

### 2.7.5 Rambipuji Dry Port and Connecting Railway

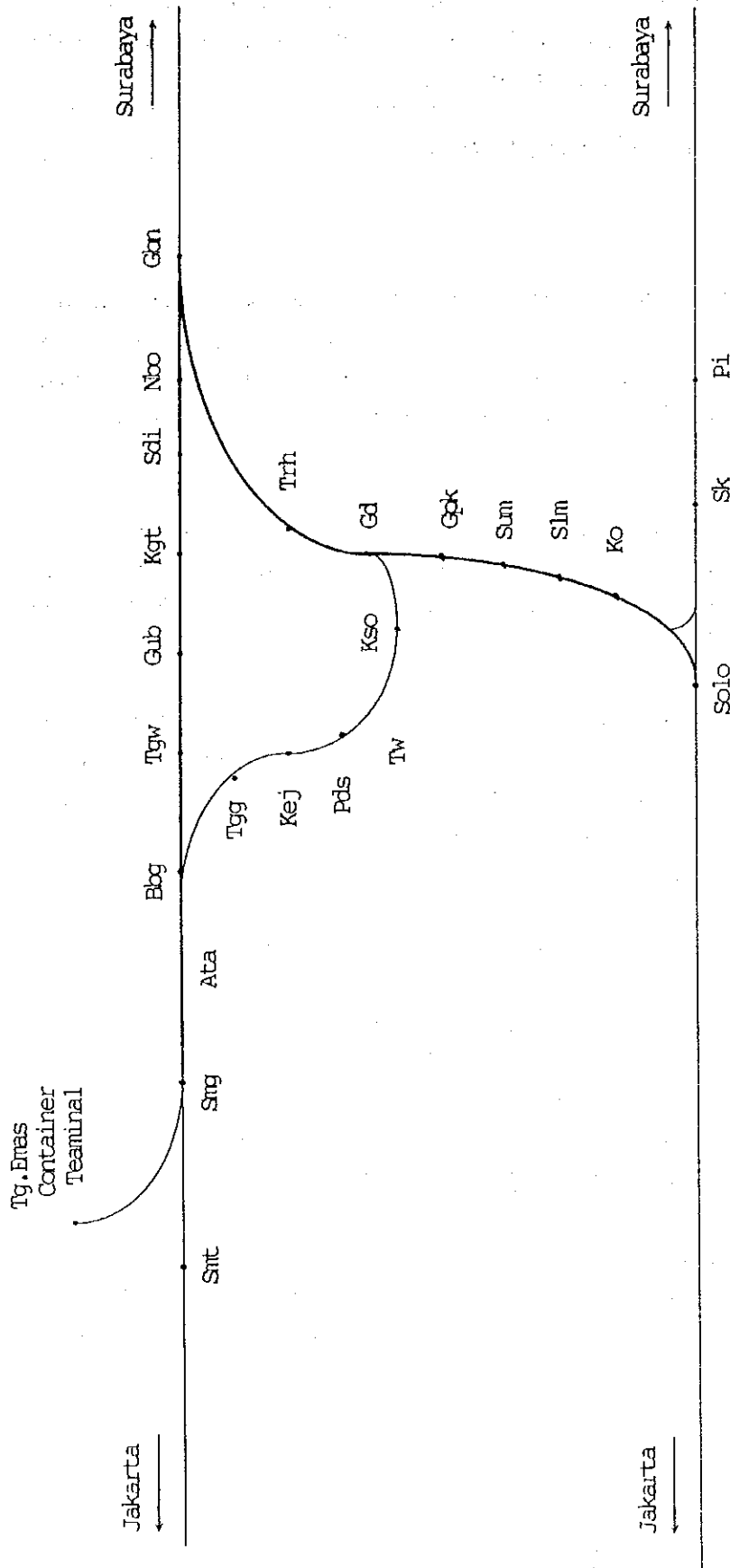
#### (1) Activity

305. East Java State comprising the eastern area of Java Island and Madura Island is the first level administrative district with area of 47,922 km<sup>2</sup> and the population of 30.33 million. The state has eight cities and 29 prefectures as 2nd level administrative districts. Surabaya, the state capital, has the population of 2.5 million and is the second largest city in Indonesia.

306. Surabaya and its adjacent area with radius of 20 km in the south and west have the industrial complexes with electronic parts assembly factories, furniture factories, etc. Industrial complex construction works are underway in the area within 50 km from Surabaya.

307. Rambipuji Dry Port is situated in 194 km (in railway distance) away to the southwest of Surabaya. It is located in the inland area and connected with Tanjung Perak (Tg. Perak) Port of Surabaya. The port was set up on September 8, 1989. The transportation route between Rambipuji and Tanjung Perak International Container Terminal (Perak ICT) is shown in **Figure 2.71, 2.72.**

308. Jember district where Rambipuji Dry Port is located, is in primary industrial zone such as agriculture and stone material processing, as the main industries. The population of this area including Jember City is about 2 million. The major containerized commodities shipped from Rambipuji Dry Port are tobacco and stone materials (Teppei stone) used for construction. They said that coffee and cocoa were shipped occasionally, but the transportation records since the opening of the port in September 1989 show that neither coffee nor cocoa has been shipped. **Table 2.45** shows the marine containers handled at Rambipuji Dry Port. In 1993, the volume of outgoing containers was 1,258 TEUS and that of arriving containers was 1,258 TEUs, making the total to 2,516 TEUs. They accounted for less than 1% of containers handled at Tg. Perak Port. All of the arriving containers were empty. In other words, no loaded container arrived at Rambipuji Dry Port.



Smt	Senaringtawang	Sng	Senaranggudang	Ata	Alastua	Bbg	Brunbung	Tgw	Tegwanu
Gub	Gubug	Kgt	Karangjati	Sdi.	Sedadi	Nbo	Ngrambo	Gbn	Gambringan
Trh	Torch	Gd	Gundih	Tgg	Tanggung	Kej	Kedungjati	Pds	Padas
Tv	Telawa	Kso	Karangsono	Gpk	Coprak	Sum	Sumberlawang	SIm	Salem
Ko	Kalioso	Slo	Solobalapan	Sk	Solojebres	Pl	Palur		

