number of buses to be assigned for the transportation of the share of bus in the urban transport demands of the Medan Area in 1985 are calculated as follows:

### A-1 City Buses

The word "city buses" used in the report means those buses as presently engaging in the passenger transport service of urban traffic in the Medan Area, belonging partly to P.N. DAMRI and partly to several bus operating firms.

The number of bus routes in Medan Area in 1985 is estimated to be 12, the sum of the 11 routes existing in 1979 and one additional circulating route proposed by the Study Team.

The number of buses necessary in 1985 is calculated on the basis of the estimated peak-hour bus traffic in 1985 which is obtained from the bus traffic potentialities in 1979 of such zones, through which the existing and proposed bus routes are located, by multiplying the growth rate of residential night population of these zones between 1979 and 1985.

Basic points in deciding the number of buses by type, large and micro bus are summarized as follows:

- 1) Judging from the future projection of traffic demands in Medan Area it is preferable to increase basically the number of large buses.
- 2) Much differences cannot be anticipated from the viewpoint to minimize the procurement costs between increasing only large buses and increasing large buses and micro-buses simultaneously.
- 3) Large buses are desirable in future from the viewpoint of operating cost.



- 4) Not so much difference can be seen from the viewpoint of road conditions and road traffic situations.

Judging from the facts mentioned above, it seems to be desirable to strengthen the large-bus fleet in order to attain the favorable development of Medan Urban Transport System. Therefore, the number of buses by type is estimated based on the following policies:

- 1) To replace only those micro-buses already depreciated with new micro-buses (The present number of micro-buses remains unchanged or decreases).
- 2) To fill the rest of all new demands in the bus fleet with the new large-buses.

Furthermore, these numbers of bus by type thus calculated are usually different from the number of those buses to be procured; however, the number of buses to be procured in the Short-Term Improvement Plan is just same that of existing number of buses because the depreciating period of buses of five years incidentally coincides with the remaining number of years of the Short-Term. The following table shows the total number of buses by route to be assigned for Medan Area in such a way.

Table Total Number of Buses to be Assigned for Medan Area in 1985

Route Name <sup>(1)</sup>	Present Number <sup>(3)</sup> of Buses(Vehicles)	Traffic Demands (Passenger/day)	Number of Buses (Vehicles) <sup>(2)</sup>		
			Large Bus	Micro Bus	Total
R1	124	47,300	183	41	224
R2	24	24,400	52	8	60
R3	10	23,900	75	3	78
R4	24	14,700	26	8	34
R5	44	20,200	41	15	56
R6	26	10,500	22	9	31
R7	21	14,100	24	7	31
R8	12	9,900	13	4	17
R9	12	11,700	23	4	27
R10	12	5,900	13	4	17
R11	10	8,000	8	3	11
New Circulating	-	8,500	7	0	7
<b>Total</b>	<b>319</b>	<b>199,100</b>	<b>487</b>	<b>106</b>	<b>593</b>

Note: (1) See Fig. 3.2.8 in the Final Report of Short Term Improvement Plan  
 (2) Including the supplementary numbers for maintenance repair  
 (3) P.N. Daari; 74 vehicles, Private Company; 245 vehicles





The following table shows the estimated procurement cost of buses in the Short-Term such costs shall be borne partly by private bus operating firms.

Table Procurement Cost of Bus Units

	Number of Buses (Vehicles)	Unit Cost (x10 <sup>6</sup> Rp)	Total Cost (x10 <sup>6</sup> RRP)
Large Bus	487	20.8	10,130
Micro Bus	106	11.7	1,240
<b>Total</b>	<b>593</b>	<b>-</b>	<b>11,370</b>

A-2 Inter City Buses

The numbers of Inter-city Buses in 1985 for Medan Area is calculated based on the present numbers of buses by multiplying the growth rate of residential night population in Medan Area. The calculated results are shown in the following table.

Table Number of Inter-City Buses for Medan Area (1985)  
(Unit: Vehicles)

	Large Bus	Micro Bus	Total
Inter-City Service	196	112	308
Inter-Province Service	547	314	861
Inter-Region Service (North Sumatra- East Sumatra)	459	264	723
<b>Total</b>	<b>1,202</b>	<b>690</b>	<b>1,892</b>



## 2. Optimum Railway Tariff System

"It is required to mention the railway tariff policy so as to promote diverting passengers from the existing bus passengers and private car owners."

### A-1 General

The following are the key points to discuss the tariff system of public transport.

- 1) Relationship between the tariff system and the favorable state of the public transport system;
- 2) Tariff system itself; and
- 3) Discount rate for commuters.

