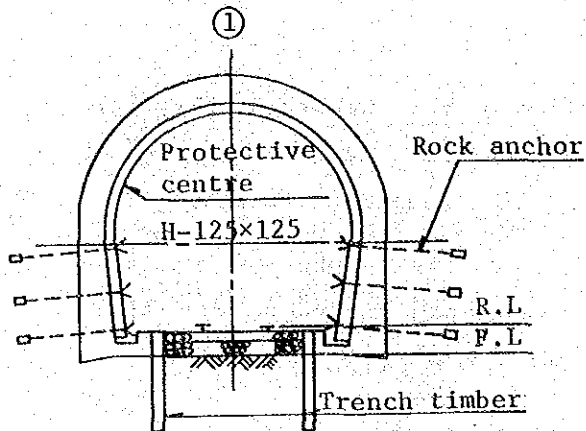
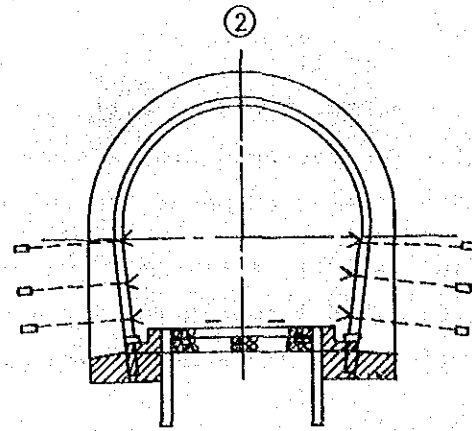


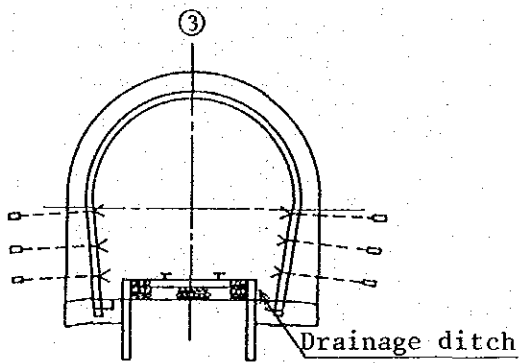
Appendix 9-3-1 Roadbed Lowering Method for the Sasaksaat Tunnel



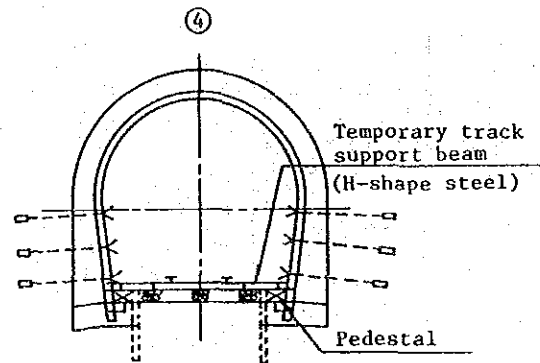
1. Placement of protective centres (H-shape steel - 125 v 125) with rock anchors.
(Protective centres should be reused for construction works consecutively conducted for the span of 60 m.)
2. Driving trench timber.



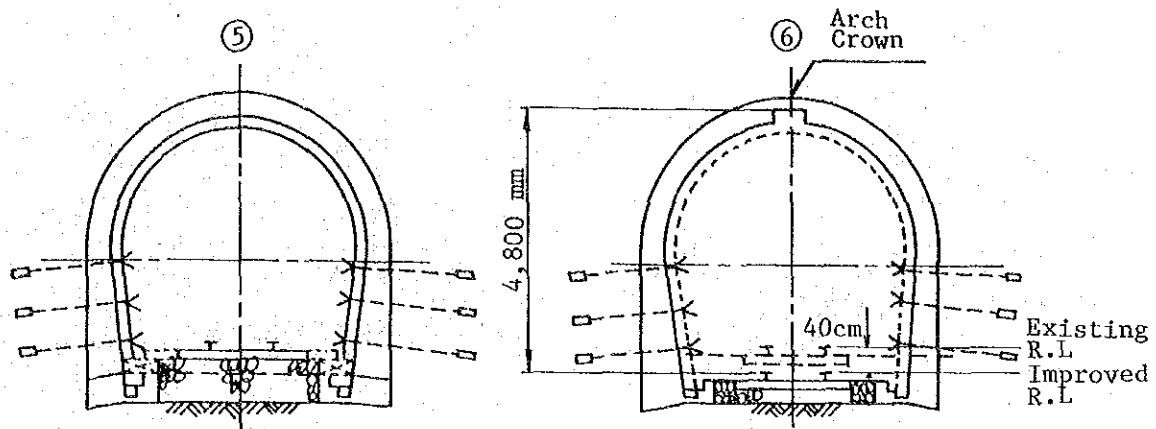
1. Pit excavation under side walls and drainage ditches (excavation should be performed alternately on both sides the pitch of 4.5 m).
2. Extension of centers for fixing their studs.



1. Construction of side wall base and new drainage ditches on both sides.



1. Placement of pedestals for temporary track support beam (H-shape steel) and removal of trench timber.
2. Installation of H-shape steel for temporary track support.

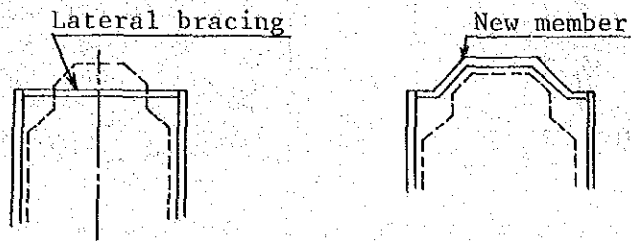


1. Disposal of ballast material.
2. Excavating roadbed to 40 cm depth.
3. Placing of ballast and tamping.
4. Removal of H-shape steel and pedestals.

1. Cutting-off concrete at the arch crown for electrification.
2. Removal of protective centers.
3. Lowering rail level (40 cm).
4. Overall tamping, surfacing and lining.

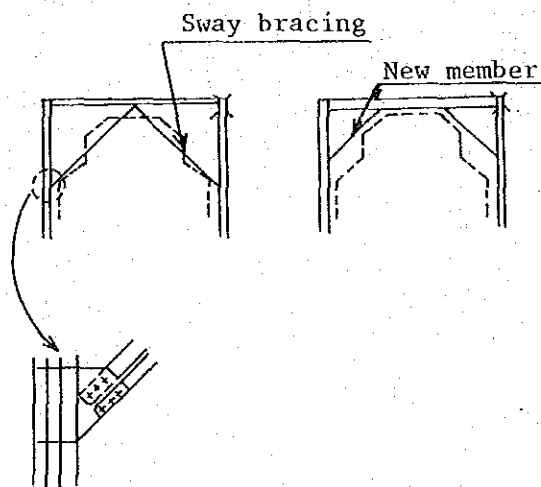
Appendix 9-3-2 Improvement of Railway Bridge

TYPE 1



Existing lateral bracings and struts should be replaced with new members.