Fig. 2.64 Solo Jebres - Semarang Port Railway Connection

\* Sng - Bdg Track capacity

$$N = \frac{1440}{14 + 6} = 50$$

Operation time between adjacent stations shall be used maximum value

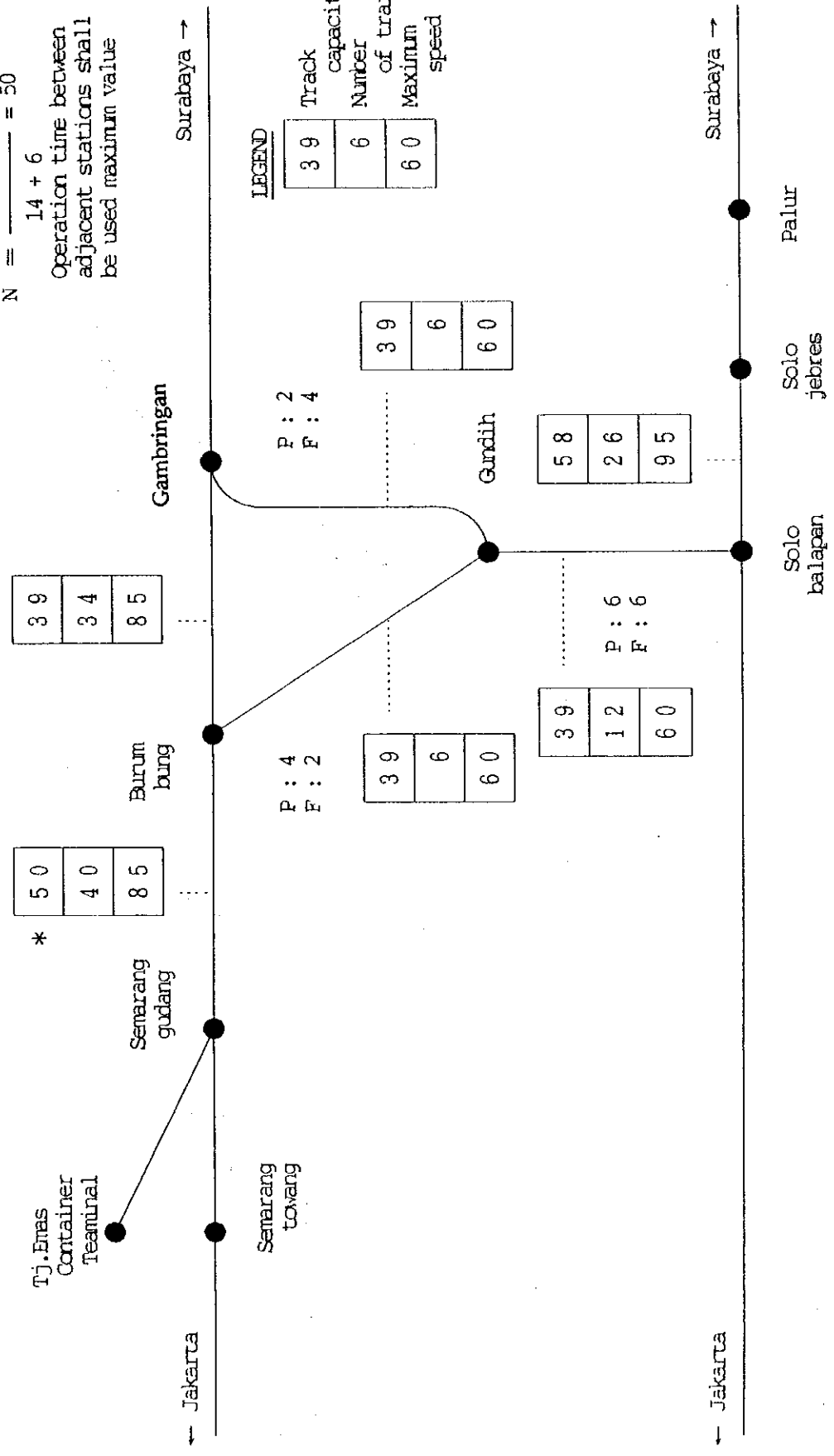


Fig. 2.65 Solo Jebres - Semarang Track Capacity

SEMARANG GUDANG

Tg. Eras Port  
Container Terminal

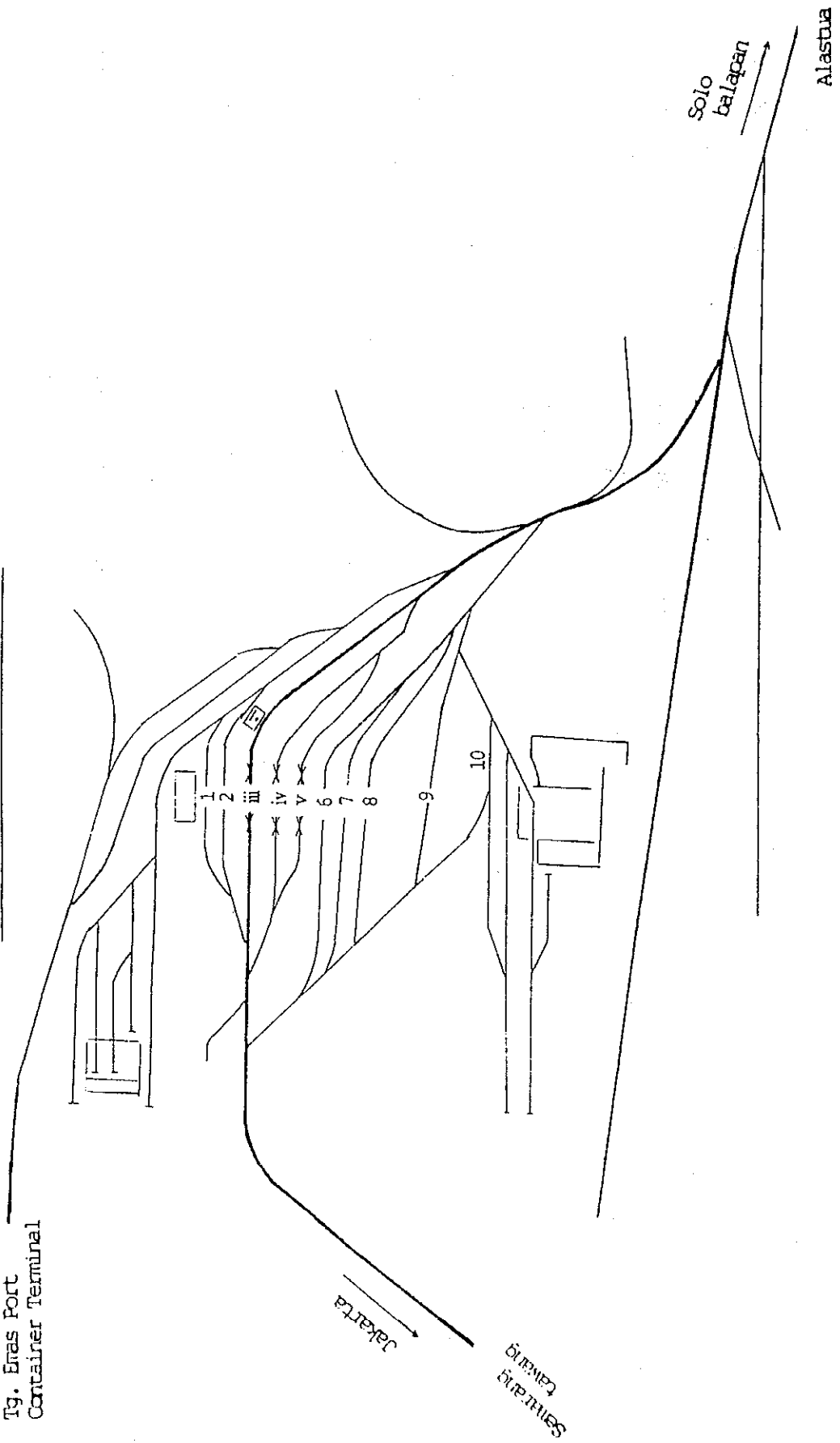


Fig. 2.66 Semarang gudang St. Track Layout

TANJUNG EMAS PORT  
CONTAINER TERMINAL

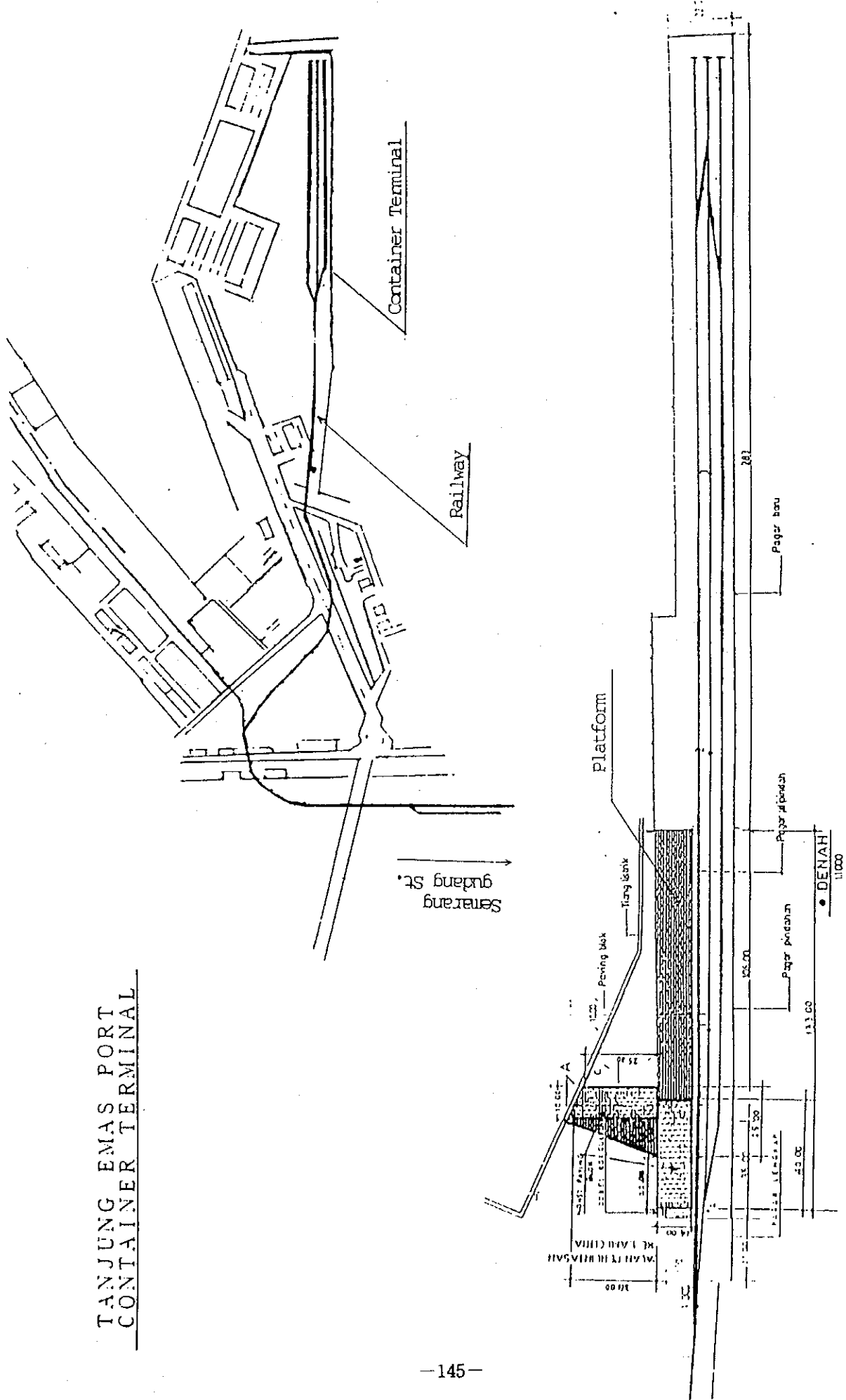
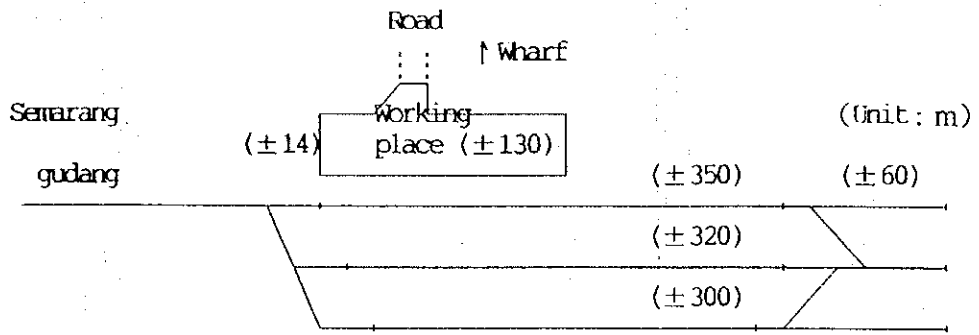
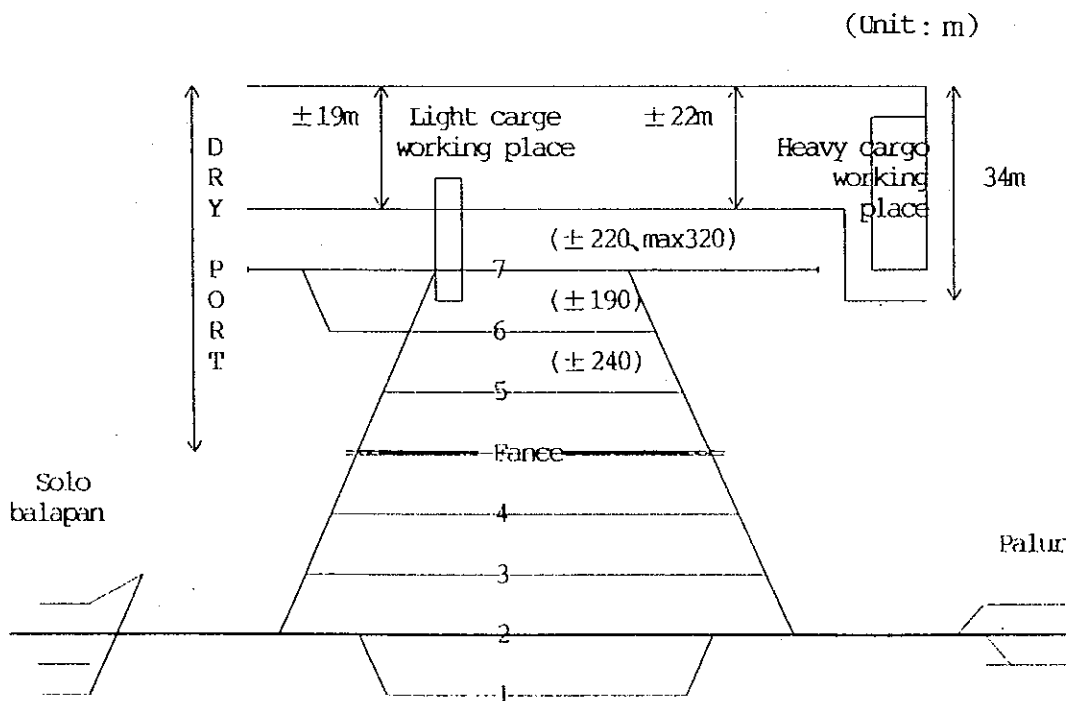