The details optimum railway tariff system are described as follows:

- 1) Relationship between the tariff system and the favorable public transport system.

As the item "The favorable state of public transport system" is already discussed in the Final Report on Short-Term Improvement Plan, only its brief summary is presented as below.

- (i) To reduce or avoid the reason of road traffic congestion by diverting the traffic from private vehicles to the public transportation;
- (ii) To save the energy consumption; and
- (iii) To secure the transportation for majority of citizens who have no private means of transport.

Furthermore, the following two items are to be discussed in view of the tariff system of public transport in general.

- (i) To maintain the self-support financing system, and,
- (ii) To receive subsidies from the Central Government.

It is evident that the low fare is more preferable for users of the public transport system from the viewpoint of the favorable state of public transport, however, it is anticipated that the fare will become higher than the favorable one from the viewpoint of self-support financing system. Therefore, the balance between such two points of



views mentioned above will become important to find its solution.

The importance of this problem is clearly observed in real examples in the world through the fact that small countries can usually maintain a balance between revenues and expenditures of their public transports.

## 2) Tariff System

In this paragraph the tariff system of passenger transport is mentioned. The tariff system proportional to travel distance is generally applied in many countries in the world, in which such two types of systems can be seen, namely, the inter-zone tariff system and the per kilometer tariff system. And recently such an unified tariff system is often applied over several modes of public transport in a city as if they are operated in an unified system in order to give a more convenient service to their users and also to induce more traffic demand on the public transport.

## 3) Discount Rate

As is described later, the rate discount system for commuters has been applied in almost all countries in the world and rather high discounting rates have been usually adopted. This reason is to carry so many passengers in peak hours and the discount rate for commuters is decided keeping approximately a balance between the decrease in revenues and the saving in necessary costs.

### A-2 Tariff System in Medan Area

#### A-2-1 Tariff System of Railway

Although the passenger transport service by diesel-railcar trains is expected to be opened between Belawan and Medan in 1981, it goes without saying that it is really difficult to decide the optimum tariff system theoretically at present. In other words, it is inevitable to decide it practically case by case. However, the attention shall be paid to the following items to discuss the tariff system:



- 1) Self-support financing system or public subsidizing system;
- 2) Comparison with the tariff system of public transport in Jakarta;
- 3) Comparison with the tariff system of bus; and
- 4) Application of which tariff system to Medan Area.

The detailed descriptions on these items are as follows:

- 1) Self-support financing system or public subsidizing system:

It seems generally to be difficult to maintain the self-support financing in case of new railway system for urban transport and it is also anticipated to decrease the passenger traffic demands if the railway fare is decided on the basis of self-support financing. Judging from these facts mentioned above the public subsidizing system is considered to be desirable.

- 2) Comparison with the Case of Public Transport in Jakarta

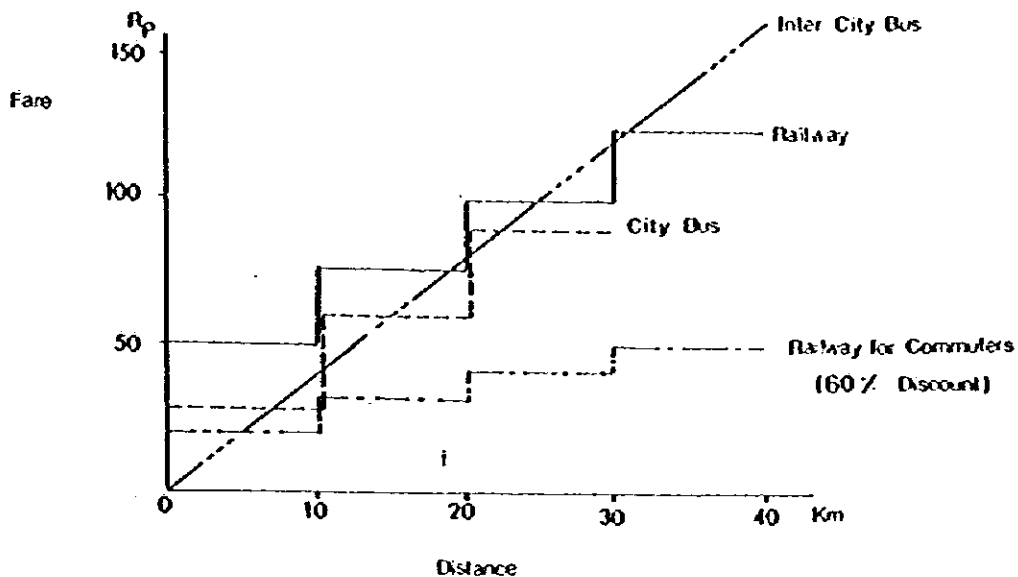
In Medan, the same tariff system as that in Jakarta is adopted for the long-distance passenger transport at present. No modification is considered necessary unless any particular problem arises concerning this system.