TYPE 2



Existing lateral and sway bracing should be replaced with new members.

Appendix 9-3-3 Positioning of Block Signals

Block signals in an automatic block section are positioned so as to permit the following train to keep running while the driver observes the proceed signals ahead of him. In the "2 section clear" system, the signals are installed at such positions to satisfy the required operation time between each pair of block signals.

As a first step, their tentative positions are determined with reference to the time-distance curves. Positions are then determined in consideration of the operating performance of the various train types (different speed, acceleration, deceleration, etc.) operated on the line. In addition, to save the construction costs final adjustments are made for single-track section so that positions of the block signals for up and down traffics coincide, ensuring the desired operation headway.

The signal arrangement in Fig. 9.3.3.1 is designed to permit an express train to follow with 5-minute headway after a local train. The approximately 9-km distance between stations is divided into four block sections. With this arrangement, the headway between express trains, successively operated, can be reduced to 3.8 minutes.

It should be noted, however, that this arrangement does not take into consideration curves, grades, visibility of signals, or other topographical conditions.

Fig. 9.3.3.1 was drawn with the following conditions;

Max. train speed	: 100 km/h
Acceleration	: 1.0 km/h/sec
Deceleration	: 1.5 km/h/sec
Train length	: 240 m
Train operation speed in station yard	
Express train	: 70 km/h
Local train	: 35 km/h

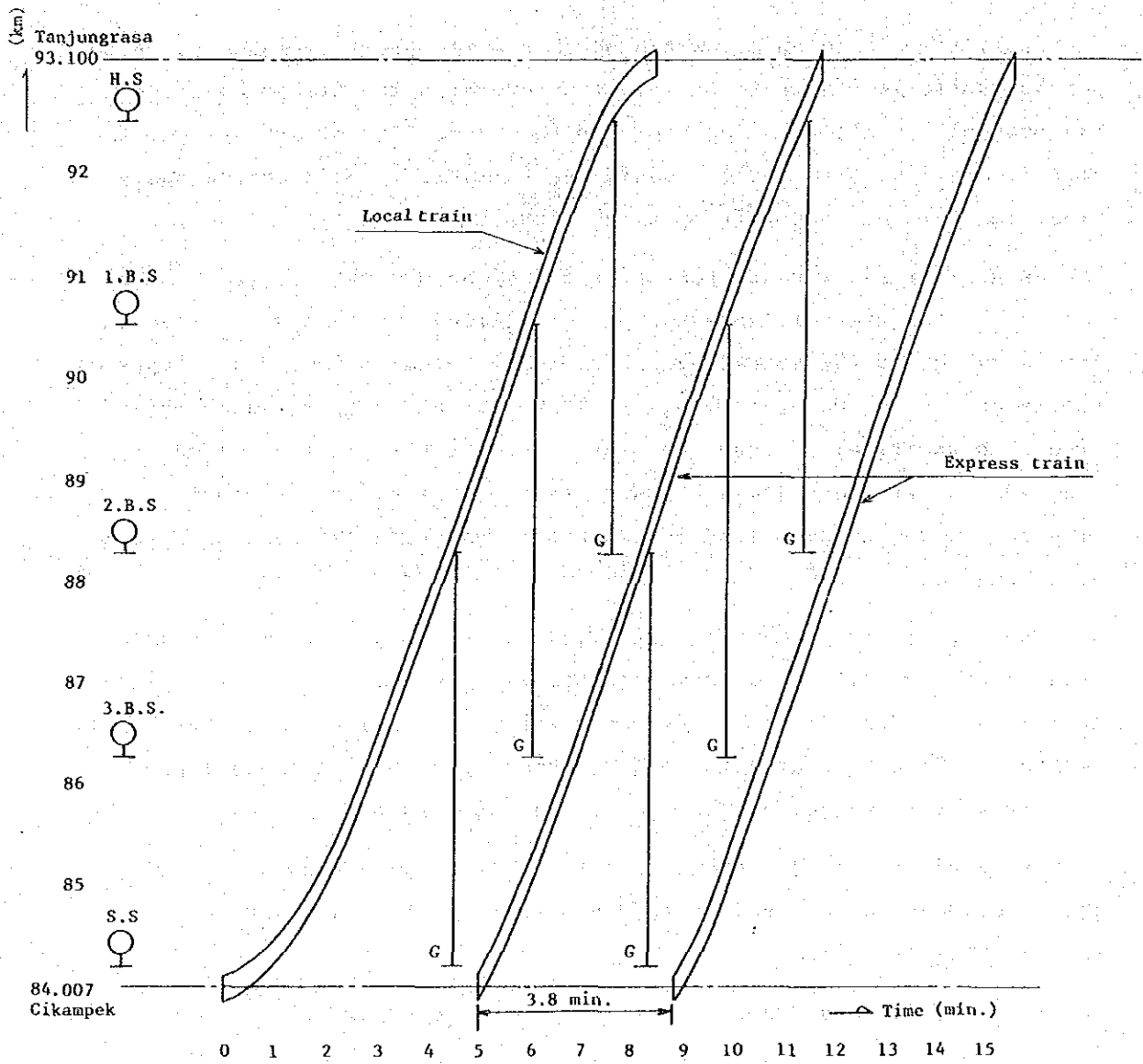


Fig. 9.3.3.1 Time-Distance Curve

Appendix 9-3-4 Plan for Improving Communications System
by Introducing Fiber Optics

The plan to improve the communications system of the Section by using fiber optics is described in the following.

1. Improvement

(1) Communications circuit capacity expansion

With the further railway modernization after electrification, such as, introduction of Reservation system, the existing UHF radio link (max. 72CH) will fall short of communication capacity. Hence, fiber optics of 8 MB/S (equivalent to 120CH) will be installed along the rail.

(2) Improving communication circuit reliability

The communications circuits reliability will be improved by duplexing the most important circuits through the introduction of the aforementioned fiber optics system in addition to the existing UHF system.

(3) Introducing digital communications

A digital communications system will enable high-speed and distortionless transmission, besides facilitating data communication by means of computers, digital exchanges, etc.

(4) Eliminating induced noise, voltage, etc.

Fiber optics is not subject to the adverse effects of induced noise and voltage, surge voltage caused by lightning, radio interference, etc.

(5) Simplifying the construction work

Fiber optics is convenient to use in the form of composite cables, to install on electrification poles, because it is lightweight, has high flexibility.

(6) Easy maintenance

Problems such as deformation of the transmitted waveform, mixture of noise, imperfect insulation, electrolytic corrosion, pilferage, etc., that occur in connection with the maintenance of overhead bare wires, metallic cables, radio facilities, are eliminated.

2. System Outline

(1) Sections in which the fiber optics system will be introduced

Bekasi - Cirebon

Cikampek - Kiarakondong

(2) Basic concept

a. Four fiber optics systems meeting specified communications needs will be provided separately.

b. The trunk circuits between main stations will be duplexed by means of the fiber optics system (8M system) and the existing UHF links.

c. The existing bare overhead wires (PJKA and PERMTEL) will be replaced with independent fiber optics systems as follows.