Fig. 2.67 Tg. Emas Port Container Terminal Track Layout



**Fig. 2.68 Tg. Emas Port Container Terminal Track Layout Sketch**



**Fig. 2.69 Solo Jebres Dry Port Track Layout Sketch**

SOLO JEBRES

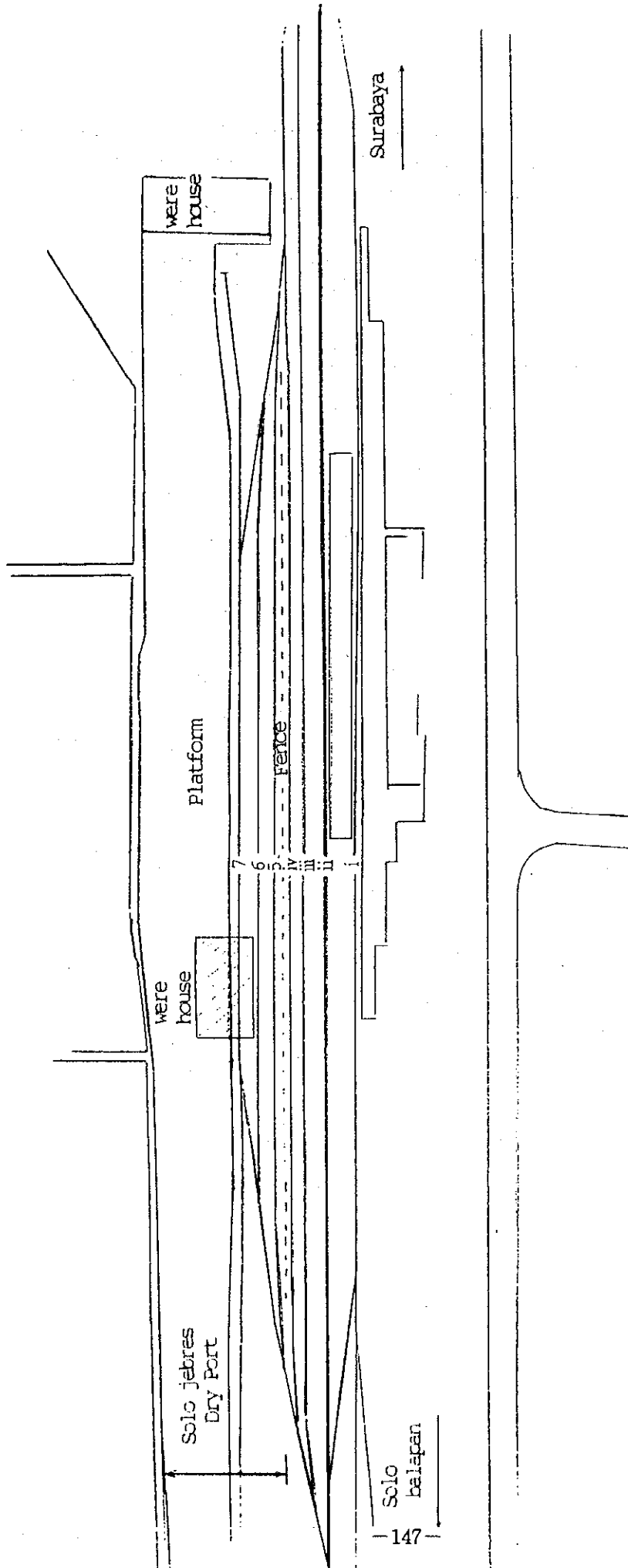


Fig. 2.70 Solo Jebres St. Track Layout

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**Table 2.45 Marine Container Handled at Rambipuji Dry Port**

Year	Outgoing (Loaded) TEU	Arriving (Empty) TEU	Total TEU	Index %	Freight Revenue (1,000 Rp.)
1990	324	324	648	100	38,676
1991	353	353	706	109	42,324
1992	518	518	1,036	160	64,053
1993	1,258	1,258	2,516	388	169,193

309. Table 2.46 shows the container cargo shipment data at each station during 1990 and 1993.

Although the cargo volumes are small, they have been increasing nearly 4 times during the last 3 years. The cause seems that PERUMKA offered convenience for shippers by occasionally operating a non regular train and all the customs clearance procedures could be completed at Rambipuji Dry Port, so that container cargo shipped from the following 6 stations could increase via Rambipuji.

Kalisat and Klakah since September 1992

Kotok since October 1992

Banyuwangi since December 1992

Sukowano since October 1993

Arjoso since March 1994

310. The Minister of Transport and Communications issued an ordinance prohibiting road transportation of 20 ft or larger containers since July 1993. Since the ordinance becomes effective in May 1994 in this area, container cargo shippers will use the railway service instead of road transportation, the increase in railway freight traffic is expected.



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**Table 2.46 Container Cargo Shipping Stations and Commodities (1990 - 1993)**

Year	Station	Commodities	20ft	40ft	TEUS	Ton
1990	Rambipuji	Tobacco	60	132	324	2,982
1991	Rambipuji	Tobacco	69	142	353	3,287
1992	Rambipuji	Tobacco	95	155	405	3,602
	Kalisat	Tobacco	6	31	68	650
	Klakah	Tobacco	-	13	26	235
	Kotok	Tobacco	17	-	17	127
	Banyuwangi	Sepatu Kain	-	1	2	7
1992	Total of Jan. - Dec.		118	200	518	4,621
1993	Rambipuji	Tobacco	115	215	545	4,991
	Kalisat	Tobacco	89	238	565	5,513
	Kalisat	Teppei Stone	13	-	13	264
	Sukowono	Tobacco	-	11	22	222
	Sukowono	Black stone	46	-	46	966
	Klakah	Tobacco	6	-	6	55
	Kotok	Teppei stone	52	-	52	938
	Banyuwangi	Handicraft	1	4	9	31
1993	Total of Jan. - Dec.		322	468	1,258	12,980

311. The Chief of Rambipuji Dry Port estimates that the total transportation demand for tobacco, which is the major cargo shipped from this district, is about 14,000 tons (1,560 TEUs).

In 1992, tobacco carried by the railway totalled about 4,600 tons, accounting for 33% of the total tobacco transportation demand. In 1993, it sharply increased to about 10,800 tons, increasing the railway share to 77%. However, the transportation records during

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the first 4 months, January through April, of 1994 show that the volume of tobacco decreased, but that of the stone material increased greatly because additional handling stations were specified.

**Table 2.47 Container Cargo Shipping Stations and Commodities  
 (January - April 1993 and January - April 1994)**

Year	Station	Commodities	20ft	40ft	TEUS	Ton
1993	Rambipuji	Tobacco	16	62	140	1,279
	Kalisat	Tobacco	16	147	310	3,097
	Total(tobacco)of Jan.- Apr.		32	209	450	4,376
	Kotok	Teppei Stone	13	-	13	234
1993	Total(tobacco)of Jan.- Apr.		45	58	463	7,610
1994	Rambipuji	Tobacco	29	56	145	1,284
	Kalisat	Tobacco	22	114	134	1,292
	Total(tobacco)of Jan. - Apr.		51	-	279	2,576
	Kalisat	Teppei Stone	15	-	15	310
	Kotok	Teppei Stone	30	-	27	549
	Arzoso	Teppei Stone	1	-	1	20
	Sukowono	black Stone	41	-	41	861
	Total(stone)of Jan. - Apr.		87	-	87	1,245
	Total of Jan. - Apr.		138	114	366	4,316

Source : Rambipuji Dry Port

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(2) Facilities

312. The transportation route from Rambipuji Dry Port to Perak ICT of Perak Port is Rambipuji - Surabaya - Sidotopo - Kalimas - Perak ICT. The section between Surabaya and Wonokromo, which is located between Surabaya and Banyuwangi, is a double track section. The line branches at Wonokromo to the southern trunk line that leads to Kertosono and Solo. A single track section starts at Wonokromo. The line branches toward Blitar at Bangil and toward Sukowono at Kalisat. (Refer to Figure 2.71)

313. The section between Surabaya and Bangil is a flat section where the standard grade is less than 5/1000. The section between Bangil and Rambipuji and that between Rambipuji and Banyuwangi have sharp grades of 15/1000 and 18/1000, respectively. The allowable axle load is 15 tons in all the sections. The allowable maximum running speed is 60 km/h between Surabaya and Bangil and 70 km/h between Bangil and Banyuwangi.

314. Model BB-301 diesel locomotives operated in this section have haulage capacity of 450 tons. One locomotive can haul 10 container cars. Up to 16 cars can be hauled by multiple locomotives.

The tokenless block system is used in all the sections including the double track section.

Surabayagubeng and Wonokromo Stations are equipped with relay interlocking devices and 3-aspect color light signals. Since no intermediate block signal is installed, the section between two stations constitutes one block section.

The other stations are equipped with 2-aspect semaphore signals and operated by mechanical interlocking lever frames.

Since intermediate stations have no safety siding, more than one train cannot enter the station simultaneously.

315. The stations have enough capacity for a container train with 16 cars hauled by multiple locomotives, because the effective length of the main track is 280 to 300 m. Since multiple locomotive trains are possible, the transport capacity can increase without multiplication of train numbers.

The current track capacity is 41 trains, but only 26 trains are realized. Therefore, the tracks have sufficient capacity for future train increase. (Refer to Fig. 2.73)

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316. The improvement works for the small section tunnel between Jember and Banyuwangi has been completed. The restriction on 40 ft containers in this section was dismissed in December 1992. Five 40 ft containers (10 TEUs) were carried from Banyuwangi to Tg. Perak Port since the dismissing in December 1992 until April 1994.

(3) Train routes and container transportation

317. The train routes between Surabaya and Banyuwangi is as follows. A daytime express direct train and a rapid service direct train each make one round trip, and a night express train makes one round trip, totaling to 3 round trips daily. A rapid service train makes one round trip daily between Probolinggo and Banyuwangi. Therefore, the total service available is 4 round trips daily. Mixture trains consisting of passenger cars and freight cars are operated in some section.