- 3) Comparison with the Tariff System of Bus

The existing bus routes are presently operated by P.N. DAMRI and several private firms, and it seems that the bus tariff system depends on self-support financing system for the time being although the present tariff system is inducing slight deficit on the side of P.N. DAMRI. The following is a comparison table of the present tariff system by mode of public transport.







The present railway tariff system is such that is higher than that of city bus system and lower than that of inter-city bus system. However, considering the discounting system for commuters, the railway fare becomes rather low comparing to that of city bus system.

Summarization can be given to the fact that in the case of commuters the railway system has an attractive point in its present tariff system comparing to the bus system if the present discounting to railway commuters is applied.

#### 4) Applicable to Medan Area

The present railway tariff in Medan area seems to have no problem; however, it is necessary to prepare a tariff system which is able to respond flexibly to its future trend of traffic demand and its affiliated conditions including the discount rate to commuters.

#### A-2-2 Discount Rate

Although it could be qualitatively discussed in previous paragraph, it is actually difficult to judge what discount rate for commuters is favorable as is mentioned in section 1 "General." The following table shows some examples of discount rate to railway commuters in major countries.



Table Discount Rates for Commuters in Various Countries  
(Unit: %)

Name of Country	For Workers	For Students
United Kingdom	10	50
Holland	-	-
Germany	30 - 70	60 - 80
Switzerland	-	35 - 45
Japan	50	70
Indonesia	60	80

Note: (1) Discount rates in the table show the cases of three-month commuter ticket.

(2) Values of discount rate are all approximate percentages.

Although it cannot be easily concluded by those examples mentioned above whether the discount rates are too high or not; for example in Japan, the discount rate has been diminished year by year by the increase of deficit on the railway account. In Medan, it seems, first of all, to be necessary to apply the same tariff system in Jakarta to keep the passenger demands as much as possible, as this is the first trial to open the railway passenger service for urban transport in the area.

### A-3 Conclusions

As is described above it is difficult to decide the optimum railway tariff system theoretically and it seems to be preferable to adopt the tariff system that has been presently applied in Jakarta for the time being because no unreasonableness can be found in such a procedure so that a stable demand of railway passengers can be maintained in Medan area. Furthermore, it is necessary to take into consideration the railway tariff system that can be modified flexibly judging from the future tendency of local traffic demand.



### 3. Improvement of Railway Crossing Barriers

"The Indonesian State Railway intends to select the sliding type of barriers because of its low manufacturing and maintenance costs and others. The comparison table in Fig. 7.3.2. does not include the cost item of those types of barrier. It is requested to add the evaluation based on their costs to this table."

A. The costs of barriers by type are presented in the following table:

	<u>Up and down type</u>	<u>Swing type</u>	<u>Sliding type</u>
Cost of construction per location in case of 8 m of width of crossing road (Rp. x 10 <sup>6</sup> )	13.9	5.0	3.4

The cost of sliding type is the cheapest of all three types. It is also superior to other types in durability although it has the disadvantage of requiring more operators and more time to close and open barriers than in other types. Presently in the project area the sliding type is used at most crossings because of its rigidity and durability and low cost of construction. Consequently the barriers of sliding type will be the most suitable type in the project area.



#### 4. Installation of Device to Inform Approaching Trains

4-1 "Device to inform approaching trains in Table 7-3-1 shows locations of crossing to be equipped with this device. It is requested to propose the appropriate type by location."

A. It is proposed that the type of device informing approaching trains shown in Fig. 7.3.2. be installed basically at all crossings listed in Table 7-3-1. In this type the cable length is usually long enough so as a train approaching a crossing in a speed of 59 kph to need 60 seconds to reach the crossing after the train passed over a treadle switch located in the approach track. However, at those crossings on Jl. Prof. H.M. Yamin, Jl. Jati and Jl. Nusantara it is proposed to add a manual controlling system operated by signalman of Medan Station for trains departing from Medan Station, while the device to inform approaching trains is proposed to be installed on the side of arriving trains, because those crossings situate too close to the existing Medan Station.

4-2 "It is requested to replace the treadle switch with the magnetic type in the device to inform approaching trains shown in Fig. 7.3.1."