(a) Between main and way stations (PJKA):

2M system

(b) Between way stations (PJKA): Analog system

(c) PERUMTEL: 2M system

d. Fiber optic systems (a) and (b) will be tied together in a composite cable and will be installed on the electrification poles together with (c).

- e. The VHF dispatcher telephone circuit will be replaced with fiber optics (a).

(3) System outline

The outline of the communications circuits is shown in Fig. 9.3.4.1.

a. Between main stations

(a) Composition

Fiber optics: 8M system (120CH) 4 cores

(b) Channels to be accommodated

- o Existing channels accommodated in the UHF radio links

max. 48CH

- o Additional channels max. 60CH

- . Exchange telephone tie lines

- . Teletype

- . Direct telephone

- . Dispatcher telephone

- o New channels max. 4CH

- . CTC

- . Substation control

Total max. 112CH

b. Between main and way stations

(a) Composition

Fiber optics 2M system (30CH) 2 cores

(b) Channels to be accommodated

Approach circuits to the way stations, substations, etc., such as CTC, dispatcher telephone, substation control telephone, and exchange telephone.

c. Between way stations

(a) Composition

Fiber optics

Analog system

2 cores

(b) Channels to be accommodated

Between stations:

Block circuit, block telephone

Between stations and

intermediate points:

Wayside telephone, railroad crossing communications telephone, and track circuit control (single line).

d. PERUMTEL circuit

(a) Composition

Fiber optics

2M system (30CH)

Drop/Insert points

Bandung/Cimahi/Padalarang

Cikubang/Purwakarta/Sadang

Cikampek/Krawang

Pegadenbaru/Trisi/Jatibarang

Arjawinangun/Cirebon

(b) Channels to be accommodated

Telephone and telegraph circuits.

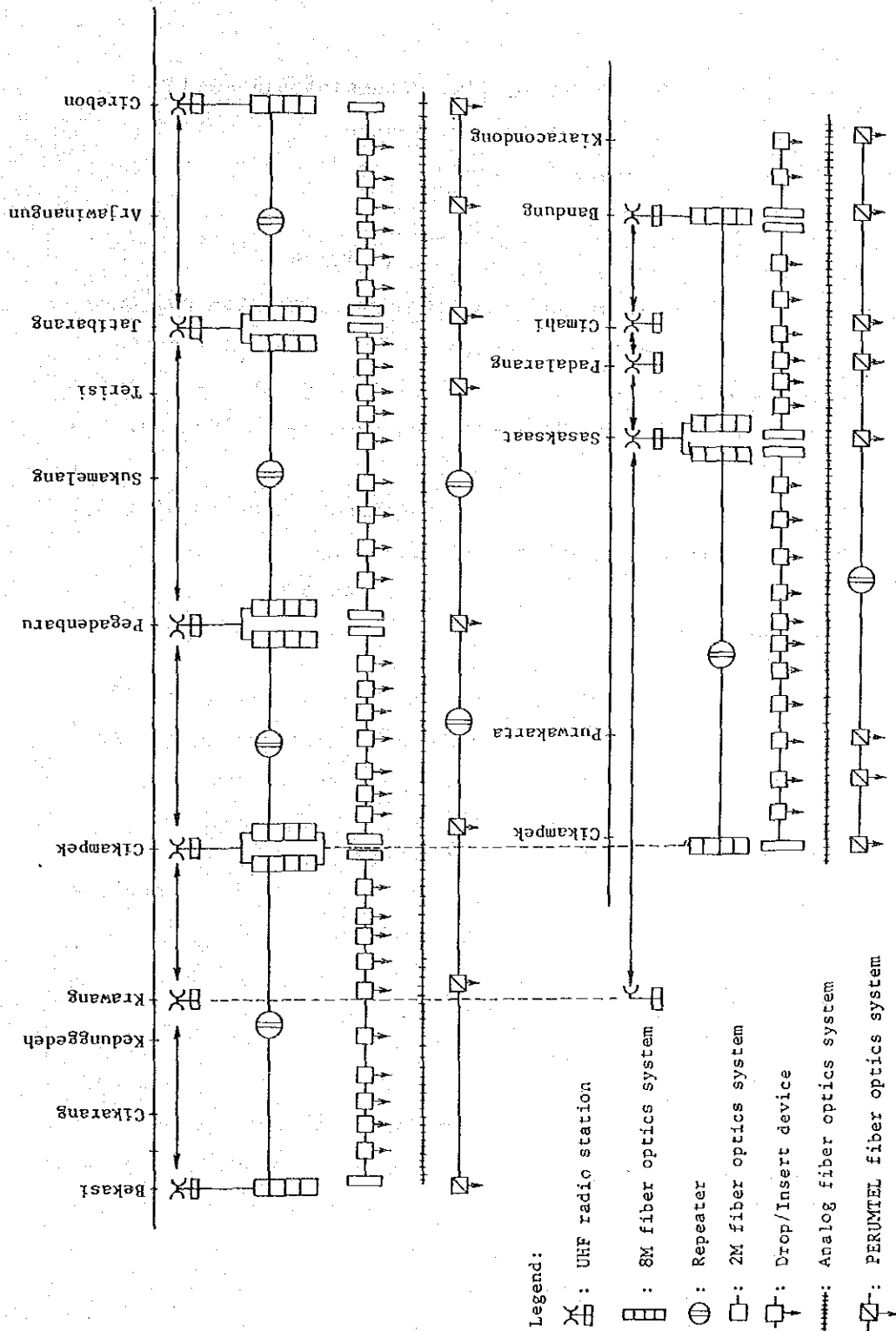


Fig. 9.3.4.1 Improvement Plan of Communication System by Introduction of Fiber Optics

Appendix 12-1-1 Estimation of Passenger Time Value

Passenger time value = $\frac{\text{Monthly per capita income of passengers/}}{\text{Monthly average working time} \times \text{Non-working time adjustment factor}}$

where:

- Monthly per capita income of passengers: 43,714 Rp.

The sector of the population using public transportation and traveling middle/long distances is determined by monthly per capita income, from the results of the cost of living surveys conducted in three major cities, Jakarta, Surabaya, and Bandung in 1977/78.

	(Estimated value as of 1984)
- Monthly average income per family	198,602 Rp.
- Average family size	4.6 persons
- Monthly average per capita income	43,714 Rp.

Estimated value as of 1984 was determined from data obtained from the above mentioned cost of living surveys implemented in 1977/78, and the consumer's price indices of each year for Jakarta.

- Monthly average working time = 160 hours
Data from Statistical Yearbook of Indonesia, 1983

- Nonworking time adjustment factor = 0.58
The period of daily activity is assumed to be 12 hours, and the time value of the non-working hour is assumed to be 1/4 that of the working hour.