318. Freight trains are operated by a complicated system. A direct train between Surabayagubeng and Banyuwangi makes only one round trip. At intermediate terminals, cars are relayed among conventional local trains each other. 12 to 19 trains (including non-regular trains) are scheduled per section. (Refer to Figure 2.74, 2.76)

**Table 2.48 Number of Trains Scheduled by Section  
 between Surabayagubeng and Banyuwangi**

	Sgu	Wr	Bg	Pb	Rbp	Jr	Klt	Bw
Passenger	22	6	8	8	8	8	8	
Freight	18	14	12	3	13	19	15	
Total	40	20	20	1	21	26	23	

Note: Station name abbreviations

Sgu : Surabayagubeng      Pb : Probolinggo      Klt : Kalisat  
 Wr : Waru                      Rbp: Rabmipuji      Bw : Banyuwangi  
 Bg : Bangil                      Jr : Jember

319. One round trip of a non-regular container freight train is scheduled between Rambipuji and Kalimas. However, container cars are connected with a conventional rapid

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service freight train because Jember district had very small demand for container transportation, e.g., 3.4 TEUs (2 cars) daily on an average in 1993.

320. Container cars destined for Surabaya from the six stations (Klakah, Kotok, Kalisat, Sukowono, and Banyuwangi) in Jember district are gathered toward Rambipuji by conventional trains or temporary forward trains. At Rambipuji, they are connected with a container designated train. A container designated train consisting of both container cars and conventional freight cars is classified again at Sidotopo and Kalimas. Then, container cars are relayed to Perak ICT.

#### (4) Rambipuji Dry Port

##### a. Facilities

321. **Figure 2.77** shows the facility layout at Rambipuji Dry Port.

The marine container handling facilities and their specifications are summarized below.

Container yard:	6,600 m <sup>2</sup>
Container handling platform:	High floor type, concrete pavement
Loading/unloading track:	220 m
Storage and engine run-round track:	280 m
Cargo handling machine:	None installed
Warehouse:	None

(A private tobacco warehouse exists next to the station.)

Dry port function: Rambipuji does not have all of the customs clearance and other functions, but all the important export formalities can be completed at the related organizations in Jember.

##### b. Operation

322. The container handling platform with elevated floor was constructed for handling full containers by using a heavy cargo handling machine.

Containers are handled by the following procedure. Cars loading empty containers are led into the loading/unloading track and containers are stuffed by man power. They say that cargo handling workers will be increased whenever the cargo volume increases.

At Arjoso, Kotok, Kalisat, and Sukowono Stations, containers are handled by the same method as Rambipuji Station. These stations have no cargo handling machine, either.

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c. Organization and management

323. The chief official of dry port belonging to PERUMKA is posted at Rambipuji St. The offices with various functions necessary for export and import procedures such as customs, export and import examination, medical inspection and foreign exchange banks, etc. are not concentrated at Rambipuji St.

However, customers can finish export and import procedures at the relevant offices scattered in Jember City without going to the port authority office. (Fig 2.78)

(5) Kalimas Station

324. Kalimas Station is a freight station located next to Tg. Perak Port. It has the branched lines radiated to Surabayapasarturi Station, the terminal of the northern trunk line, Sidotopo Freight Station, and the industrial railway track of Perak ICT of Tg. Perak Port. (Refer to Fig. 2.71)

325. Figure 2.75 shows how container cars are shunted between Rambipuji and Perak ICT. It shows that cars are marshalled twice at Sidotopo and Kalimas Stations. They are carried on a basis of the shunting system between Kalimas and Perak ICT.

The railway service between Kalimas and Perak ICT has not been officially started. Containers are carried experimentally with the shunting system. During experimental container transportation, several PERUMKA station workers board the train and control the traffic at level crossings with heavy traffic. They unlock the door installed at the boundary between PERUMKA and the port authority. (PERUMKA's Kalimas Station staff have the key.)

326. When container cars arrive at the platform of ICT, a toplifter for cargo handling and chassis are sent from the container yard of Perak ICT. The number of chassis depends on the number of arriving containers. Containers are unloaded immediately and carried to the container yard of Perak Port. Container handling operation on the industrial railway track of Perak ICT is very quick.

After cargo handling, the empty cars are immediately returned to Kalimas Station.

(6) Existing issues

a. Container cargo shipped via Rambipuji Dry Port consists mainly of tobacco and

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stone materials used for building produced for export in the Jember district. Since both of them are products of the primary industry, mass production and mass shipment cannot be expected. Furthermore, they are shipped by a small number of specified customers.

Since the area from Rambipuji is a farming region, it is doubtful whether a large increase in container cargo can be expected in future.

b. The industrial zone where is expected to comprise the main origins and destinations of import and export cargo is located in the 20 km zone in the south and west of central Surabaya.

Construction works to expand the industrial zone to the 50 km area are underway. This distance is most advantageous for trailers that are suitable for door-to-door transportation service.

c. The container platform at Rambipuji Dry Port is long enough for one container train (20 TEUs). It will be long enough even for a longer train (32 TEUs) operated by multiple locomotives. However, the current cargo volume is too small to install heavy machines for 40 ft containers and to operate them efficiently.

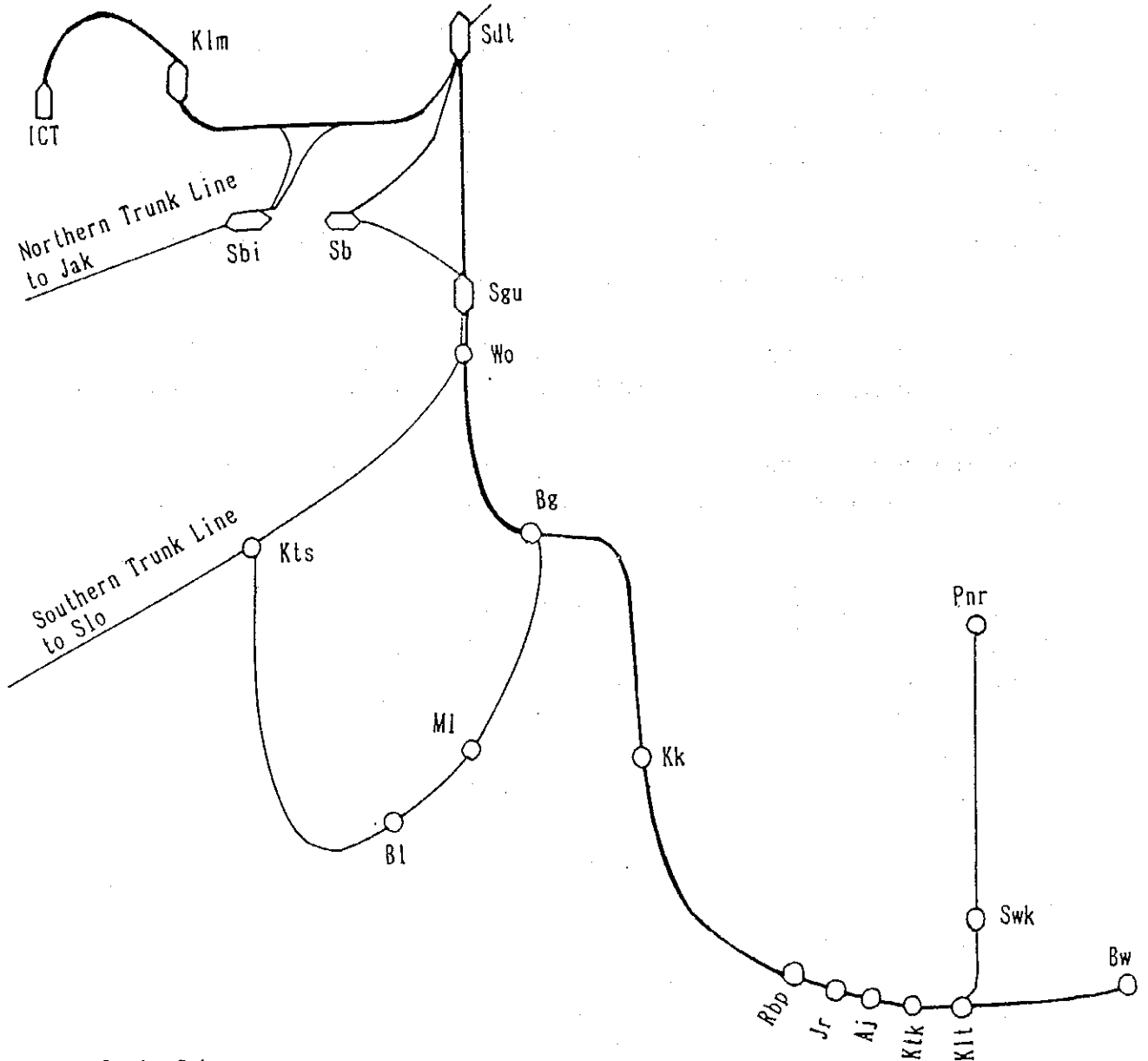
Cargo handling by man power is inevitable from the viewpoint of transportation cost until sufficient container demand can be predicted.

d. The land bridge with 10.5 m width and 2km length connects between the container berth of Perak port and the container yard. Here, containers are carried by trailers belonging to Perak ICT.

It is said someone has the idea to extend the railway between Kalimas Station and below the gantry crane at the container berth of Perak ICT. Since the railway has the very small share of the containers handled at the container yard of Perak ICT, no need is found to make equipment investment anew to replace trailers by container wagons.

e. The approximately 3 km long port track between Kalimas Station and Perak ICT runs along the roads with considerably heavy traffic and has level crossings with heavy traffic. There is a possibility to cause some difficulty on the transportation during daytime when traffic congestion on the roads would occur in future.