A. The treadle switches shown in Fig. 7.3.1 are switches of magnetic type with short track circuit.

#### 5. Reopening of Railway Passenger Service Between Medan and Belawan

"Railway passenger service between Medan and Belawan mentioned in 7.3.1 (2) is requested to extend additionally from Belawan Station up to Ujung Baru Quay, the additional distance being 2.5 km long."

A. The reason why the description in 7.3.1 (2) does not include the section between Belawan and Ujung Baru is that the pamphlet named "Reopening the Railway Passenger Service between Belawan and Medan" provided by the Indonesian Government to the JICA Study Team in the joint meeting held in Jakarta in March 1980 did not include the said section in the proposed service section. The JICA Study Team has no objection to extend this service section from Belawan Station to Ujung Baru Station because of its necessity. Accordingly, paragraphs in 7.3.1 and Fig. 7.3.4. are revised as follows:





The length of service section	24.1 km
The scheduled speed	30 kph
Travelling time	49 minutes

Revised Fig. 7.3.4 shows a proposed train operating diagram of diesel railcar trains on the Medan - Ujung Baru Line.

In the category Necessary Improvement of Facilities, Station, the following description is added:

(Ujung Baru Station)

The existing passenger platform and the platform track at Ujung Baru Station can be used for the diesel railcar operation. Freight cars stored presently on this track shall be transferred to any other sidetracks in the port yard. The installation of affiliated railway telephone facility is necessary at this station. The railway track between Belawan and Ujung Baru Stations can be used without any improvement.

In the Number of Personnel Newly Required for reopening passenger service, following revisions are necessary:

Conductors	7
Train despatchers or assistants	13

And the number of other types of personnel remains unchanged. Accordingly, the amount of costs relating to Reopening of Passenger Service between Medan and Ujung Baru are revised as shown in the following table.



**Table Costs of Reopening Railway Passenger Service between Belawan and Medan (price in January 1980)**

**1. Costs by Work Items**

(Unit: Rp x 10<sup>3</sup>)

Item	Q'ty	Unit Cost	Foreign currency	Local Currency	Total
1) Rehabilitation of Titipapan Station		Lump sum	-	50,082	50,082
2) Installation of a additional telephone system	5 locs.	110	-	550	550
3) Construction of an inspection pit at Medan Loco. Depot	1 loc.	28,261	-	28,261	28,261
4) Procurement of diesel railcars	12 units	260,672	3,007,685	120,379	3,128,064
<b>Total</b>			<b>3,007,685</b>	<b>199,272</b>	<b>3,206,957</b>

**2. Financial Cost**

**1) Construction Cost:**

Rp x 10<sup>3</sup>

a) Direct construction cost 1) + 3)	Foreign currency	0
	Local currency	78,343
b) Land Acquisition & Compensation cost		0
c) Physical Contingencies (15%)		11,751
d) Final Engineering Services (10%)		7,834