Appendix 12-1-2 Estimation of Freight Time Value

Freight in the process of being transported is regarded as capital; therefore, shortening the transport time translates to a cost saving of capital (i.e., interest saving).

Freight time value = Average freight value per ton
x Interest rate per hour

Average freight value per ton: 231 thousand Rp.

Weighted mean of the five major freight items.

The share as of 1983 and the price as of March 1984 of each freight item are used.

Price Per Ton of Main Freight Items

	<u>Price (thousand Rp.)</u>	<u>Share (%)</u>
Fertilizer	88	24.8
Cement	127	11.3
Steel	363	3.2
Petroleum	301	37.1
Sugar	590	4.7
Others		18.9

Interest rate per hour: The annual average interest rate of interbank call money in the Jakarta money market in 1983, 17.56% p.a. is used to obtain the interest rate per hour. In this study, the average freight transport time per week is assumed to be 37.5 hours.

Appendix 12-1-3 Economic Analysis

(1) Base Case

(Unit : million Rp.)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017		
INVESTMENT DIFF	10053	10738	20522	70612	20756	3305	-6234	-3322	-3638	-2856	-6682	-7616	-7972	-6657	-49780	-8174	-7284	-7932	-7971	-3942	-8136	-8237	-7355	-8301	12513	-8096	-8270	-8309	-7419	-38409		
WITH	10053	12639	22422	73051	37453	11077	1500	4457	4185	11371	0	0	0	1360	12557	0	0	0	0	0	5666	0	0	0	0	27522	0	0	0	0	-70945	
ELECTRIFICATION	282	943	14174	16967	7295	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SIGNALS & TELECOM	9289	7107	2774	2660	1461	0	0	0	0	623	0	0	0	1101	4491	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CIVIL WORK	482	4159	3635	2912	416	0	0	0	0	82	0	0	0	259	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
WORK SHOP	0	429	1839	448	0	0	1500	4457	4185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12858	
ROLLING STOCKS	0	0	0	50064	25281	11077	0	0	0	10641	0	0	0	0	0	0	0	0	0	0	5666	0	0	0	0	0	0	0	0	0	0	0
-SALVAGE VALUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	83803	
WITHOUT	0	1900	1900	2439	8697	7692	7734	7778	7823	14227	6682	7616	7972	8017	62337	8174	7284	7932	7971	9608	8136	8237	7355	8301	15010	8096	8270	8309	7419	-32535		
RAILWAY	0	1900	1900	2439	2256	0	0	0	0	6354	0	0	0	0	54272	0	0	0	0	1271	0	0	0	0	0	6958	0	0	0	0	-19367	
ELECTRIFICATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SIGNALS & TELECOM	0	1838	1838	2377	2194	0	0	0	0	0	0	0	0	0	895	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CIVIL WORK	0	62	62	62	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
WORK SHOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ROLLING STOCKS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-SALVAGE VALUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53377	0	0	0	0	1271	0	0	0	0	0	0	0	0	0	0	0	6354
ROAD	0	0	0	0	6441	7692	7734	7778	7823	7872	6682	7616	7972	8017	8065	8174	7284	7932	7971	8337	8136	8237	7355	8301	8052	8096	8270	8309	7419	-13168		
BUS	0	0	0	0	4018	4951	4987	5024	5063	5103	4201	5136	5173	5211	5249	5340	4441	5377	5416	5459	5311	5402	4503	5439	5478	5522	5373	5465	4566	5502		
TRUCK	0	0	0	0	2423	2742	2748	2754	2760	2770	2481	2481	2800	2806	2816	2834	2844	2555	2555	2877	2825	2835	2853	2862	2574	2574	2096	2844	2854	2872		
-SALVAGE VALUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21542	
MAINT & OPE COST DIFF	0	0	0	0	-20893	-22537	-23220	-24038	-24884	-25228	-25438	-25595	-25753	-25912	-26053	-26221	-26415	-26611	-26808	-26988	-27017	-27068	-27118	-27168	-27219	-27270	-27320	-27371	-27422	-27473		