The conceptional Map Rambipuji - Surabaya Port



Station Code

code	Station name	code	Station name	code	Station name
ICT	Perak International Container Terminal	Wo	Wonokromo	Kit	Kalisat
Klm	Kalimas	Bg	Bangil	Bw	Banyuwangi baru
Sdt	Sidotopo	Kk	Klakah	Skw	Sukuwono
Sbi	Surabaya pasarturi	Rb	Rambipuji	Pnr	Ponorogo
Sb	Surabaya kota	Jr	Jember	Ml	Malang
Sgu	Surabaya gubeng	Aj	Arjosari	Bl	Blitar
		Kl	Kotok	Kts	Kertosono

Fig. 2.71 The conceptional Map Rambipuji and Surabaya Port



# Tanjung Perak International Container Terminal

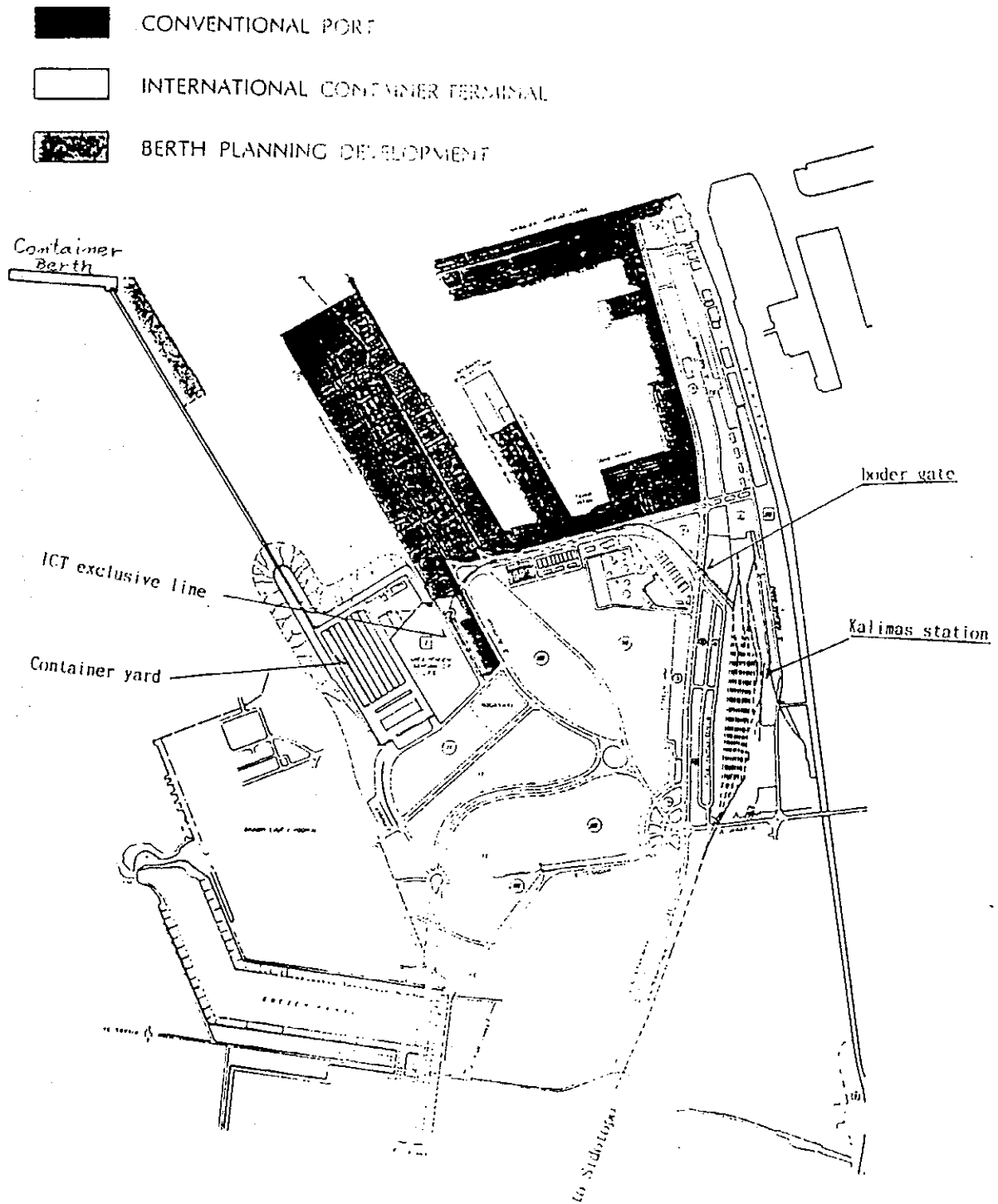


Fig. 2.72 The Tanjung Perak International Container Terminal

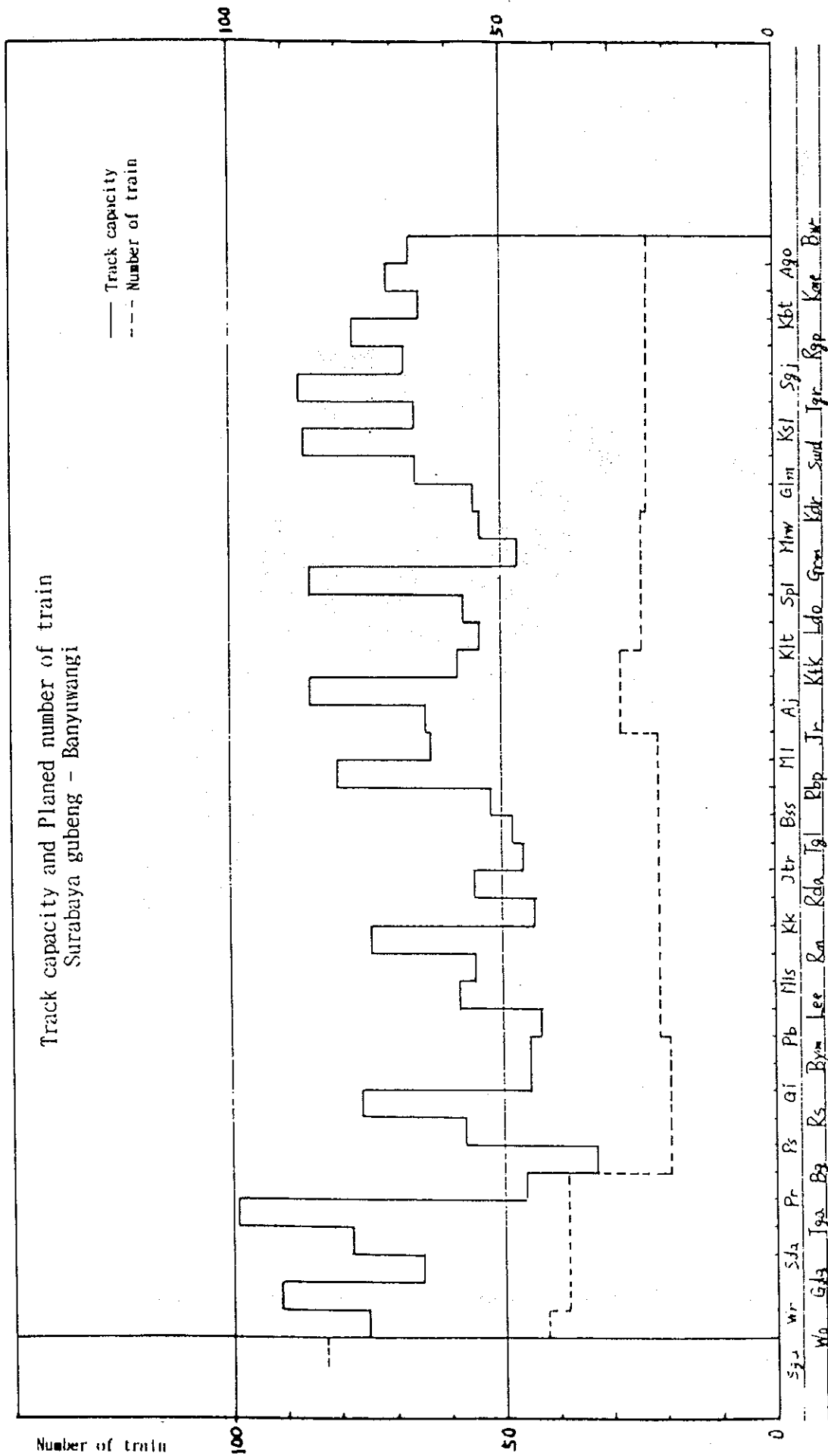


Fig. 2.73 Track capacity and planned number of train between Surabaya and Banyuwangi

Train Routes between Surabaya and Banyuwangi

1. Passenger train

	Sbi	Klm	Sdt	Sb	Wr	Bg	Pb	Kk	Rbp	Jr	Klt	Kbr	Bw
Express				②									②
Rapid				①									①
Rapid							①						①
Express				①		① (Blital)							
Express F				①		① (Malang)							
Rapid				⑥		⑥ (Malang, Blital, Kwrtosono)							

number of train	11	11	3	4	4	4	4	4	4	4	4	4	4
	11	11	3	4	4	4	4	4	4	4	4	4	4

2. Fright train

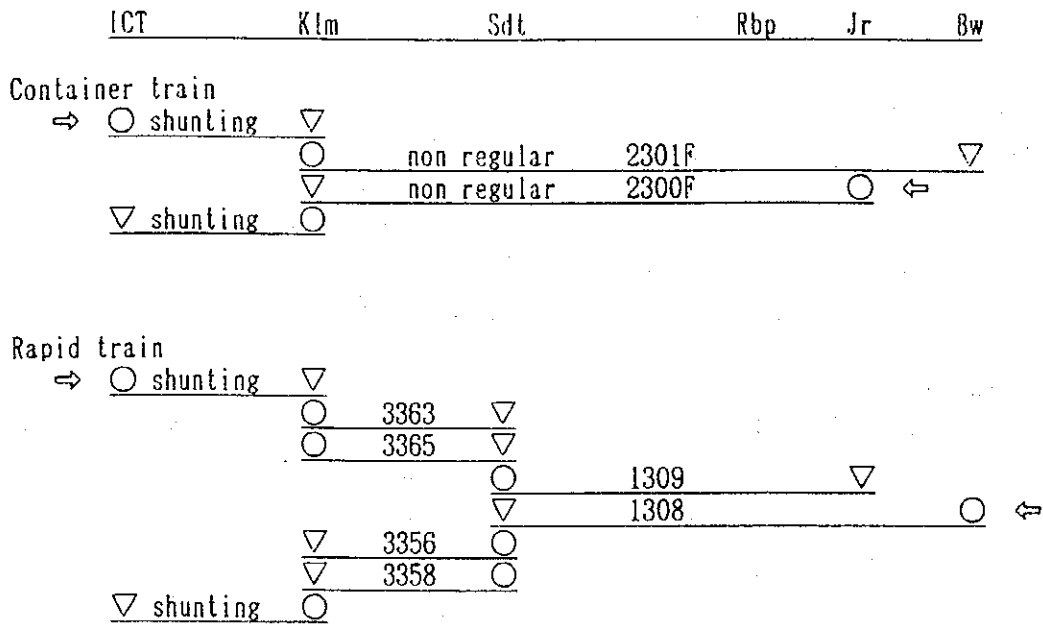
	Sbi	Klm	Sdt	Sbg	Wr	Bg	Pb	Kk	Rbp	Jr	Klt	Kbr	Bw
Container F			①										▽
Container F			▽							①			
Rapid			①								▽		
Rapid			▽										①
Local			②	②									
Rapid						▽							①
Rapid						①				①			
Rap + Loca							③			①			
Rap + Loca										⑤			④
Local			①				①						
Local F			①				①						
Local			①			▽							
Local F						①		▽					
Local F								①		▽			
Local								▽		①			
Local							▽	①					
Local										②	②		
Local										②		②	
Rap • Loca												②	①
Local			②			▽							
Local		▽				②							
Rapid			①				① (Pakisali)						
Local			②				② (Malang)						

number of train	10	8	6	7	7	7	10	8	8
	10	8	6	6	6	6	10	8	7
Total number of train	42	38	18	21	21	21	28	24	23

notes: F : non regular      ① : number of train

Fig. 2.74 Train routes Surabaya - Banyuwangi

Container Transportation between  
Rambipui and Perak ICT



notes; staition name code

ICT : Tanjung Perak International container Terminal  
 Klm : Kalisat  
 Sdt : Sidotopo  
 Rbp : Rambipuji  
 Jr : Jember  
 Bw : Banyuwangi