**Total 97,928**

**2) Mechanical Cost  
2) + 4)**

Rp x 10<sup>3</sup>

Foreign currency	3,007,685
Local currency	120,929

**Total 3,128,614**

**3) Grand Total**

Rp x 10<sup>3</sup>  
3,226,542

**4) Annual Operation cost**

Rp x 10<sup>3</sup>  
39,830

**5) Annual Maintenance cost**

Rp x 10<sup>3</sup>  
110,363



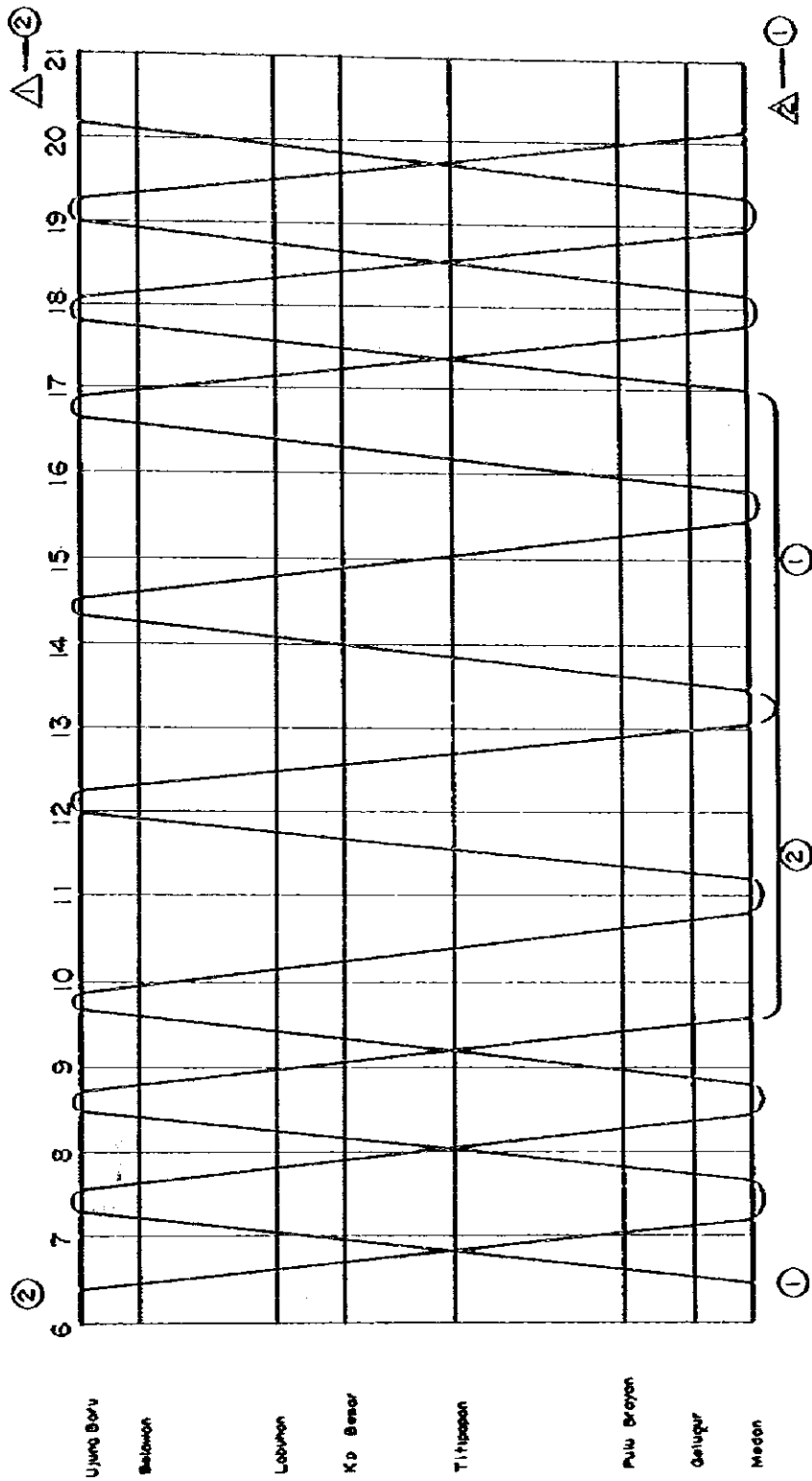


Fig. 7.3.4  
Proposed Operating Diagram for  
Passenger Service  
(Medan-Ujung Baru)

Medan Area Transportation Study

Legend



6. Improvement of Pulu Berayan Railway Workshop

"It is requested to improve the existing facilities at Pulu Berayan Railway Workshop for overhauling the newly assigned 12 diesel railcars."

- A. As mentioned in 7.3.1 (2) (c) (ii) the existing overhauling facilities at Pulu Berayan Railway Workshop are considered to have some allowance in their spaces, facilities, equipment, and workmen for the assignment of presently existing diesel locomotives and passenger coaches although facilities are somewhat old already. Such allowance is considered enough to overhaul additional diesel railcars to be assigned in the Short-Term, the additional overhauling assignment being estimated to be 6 diesel railcars per year which means every diesel railcar is to be overhauled once in two years. Facilities and workmen for diesel locomotives can be utilized for overhauling engines of diesel railcars and facilities and workmen for passenger coaches can be utilized for overhauling bodies and trucks of diesel railcars.

The improvement of existing facilities including replacing equipment will be necessary at the time when more additional diesel railcars are assigned to the Medan Area in future.

7. Revision of Word, according to the Comments on Short-Term Final Report

"The word 'Asian Development Bank' in the 17th line of 5.2.5. shall be replaced with the word 'International Bank of Reconstruction and Development'."

- A. The JICA Study Team agrees on this revision.

8. Others

8-1 Contents of the comment

- a. "Only 1% share is shown for City Bus compared with other urban transport modes, such as Bero/three - wheeled cars, Colt, private owned cars.

The report seemed not having description of the ways to speed up the number of Buses in short - term Repelita III"





- b. "Has the supply of seven city buses for Pelita III been in accordance with the need of transport modes in the area concerned?"
- c. "No Institution/Body is existing presently or will exist in engaging in handling urban transport in future in possession of city buses."

8-2 Answers

The answers to those comments mentioned above are stated in the section A-1 City Bus, Item 1 Necessary Number of Buses to be assigned in 1985, in this Appendix.