FACILITY MAINT COST DIFF	0	0	0	0	-8339	-9555	-9797	-10149	-10536	-10745	-10594	-10661	-10727	-10794	-10862	-10921	-11007	-11093	-11180	-11269	-11270	-11292	-11315	-11337	-11359	-11381	-11404	-11426	-11448	-11471		
RAILWAY	0	0	0	0	1753	875	984	984	984	1435	1381	1381	1381	1381	1381	1407	1407	1407	1407	1407	1407	1427	1427	1427	1427	1427	1427	1427	1427	1427	1427	
ELECTRIFICATION	0	0	0	0	612	612	612	612	612	612	613	613	613	613	613	613	613	613	613	613	613	613	613	613	613	613	613	613	613	613	613	
SIGNALS & TELECOM	0	0	0	0	470	470	470	470	470	470	487	487	487	487	487	536	536	536	536	536	536	536	536	536	536	536	536	536	536	536	536	
CIVIL WORK	0	0	0	0	97	97	97	97	97	97	99	99	99	99	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
WORK SHOP	0	0	0	0	0	0	0	0	0	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	
ROLLING STOCKS	0	0	0	0	574	-304	-195	-195	-195	-195	-268	-268	-268	-268	-268	-293	-293	-293	-293	-293	-293	-293	-293	-293	-293	-293	-293	-293	-293	-293	-293	
ROAD	0	0	0	0	-10092	-10430	-10781	-11144	-11520	-11910	-11976	-12042	-12109	-12176	-12243	-12328	-12414	-12500	-12587	-12676	-12698	-12720	-12742	-12764	-12786	-12809	-12831	-12853	-12876	-12898		
BUS	0	0	0	0	-7475	-7764	-8065	-8377	-8701	-9038	-9094	-9152	-9209	-9267	-9325	-9399	-9473	-9548	-9623	-9700	-9719	-9738	-9758	-9777	-9796	-9816	-9835	-9854	-9874	-9893		
TRUCK	0	0	0	0	-2617	-2666	-2716	-2767	-2819	-2872	-2881	-2890	-2899	-2908	-2918	-2929	-2941	-2952	-2964	-2976	-2978	-2981	-2984	-2987	-2990	-2993	-2996	-2999	-3002	-3005		
OPERATING COST DIFF	0	0	0	0	-12555	-12983	-13424	-13878	-14348	-14753	-14843	-14934	-15025	-15117	-15192	-15299	-15408	-15518	-15628	-15719	-15747	-15775	-15803	-15832	-15860	-15888	-15917	-15945	-15974	-16002		
PERSONNEL COST	0	0	0	0	-4561	-4708	-4860	-5016	-5178	-5266	-5294	-5322	-5351	-5379	-5389	-5425	-5462	-5498	-5536	-5549	-5558	-5568	-5577	-5587	-5596	-5606	-5615	-5625	-5634	-5644		
RAILWAY	0	0	0	0	542	542	542	542	542	622	622	622	622	622	642	642	642	642	642	666	666	666	666	666	666	666	666	666	666	666		
BUS	0	0	0	0	-2367	-2467	-2570	-2677	-2788	-3104	-3123	-3143	-3163	-3183	-3203	-3228	-3253	-3279	-3305	-3331	-3338	-3345	-3351	-3358	-3364	-3371	-3378	-3384	-3391	-3398		
TRUCK	0	0	0	0	-2536	-2584	-2632	-2682	-2732	-2784	-2793	-2801	-2810	-2819	-2828	-2839	-2850	-2861	-2872	-2884	-2887	-2890	-2892	-2895	-2898	-2901	-2904	-2907	-2909	-2912		
FUEL COST	0	0	0	0	-7994	-8275	-8564	-8862	-9170	-9487	-9549	-9612	-9675	-9738	-9803	-9874	-9947	-10019	-10093	-10170	-10189	-10207	-10226	-10245	-10264	-10283	-10302	-10321	-10340	-10359		
RAILWAY	0	0	0	0	2079	2099	2119	2141	2164	2189	2180	2176	2171	2165	2168	2171	2174	2176	2177	2177	2177	2178	2178	2179	2180	2180	2180	2181	2181	2182		
BUS	0	0	0	0	-5552	-5767	-5991	-6222	-6463	-6713	-6755	-6798	-6841	-6884	-6927	-6981	-7036	-7092	-7148	-7205	-7219	-7234	-7248	-7262	-7277	-7291	-7305	-7320	-7334	-7349		
TRUCK	0	0	0	0	-4521	-4606	-4693	-4781	-4871	-4963	-4979	-4994	-5009	-5025	-5042	-5061	-5081	-5101	-5121	-5141	-5146	-5151	-5157	-5162	-5167	-5172	-5177	-5182	-5187	-5192		
TIME SAVING BENEFIT	0	0	0	0	3536	3653	3773	3895	4020	4143	4172	4200	4228	4256	4291	4323	4354	4385	4415	4437	4444	4452	4459	4467	4474	4482	4489	4497	4504	4512		
PASSENGER	0	0	0	0	4025	4130	4237	4347	4460	4571	4586	4600	4614	4627	4649	4663	4678	4692	4706	4711	4715	4718	4721									