Fig. 2.75 Container Transportation between Rambipuji and Perak ICT

Train Diagram Surabaya - Banyuwangi

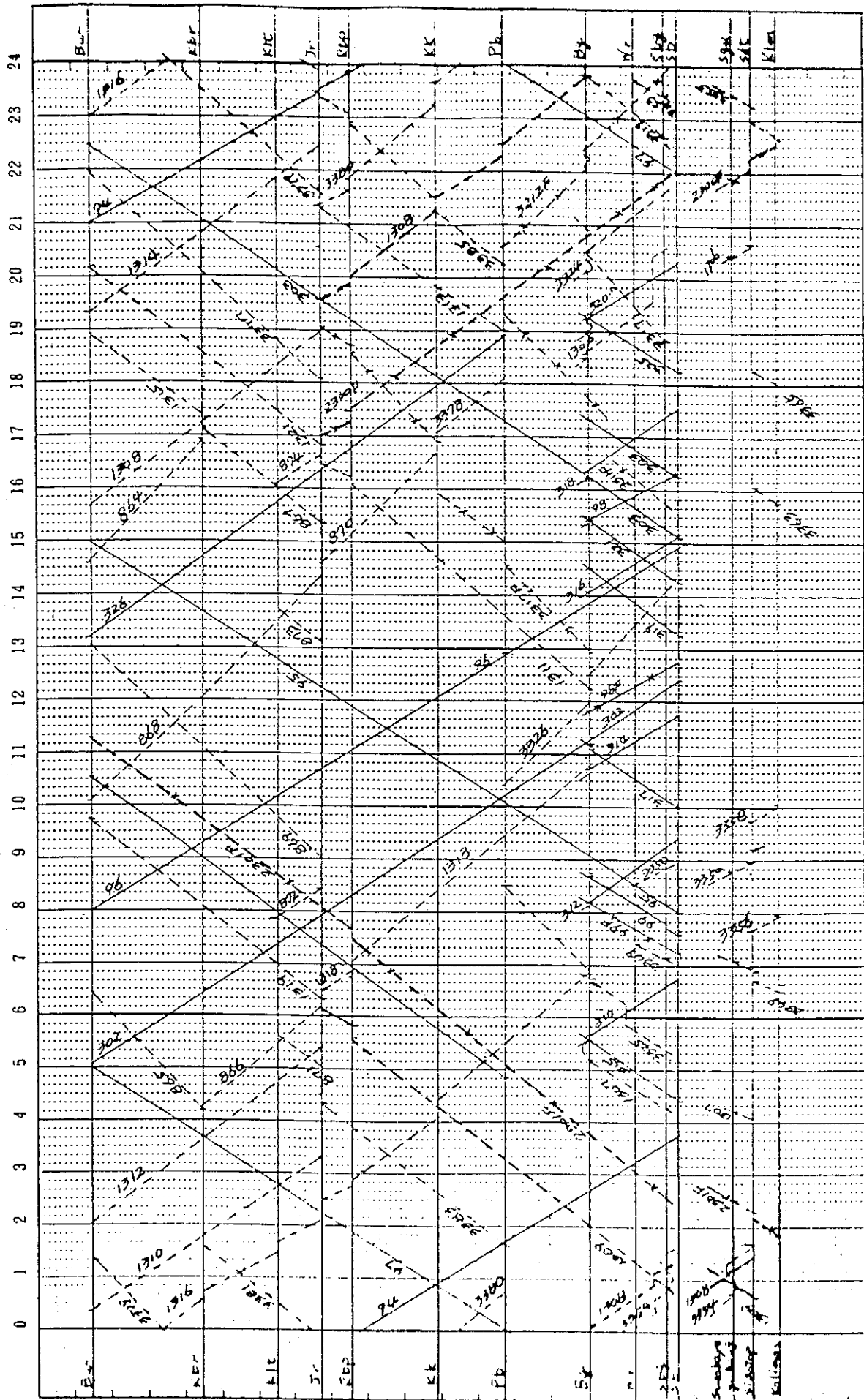
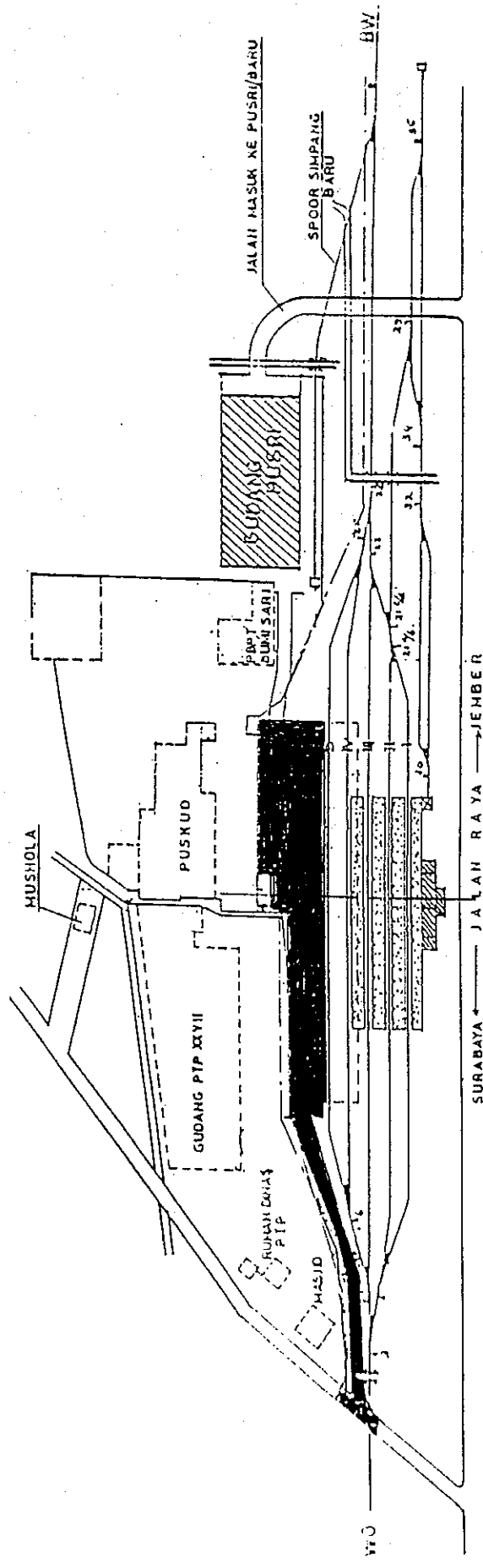


Fig. 2.76 Train Diagram Surabaya and Banyuwangi

KAWASAN TERMINAL PETI KEMAS  
RAMBIPUJI




KEJERANGAN  
 DIKERJAKAN OLEH BINA MARGA

Fig. 2.77 Rambipuji Dry Port : Track layout

Organization chart of Rambipuji Dry Port(LAMPIRAN SG No. 5/12/1989)

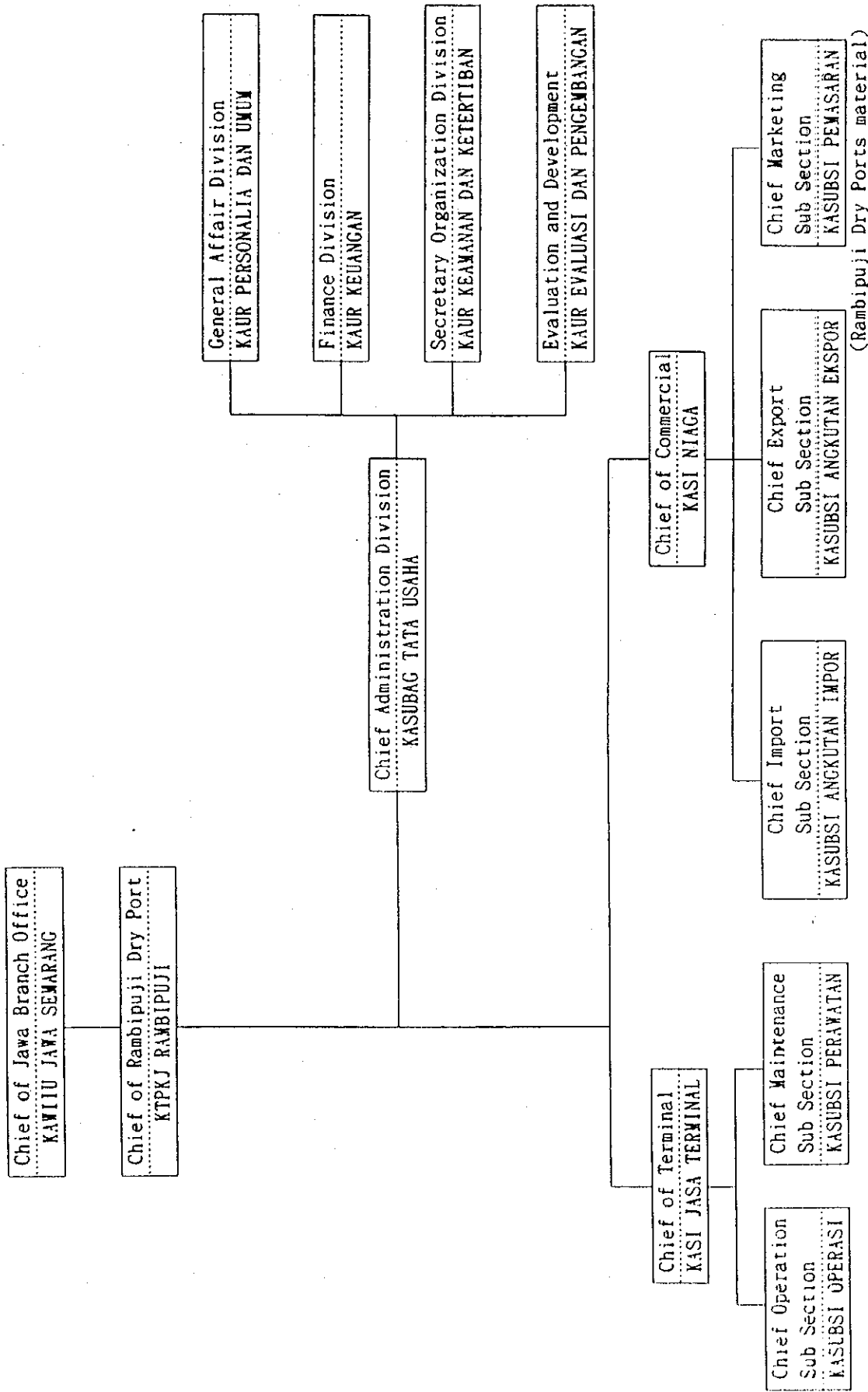


Fig. 2.78 Organization chart of Rambipuji Dry Port

### 3. MACRO FORECAST OF CONTAINER CARGO TRAFFIC IN 2010

#### 3.1 SOCIOECONOMIC FRAMEWORK IN THE YEAR 2010

##### 3.1.1 Population

1. There are two forecasts of population in Indonesia. One population projection up to the year 2018 is presented in the 25 Year Long Term Development Plan II (hereinafter called PJP II). The other population projection (by provinces) up to the year 2020 was presented a cooperative venture between The DEMOGRAPHIC INSTITUTE, Faculty of Economics, University of Indonesia and the NATIONAL DEVELOPMENT PLANNING BOARD (hereinafter called Case-2).

2. The two forecasts are summarized in Table 3.1.

Table 3.1 Forecast Population in Indonesia

( Unit : 1,000 persons )

	2003	2010	2018
PJP II	219,400	238,677	258,100
Case-2	224,555	246,796	270,898

##### 3.1.2 Economic framework

3. Three scenarios are set for the economic framework through 2018.

(1) Scenario 1

4. In this scenario, the GDP and each sectoral growth rates forecast in PJP II are adopted. Based on these figures, the GDP is calculated up to the year 2018.

(2) Scenario 2

5. A GDP growth model is constructed in accordance with the following procedure.



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1) A per capita GDP growth model is designed based on the growth curves of Indonesia, Malaysia, Thailand, Korea and Singapore over the last 20 years. (Fig.3.1,.2,.3 and .4)

2) The per capita GDP growth rate is calculated based on the above model.

3) The GDP growth rate is then calculated by multiplying the population growth rate by the above figure. (The population growth rate is adopted from PJP II).

4) Finally, the GDP is forecast up to the year 2018 based on this projected growth rate.

(3) Scenario 3

6. This scenario sets 6% as the average annual GDP growth rate up to the year 2018. This is the same as the average growth rate over the last 10 years (1984-1993).

**Table 3.2 Annual GDP growth rate under each scenario**

Unit: %

	1994-1998	1999-2003	2004-2008	2009-2013	2014-2018
Scenario 1	6.2	6.6	7.1	7.8	8.7
Scenario 2	9.2	8.9	8.6	8.2	7.8
Scenario 3	6.0	6.0	6.0	6.0	6.0

7. The projected GDP under each scenario is presented in Fig.3.5 and summarized below in constant 1983 prices.

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**Table 3.3 Projected GDP**

( Unit : Trillion rupiahs )

	2003	2010	2018
Scenario 1	261.877	427.499	816.788
Scenario 2	323.948	574.003	1,056.930
Scenario 3	250.601	376.811	600.579

8. The per capita GDP under each scenario is presented below in constant 1983 market prices.

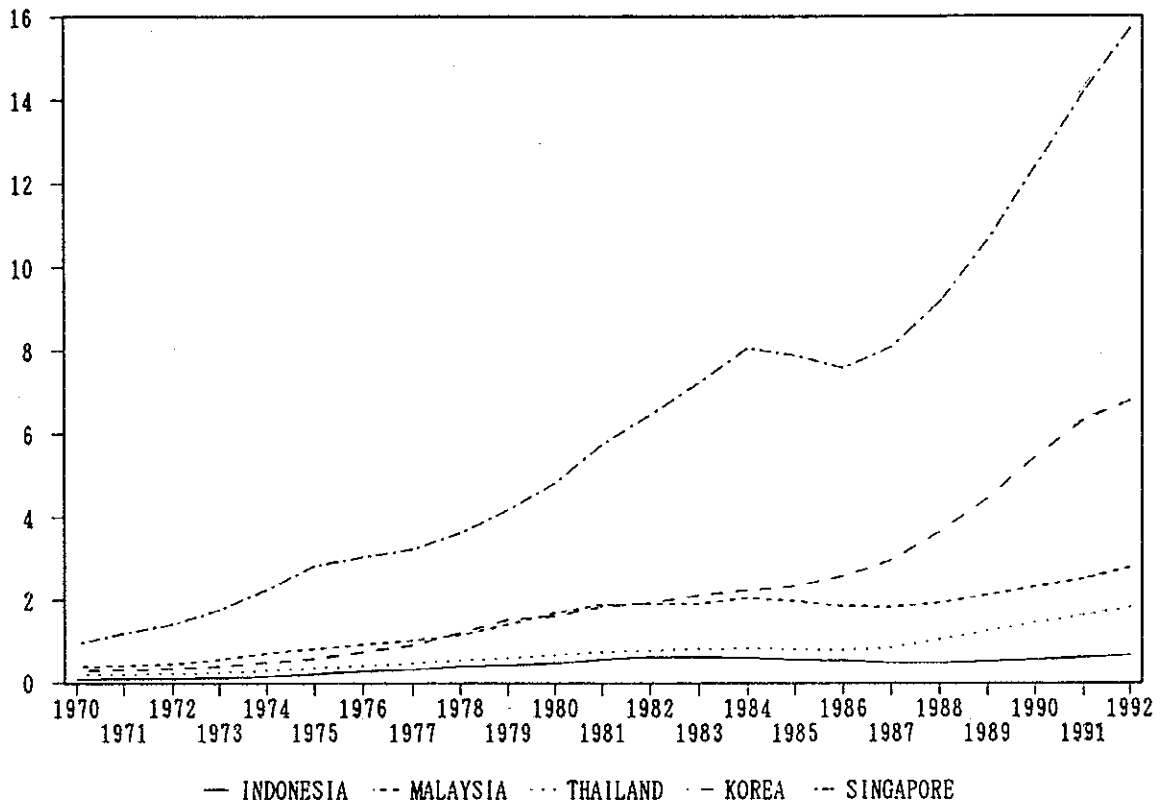
**Table 3.4 Per Capita GDP**

( Unit : Million rupiahs )

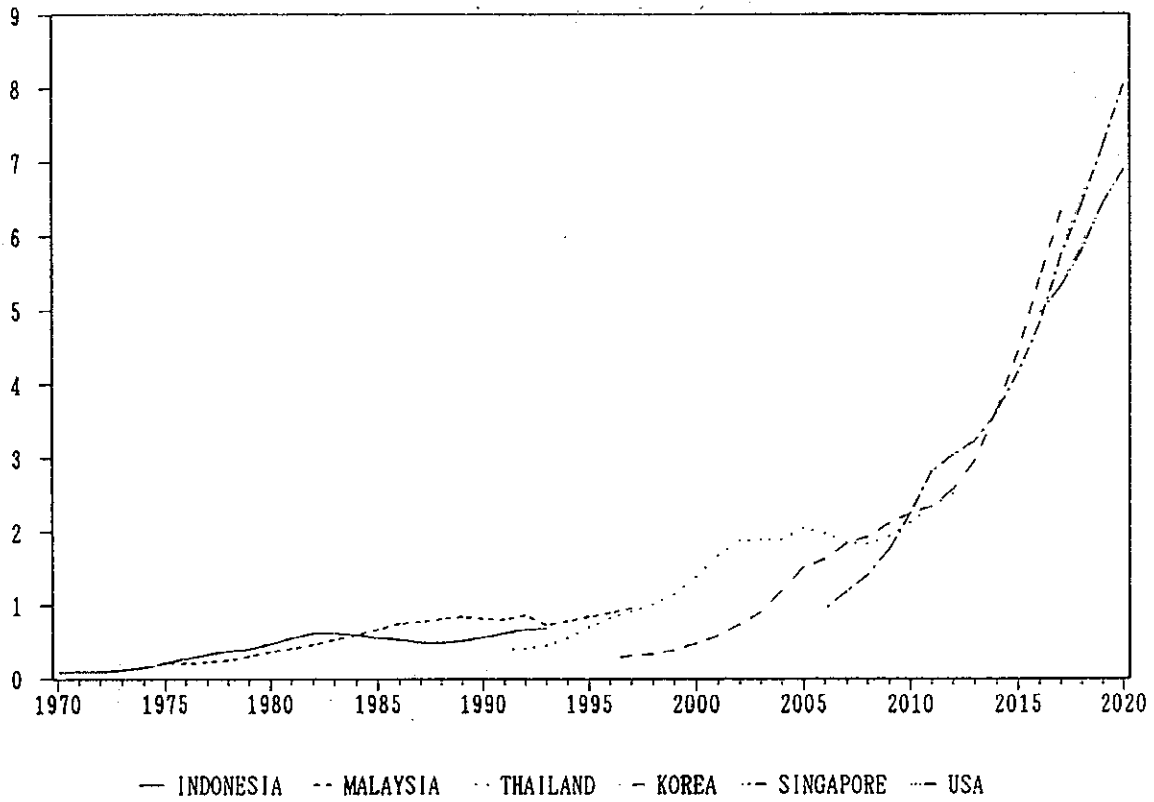
	2003	2010	2018
Scenario 1	1.194	1.791	3.165
Scenario 2	1.477	2.405	4.095
Scenario 3	1.142	1.579	2.327

9. According to Scenario 1, the GDP will reach 427.5 trillion rupiah in 2010 and the per capita GDP will be 1.79 million rupiah in constant 1983 prices. This is equivalent to 2.84 million rupiah in constant 1989 market prices. (The conversion factor is 1.588).