(2) Sensitivity analysis

20% traffic demand reduction

(Unit : million Rp.)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
INVESTMENT DIFF	10053	10738	20522	70612	30045	4923	-4688	-1766	-2074	-1281	-5346	-6093	-6378	-5053	-48167	-6539	-5828	-6345	-6377	-2275	-6508	-6590	-5084	-6641	14123	-6477	-6616	-6647	-5936	-41043	
WITH	10053	12639	22422	73051	37453	11077	1500	4457	4105	11371	0	0	0	1360	12557	0	0	0	0	0	5666	0	0	0	0	27522	0	0	0	0	-70945
ELECTRIFICATION	282	943	14174	16967	7295	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12709	0	0	0	0	0
SIGNALS & TELECOM	9289	7107	2774	2660	4461	0	0	0	0	623	0	0	0	1101	4491	0	0	0	0	0	0	0	0	0	0	14813	0	0	0	0	0
CIVIL WORK	482	4159	3635	2912	416	0	0	0	0	82	0	0	0	259	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WORK SHOP	0	429	1839	448	0	0	1500	4457	4185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12858	0
ROLLING STOCKS	0	0	0	50064	25281	11077	0	0	0	10641	0	0	0	0	7946	0	0	0	0	0	5666	0	0	0	0	0	0	0	0	0	0
-SALVAGE VALUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	83803	0
WITHOUT	0	1900	1900	2439	7409	6154	6108	6222	6259	12652	5346	6093	6378	6414	60724	6539	5828	6345	6377	7940	6508	6590	5084	6641	13399	6477	6616	6647	5936	-29902	
RAILWAY	0	1900	1900	2439	2256	0	0	0	0	6354	0	0	0	0	54272	0	0	0	0	0	1271	0	0	0	0	6958	0	0	0	0	-19367
ELECTRIFICATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SIGNALS & TELECOM	0	1838	1838	2377	2194	0	0	0	0	0	0	0	0	0	895	0	0	0	0	0	0	0	0	0	0	6958	0	0	0	0	0
CIVIL WORK	0	62	62	62	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WORK SHOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROLLING STOCKS	0	0	0	0	0	0	0	0	0	6354	0	0	0	0	53377	0	0	0	0	0	1271	0	0	0	0	0	0	0	0	0	6354
-SALVAGE VALUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25722	
ROAD	0	0	0	0	5152	6154	6188	6222	6259	6298	5346	6093	6378	6414	6452	6539	5828	6345	6377	6667	6508	6590	5884	6641	6442	6477	6616	6647	5936	-10535	
BUS	0	0	0	0	3214	3961	3989	4019	4051	4082	3361	4108	4138	4169	4199	4272	3553	4301	4333	4367	4249	4322	3602	4351	4383	4417	4299	4372	3653	4402	
TRUCK	0	0	0	0	1938	2193	2198	2203	2208	2216	1984	1985	2240	2245	2253	2267	2275	2044	2044	2302	2260	2268	2282	2290	2059	2059	2317	2275	2283	2297	
-SALVAGE VALUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17233	
MAINT & OPE COST DIFF	0	0	0	0	-16019	-17510	-18035	-18689	-19365	-19534	-19713	-19839	-19965	-20092	-20201	-20330	-20486	-20643	-20801	-20939	-20959	-20999	-21039	-21080	-21120	-21160	-21201	-21242	-21282	-21323	
FACILITY MAINT COST DIFF	0	0	0	0	-6320	-7469	-7641	-7931	-8232	-8093	-8199	-8252	-8306	-8359	-8413	-8456	-8524	-8593	-8663	-8734	-8731	-8748	-8766	-8784	-8802	-8820	-8837	-8855	-8873	-8891	
RAILWAY	0	0	0	0	1753	875	984	984	984	1435	1381	1381	1381	1381	1381	1407	1407	1407	1407	1407	1427	1427	1427	1427	1427	1427	1427	1427	1427	1427	
ELECTRIFICATION	0	0	0	0	612	612	612	612	612	613	613	613	613	613	613	613	613	613	613	613	613	613	613	613	613	613	613	613	613	613	613
SIGNALS & TELECOM	0	0	0	0	470	470	470	470	470	487	487	487	487	487	487	536	536	536	536	536	536	536	536	536	536	536	536	536	536	536	
CIVIL WORK	0	0	0	0	97	97	97	97	97	99	99	99	99	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
WORK SHOP	0	0	0	0	0	0	0	0	0	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	
ROLLING STOCKS	0	0	0	0	574	-304	-195	-195	-195	-195	-268	-268	-268	-268	-268	-293	-293	-293	-293	-293	-272	-272	-272	-272	-272	-272	-272	-272	-272	-272	
ROAD	0	0	0	0	-8073	-8344	-8624	-8915	-9216	-9528	-9581	-9634	-9687	-9740	-9794	-9862	-9931	-10000	-10069	-10140	-10158	-10176	-10193	-10211	-10229	-10247	-10265	-10283	-10300	-10318	
BUS	0	0	0	0	-5980	-6211	-6452	-6701	-6961	-7230	-7276	-7321	-7368	-7414	-7460	-7519	-7578	-7638	-7699	-7760	-7775	-7791	-7806	-7821	-7837	-7852	-7868	-7883	-7899	-7915	
TRUCK	0	0	0	0	-2093	-2133	-2173	-2214	-2255	-2298	-2305	-2312	-2319	-2327	-2334	-2343	-2352	-2362	-2371	-2380	-2383	-2385	-2387	-2390	-2392	-2394	-2397	-2399	-2401	-2404	
OPERATING COST DIFF	0	0	0	0	-9699	-10041	-10394	-10758	-11133	-11442	-11514	-11586	-11660	-11733	-11788	-11875	-11962	-12050	-12138	-12206	-12228	-12250	-12273	-12296	-12318	-12341	-12364	-12387	-12409	-12432	
PERSONNEL COST	0	0	0	0	-3540	-3658	-3779	-3905	-4034	-4088	-4111	-4133	-4156	-4179	-4183	-4212	-4241	-4270	-4300	-4306	-4313	-4321	-4329	-4336	-4344	-4351	-4359	-4366	-4374	-4382	
RAILWAY	0	0	0	0	542	542	542	542	542	622	622	622	622	622	642	642	642	642	642	666	666	666	666	666	666	666	666	666	666	666	
BUS	0	0	0	0	-2054	-2133	-2216	-2302	-2391	-2483	-2499	-2514	-2530	-2546	-2562	-2582	-2603	-2623	-2644	-2665	-2670	-2676	-2681	-2686	-2692	-2697	-2702	-2707	-2713	-2718	
TRUCK	0	0	0	0	-2029	-2067	-2106	-2145	-2186	-2227	-2234	-2241	-2248	-2255	-2262	-2271	-2280	-2289	-2298	-2307	-2309	-2312	-2314	-2316	-2318	-2321	-2323	-2325	-2328	-2330	
FUEL COST	0	0	0	0	-6159	-6383	-6615	-6853	-7099	-7353	-7403	-7453	-7503	-7554	-7606	-7663	-7721	-7779	-7838	-7900	-7915	-7930	-7945	-7960	-7975	-7990	-8005	-8020	-8035	-8051	
RAILWAY	0	0	0	0	1900	1915	1932	1949	1968	1988	1984	1981	1977	1973	1969	1971	1973	1975	1977	1978	1978	1979	1979	1979	1980	1980	1981	1981	1981	1982	
BUS	0	0	0	0	-4442	-4614	-4792	-4978	-5171	-5370	-5404	-5438	-5473	-5507	-5541	-5585	-5629	-5674	-5718	-5764	-5776	-5787	-5798	-5810	-5821	-5833	-5844	-5856	-5867	-5879	
TRUCK	0	0	0	0	-3617	-3685	-3754	-3825	-3897	-3971	-3983	-3995	-4008	-4020	-4033	-4049	-4065	-4081	-4097	-4113	-4117	-4121	-4125	-4129	-4133	-4137	-4141	-4145	-4149		
TIME SAVING BENEFIT	0	0	0	0	2829	2923	3018	3116	3216	3314	3337	3360	3383	3405	3433	3458	3483	3508	3532	3550	3556	3562	3568	3574	3580	3586	3592	3598	3603	3609	
PASSENGER	0	0	0	0	3220	3304	3390	3478	3568	3657	3668	3680	3691	3702	3719	3731	3742	3753	3765	3769	3772	3774	3777	3780	3783	3785	3788	3791	3793	3796	
FREIGHT	0	0	0	0	-391	-381	-372																								

(3) Sensitivity analysis

20% cost overrun

(Unit : million Rp.)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017		
INVESTMENT DIFF	12064	12886	24627	84734	34508	4062	-7401	-3986	-4366	-3427	-8018	-9139	-9567	-7988	-59736	-9809	-8741	-9518	-9566	-4730	-9763	-9885	-8827	-9962	15015	-9715	-9924	-9970	-8903	-46091		
WITH	12064	15166	26907	87661	44944	13292	1800	5348	5022	13645	0	0	0	1633	15068	0	0	0	0	6799	0	0	0	0	33027	0	0	0	0	0	-85134	
ELECTRIFICATION	339	1132	17009	20361	8754	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SIGNALS & TELECOM	11147	8528	3329	3191	5354	0	0	0	0	748	0	0	0	1321	5389	0	0	0	0	0	0	0	0	0	0	17776	0	0	0	0	0	
CIVIL WORK	578	4991	4362	3495	499	0	0	0	0	99	0	0	0	311	144	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
WORK SHOP	0	515	2207	538	0	0	1800	5348	5022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15430	
ROLLING STOCKS	0	0	0	60076	30338	13292	0	0	0	0	0	0	0	0	9535	0	0	0	0	0	6799	0	0	0	0	0	0	0	0	0	0	0
-SALVAGE VALUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100563	
WITHOUT	0	2280	2280	2927	10436	9231	9281	9334	9388	17072	8018	9139	9567	9621	74804	9009	8741	9518	9566	11529	9763	9885	8827	9962	18012	9715	9924	9970	8903	-39043		
RAILWAY	0	2280	2280	2927	2707	0	0	0	0	7625	0	0	0	0	65126	0	0	0	0	0	1525	0	0	0	0	8349	0	0	0	0	0	-23241
ELECTRIFICATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
SIGNALS & TELECOM	0	2206	2206	2853	2633	0	0	0	0	0	0	0	0	0	1074	0	0	0	0	0	0	0	0	0	0	8349	0	0	0	0	0	
CIVIL WORK	0	74	74	74	74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
WORK SHOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7625	
ROLLING STOCKS	0	0	0	0	0	0	0	0	0	7625	0	0	0	0	64053	0	0	0	0	0	1525	0	0	0	0	0	0	0	0	0	0	30866
-SALVAGE VALUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ROAD	0	0	0	0	7729	9231	9281	9334	9388	9447	8018	9139	9567	9621	9678	9809	8741	9518	9566	10004	9763	9885	8827	9962	9662	9715	9924	9970	8903	-15802		
BUS	0	0	0	0	4821	5941	5984	6029	6076	6123	5042	6163	6207	6254	6299	6409	5329	6452	6499	6551	6373	6483	5403	6527	6574	6626	6448	6558	5479	6602		
TRUCK	0	0	0	0	2907	3290	3297	3304	3312	3323	2977	2977	3360	3367	3379	3400	3412	3066	3066	3453	3390	3402	3423	3435	3088	3089	3476	3412	3425	3446		
-SALVAGE VALUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25850	
MAINT & OPE COST DIFF	0	0	0	0	-20543	-22362	-23024	-23842	-24687	-24941	-25161	-25318	-25476	-25635	-25777	-25939	-26134	-26330	-26527	-26707	-26732	-26782	-26832	-26883	-26933	-26984	-27035	-27086	-27137	-27188		
FACILITY MAINT COST DIFF	0	0	0	0	-7988	-9380	-9600	-9963	-10339	-10188	-10318	-10384	-10451	-10518	-10585	-10640	-10725	-10812	-10899	-10988	-10985	-11007	-11029	-11051	-11073	-11096	-11118	-11140	-11163	-11185		
RAILWAY	0	0	0	0	2104	1050	1181	1181	1181	1722	1658	1658	1658	1658	1658	1688	1688	1688	1688	1688	1713	1713	1713	1713	1713	1713	1713	1713	1713	1713	1713	
ELECTRIFICATION	0	0	0	0	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	
SIGNALS & TELECOM	0	0	0	0	564	564	564	564	564	564	584	584	584	584	584	643	643	643	643	643	643	643	643	643	643	643	643	643	643	643	643	
CIVIL WORK	0	0	0	0	117	117	117	117	117	117	119	119	119	119	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
WORK SHOP	0	0	0	0	0	0	0	0	0	542	542	542	542	542	542	542	542	542	542	542	542	542	542	542	542	542	542	542	542	542	542	
ROLLING STOCKS	0	0	0	0	689	-365	-235	-235	-235	-235	-322	-322	-322	-322	-322	-351	-351	-351	-351	-351	-326	-326	-326	-326	-326	-326	-326	-326	-326	-326	-326	
ROAD	0	0	0	0	-10092	-10430	-10781	-11144	-11520	-11910	-11976	-12042	-12109	-12176	-12243	-12328	-12414	-12500	-12587	-12674	-12698	-12720	-12742	-12764	-12786	-12809	-12831	-12853	-12876	-12898		
BUS	0	0	0	0	-7475	-7764	-8065	-8377	-8701	-9038	-9094	-9152	-9209	-9267	-9325	-9399	-9473	-9548	-9623	-9700	-9719	-9738	-9758	-9777	-9796	-9816	-9835	-9854	-9874	-9893		
TRUCK	0	0	0	0	-2617	-2666	-2716	-2767	-2819	-2872	-2881	-2890	-2899	-2908	-2918	-2929	-2941	-2952	-2964	-2976	-2978	-2981	-2984	-2987	-2990	-2993	-2996	-2999	-3002	-3005		
OPERATING COST DIFF	0	0	0	0	-12555	-12983	-13424	-13878	-14340	-14753	-14843	-14934	-15025	-15117	-15192	-15299	-15408	-15518	-15628	-15719	-15747	-15775	-15803	-15832	-15860	-15888	-15917	-15945	-15974	-16002		
PERSONNEL COST	0	0	0	0	-4561	-4708	-4860	-5016	-5178	-5266	-5294	-5322	-5351	-5379	-5389	-5425	-5462	-5498	-5536	-5549	-5558	-5568	-5577	-5587	-5596	-5606	-5615	-5625	-5634	-5644		
RAILWAY	0	0	0	0	542	542	542	542	542	622	622	622	622	622	622	642	642	642	642	642	666	666	666	666	666	666	666	666	666	666		
BUS	0	0	0	0	-2567	-2667	-2770	-2877	-2988	-3104	-3123	-3143	-3163	-3183	-3203	-3228	-3253	-3279	-3305	-3331	-3338	-3345	-3351	-3358	-3364	-3371	-3378	-3384	-3391	-3398		
TRUCK	0	0	0	0	-2536	-2584	-2632	-2682	-2732	-2784	-2793	-2801	-2810	-2819	-2828	-2839	-2850	-2861	-2872	-2884	-2887	-2890	-2892	-2895	-2898	-2901	-2904	-2907	-2912			
FUEL COST	0	0	0	0	-7994	-8275	-8564	-8862	-9170	-9487	-9549	-9612	-9675	-9738	-9803	-9874	-9947	-10019	-10093	-10170	-10189	-10207	-10226	-10245	-10264	-10283	-10302	-10321	-10340	-10359		
RAILWAY	0	0	0	0	2079	2099	2119	2141	2164	2189	2185	2180	2176	2171	2165	2168	2171	2174	2176	2177	2178	2178	2178	2178	2178	2179	2180	2181	2181	2182		
BUS	0	0	0	0	-5552	-5767	-5991	-6222	-6463	-6713	-6755	-6798	-6841	-6884	-6927	-6981	-7036	-7092	-7148	-7205	-7219	-7234	-7248	-7262	-7277	-7291	-7305	-7320	-7334	-7349		
TRUCK	0	0	0	0	-4521	-4686	-4863	-4781	-4963	-4979	-4994	-5009	-5025	-5042	-5061	-5081	-5101	-5121	-5141	-5161	-5146	-5151	-5157	-5162	-5167	-5172	-5177	-5182	-5187	-5192		
TIME SAVING BENEFIT	0	0	0	0	3536	3653	3773	3895	4020	4143	4172	4200	4228	4256	4291	4323	4354	4385	4415	4437	4444	4452	4459	4467	4474	4482	4489	4497	4504	4512		
PASSENGER	0	0	0	0	4025	4130	4237	4347	4460	4571	4586	4600	4614	4627	4649	4663	4678	4692	4706	4711	4715	4718</										

(4) Sensitivity analysis

20% traffic demand reduction plus 20% cost overrun

(Unit : million Rp.)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
INVESTMENT DIFF	12064	12086	24627	84734	36053	5908	-5625	-2119	-2488	-1537	-6415	-7312	-7654	-6064	-57801	-7847	-6993	-7614	-7652	-2730	-7810	-7908	-7061	-7969	16948	-7772	-7939	-7976	-7123	-49252	
WITH	12064	15166	26907	87661	44944	13292	1800	5348	5022	13645	0	0	0	1633	15068	0	0	0	0	6799	0	0	0	0	33027	0	0	0	0	-85134	
ELECTRIFICATION	339	1132	17009	20361	8754	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SIGNALS & TELECOM	11147	8528	3329	3191	5354	0	0	0	0	748	0	0	0	1321	5389	0	0	0	0	0	0	0	0	0	0	15251	0	0	0	0	0
CIVIL WORK	578	4991	4362	3495	499	0	0	0	0	99	0	0	0	311	144	0	0	0	0	0	0	0	0	0	0	17776	0	0	0	0	0
WORK SHOP	0	515	2207	538	0	0	1800	5348	5022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROLLING STOCKS	0	0	0	60076	30338	13292	0	0	0	0	12769	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15438
-SALVAGE VALUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6799	0	0	0	0	0	0	0	0	0	0	0
WITHOUT	0	2280	2280	2927	8890	7385	7425	7467	7510	15183	6415	7312	7654	7697	72069	7847	6993	7614	7652	9528	7810	7908	7061	7969	16079	7772	7939	7976	7123	-35882	
RAILWAY	0	2280	2280	2927	2707	0	0	0	0	7625	0	0	0	0	65126	0	0	0	0	1525	0	0	0	0	0	8349	0	0	0	0	-23241
ELECTRIFICATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SIGNALS & TELECOM	0	2206	2206	2853	2633	0	0	0	0	0	0	0	0	0	1874	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CIVIL WORK	0	74	74	74	74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WORK SHOP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ROLLING STOCKS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-SALVAGE VALUE	0	0	0	0	0	0	0	0	0	7625	0	0	0	0	64053	0	0	0	0	1525	0	0	0	0	0	0	0	0	0	0	7625
ROAD	0	0	0	0	6183	7385	7425	7467	7510	7557	6415	7312	7654	7697	7742	7847	6993	7614	7652	8003	7810	7908	7061	7969	7730	7772	7939	7976	7123	-12642	
BUS	0	0	0	0	3857	4753	4787	4823	4861	4899	4833	4930	4966	5003	5039	5127	4263	5162	5199	5241	5098	5186	4323	5221	5259	5301	5158	5246	4383	5282	
TRUCK	0	0	0	0	2326	2632	2638	2644	2650	2659	2381	2381	2688	2694	2703	2720	2730	2453	2453	2762	2712	2721	2738	2748	2471	2471	2780	2730	2740	2757	
-SALVAGE VALUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20680	
MAINT & OPE COST DIFF	0	0	0	0	-15669	-17335	-17838	-18492	-19169	-19247	-19437	-19562	-19689	-19816	-19925	-20049	-20205	-20361	-20519	-20658	-20873	-20714	-20754	-20794	-20835	-20875	-20916	-20956	-20997	-21038	
FACILITY MAINT COST DIFF	0	0	0	0	-5970	-7294	-7444	-7734	-8035	-7806	-7923	-7976	-8029	-8083	-8137	-8174	-8243	-8312	-8381	-8452	-8445	-8463	-8481	-8498	-8516	-8534	-8552	-8570	-8588	-8606	
RAILWAY	0	0	0	0	2104	1050	1181	1181	1181	1722	1658	1658	1658	1658	1658	1688	1688	1688	1688	1688	1713	1713	1713	1713	1713	1713	1713	1713	1713	1713	1713
ELECTRIFICATION	0	0	0	0	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735	735
SIGNALS & TELECOM	0	0	0	0	564	564	564	564	564	564	584	584	584	584	584	643	643	643	643	643	643	643	643	643	643	643	643	643	643	643	643
CIVIL WORK	0	0	0	0	117	117	117	117	117	117	119	119	119	119	119	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
WORK SHOP	0	0	0	0	0	0	0	0	0	542	542	542	542	542	542	542	542	542	542	542	542	542	542	542	542	542	542	542	542	542	542
ROLLING STOCKS	0	0	0	0	689	-365	-235	-235	-235	-235	-322	-322	-322	-322	-322	-351	-351	-351	-351	-351	-351	-351	-351	-351	-351	-351	-351	-351	-351	-351	-351
ROAD	0	0	0	0	-8073	-8344	-8624	-8915	-9216	-9528	-9581	-9634	-9687	-9740	-9794	-9862	-9931	-10000	-10069	-10140	-10158	-10176	-10193	-10211	-10229	-10247	-10265	-10283	-10300	-10318	
BUS	0	0	0	0	-5980	-6211	-6452	-6701	-6961	-7230	-7276	-7321	-7368	-7414	-7460	-7519	-7578	-7638	-7699	-7760	-7775	-7791	-7806	-7821	-7837	-7852	-7868	-7883	-7899	-7915	
TRUCK	0	0	0	0	-2093	-2133	-2173	-2214	-2255	-2298	-2305	-2312	-2319	-2327	-2334	-2343	-2352	-2362	-2371	-2380	-2383	-2385	-2387	-2390	-2392	-2394	-2397	-2399	-2401	-2404	
OPERATING COST DIFF	0	0	0	0	-9699	-10041	-10394	-10758	-11133	-11442	-11514	-11586	-11666	-11733	-11788	-11875	-11962	-12050	-12138	-12206	-12228	-12250	-12273	-12296	-12318	-12341	-12364	-12387	-12409	-12432	
PERSONNEL COST	0	0	0	0	-3540	-3658	-3779	-3905	-4034	-4088	-4111	-4133	-4156	-4179	-4183	-4212	-4241	-4270	-4300	-4306	-4313	-4321	-4329	-4336	-4344	-4351	-4359	-4366	-4374	-4382	
RAILWAY	0	0	0	0	542	542	542	542	542	622	622	622	622	622	642	642	642	642	642	666	666	666	666	666	666	666	666	666	666	666	666
BUS	0	0	0	0	-2054	-2133	-2216	-2302	-2391	-2483	-2499	-2514	-2530	-2546	-2562	-2582	-2603	-2623	-2644	-2665	-2670	-2676	-2681	-2686	-2692	-2697	-2702	-2707	-2713	-2718	
TRUCK	0	0	0	0	-2029	-2067	-2106	-2145	-2186	-2227	-2234	-2241	-2248	-2255	-2262	-2271	-2280	-2289	-2298	-2307	-2309	-2312	-2314	-2316	-2318	-2321	-2323	-2325	-2328	-2330	
FUEL COST	0	0	0	0	-6159	-6303	-6415	-6853	-7099	-7353	-7403	-7453	-7503	-7554	-7606	-7663	-7721	-7779	-7838	-7900	-7915	-7930	-7945	-7960	-7975	-7990	-8005	-8020	-8035	-8051	
RAILWAY	0	0	0	0	1900	1915	1932	1949	1968	1988	1984	1981	1977	1973	1969	1971	1973	1975	1977	1978	1978	1979	1979	1979	1980	1980	1981	1981	1982		
BUS	0	0	0	0	-4442	-4614	-4792	-4978	-5171	-5370	-5484	-5438	-5473	-5507	-5541	-5585	-5629	-5674	-5718	-5764	-5776	-5787	-5798	-5810	-5821	-5833	-5844	-5856	-5867	-5879	
TRUCK	0	0	0	0	-3617	-3685	-3754	-3825	-3897	-3971	-3983	-3995	-4008	-4020	-4033	-4049	-4065	-4081	-4097	-4113	-4117	-4121	-4125	-4129	-4133	-4137	-4141	-4145	-4149		
TIME SAVING BENEFIT	0	0	0	0	2829	2923	3018	3116	3216	3314	3337	3360	3383	3405	3433	3458	3483	3508	3532	3550	3556	3562	3568	3574	3580	3586	3592	3598	3603	3609	
PASSENGER	0	0	0	0	3220	3304	3390	3478	3568	3657	3668	3680	3691	3702	3719	3731	3742	3753	3765	3769	3772	3774	3777	3780	3783	3785	3788	3791	3793	3796	
FREIGHT																															

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