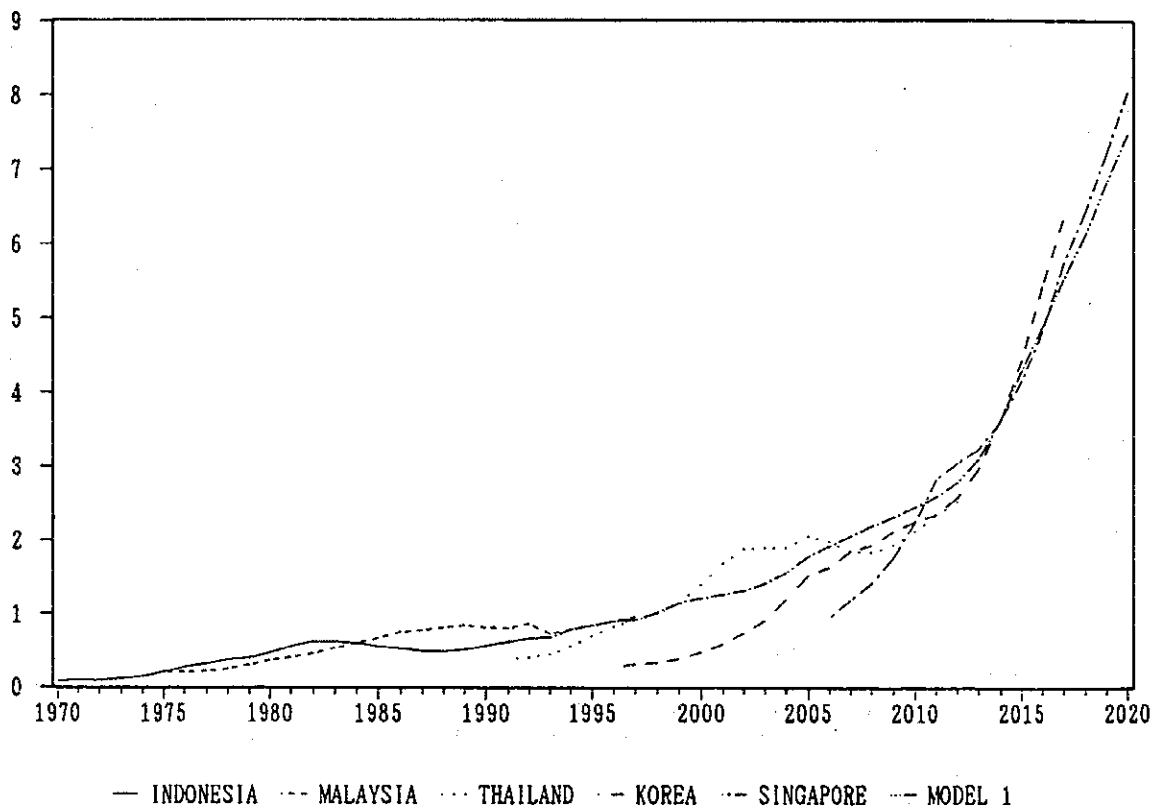
Remarks : US\$ 1 = 1,203 rupiah (in constant 1983 prices)



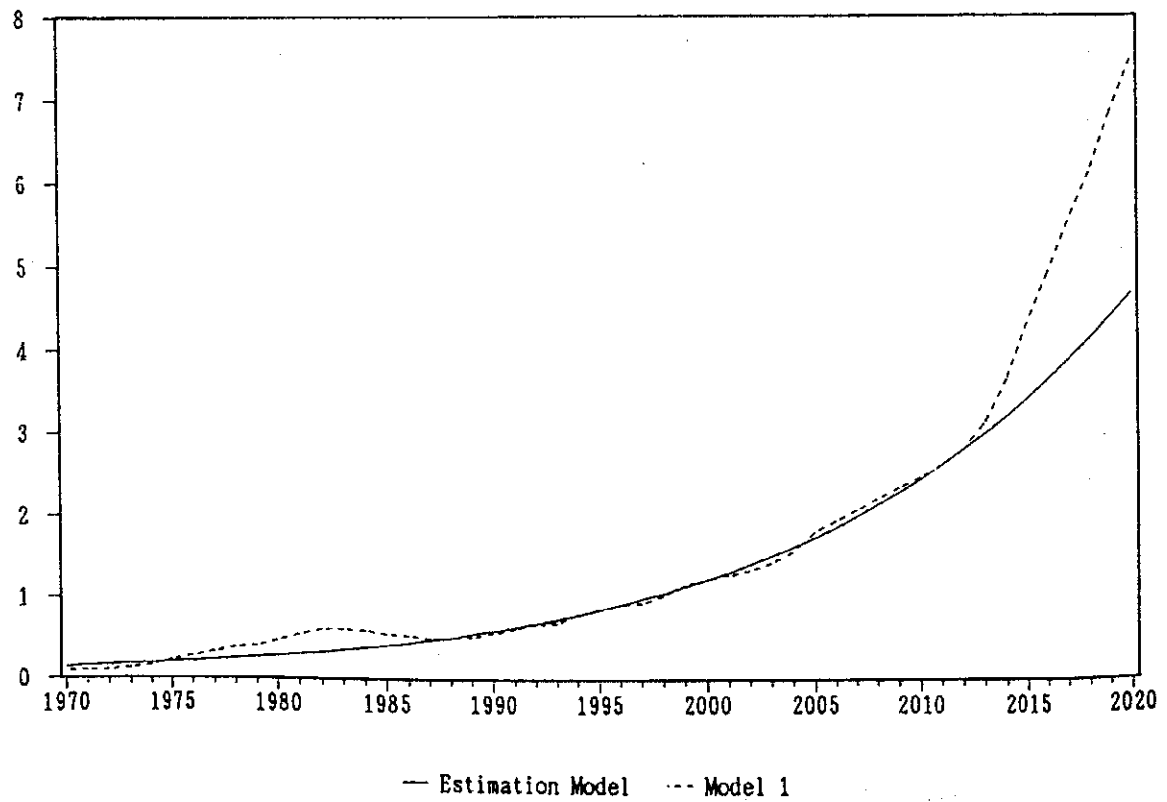
**Fig. 3.1 Growth of Per Capita GDP**  
(Unit : US\$ 1,000)



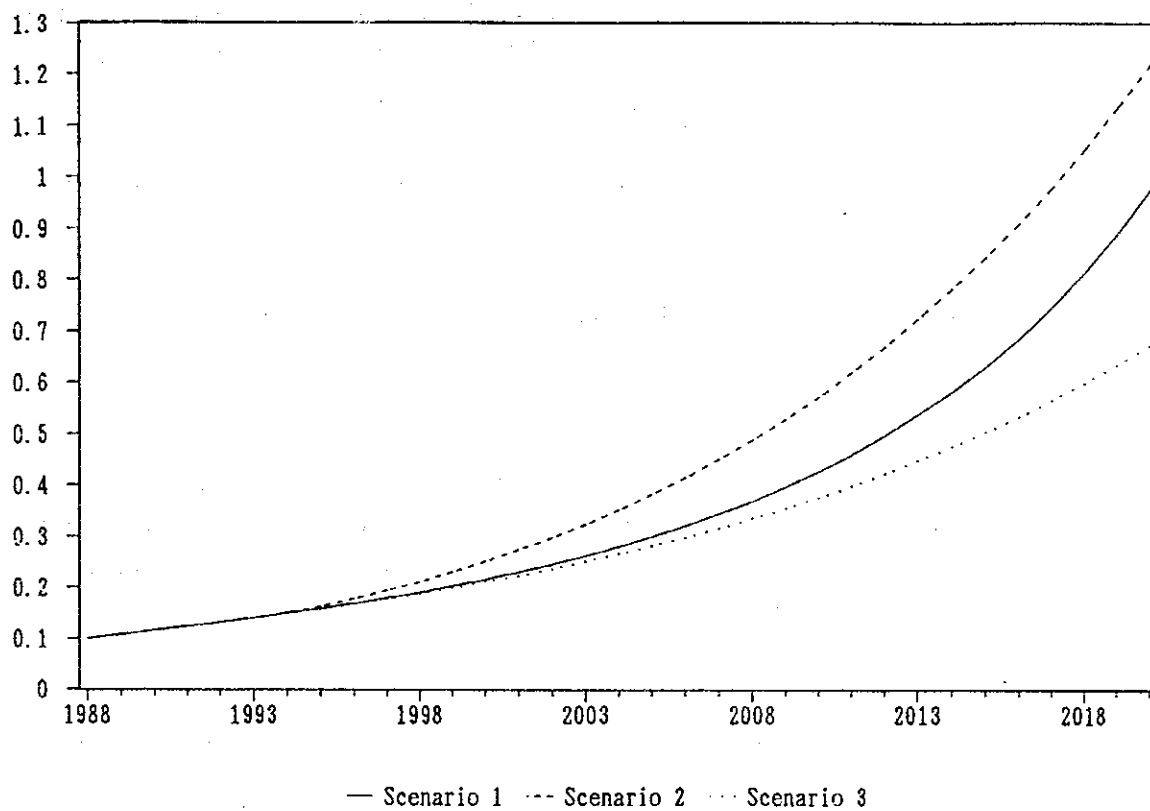
**Fig. 3.2 GDP Estimation Model 1**  
(Unit : US\$ 1,000)



**Fig. 3.3 GDP Estimation Model 2**  
(Unit : US\$ 1,000)



**Fig. 3.4 GDP Estimation Model 3**  
(Unit : US\$ 1,000)



**Fig. 3.5 GDP Forecast by Three Scenaris**  
(Unit : US\$ 1,000 Trillion Rp.)

### 3.2 MACRO FORECAST OF TOTAL CONTAINER CARGO TRAFFIC OF THE PORT SECTOR IN 2010

#### 3.2.1 Macro forecast of international container cargo traffic in 2010

##### (1) Export container cargo

10. Based on the statistics of export, export cargo is classified into ten commodities: foodstuffs, beverages & tobacco, raw materials, mineral fuels, non mineral oils & fats, chemicals, manufactured goods, machinery & transportation equipment, miscellaneous manufactured articles, and others.

11. The future cargo volume for each commodity is projected for all three scenarios based on the elasticity between the historical growth rates for each commodity and for overall GDP.

12. The potential container cargo volume is estimated based on the assumed final containerized ratio for each commodity.

13. The increase in containerized ratio is estimated from the correlation between the past trend and the logistic curve, which is shown in Fig.3.6.

14. The container cargo volume in the target year is forecast by multiplying potential container cargo volume by the containerized ratio.

##### (2) Import container cargo

15. Import container cargo is forecasted adopting the same methodology used to forecast export container cargo volume.

16. The forecast international container cargo volume is presented in Table 3.6, .7, .8, .9, .10, .11 and Fig.3.7 and summarized below.

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**Table 3.5 Forecast International Container Cargo Volume**

( Unit : 1,000 TEU )

Scenario	Export			Import			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
1							
2003	2,195	286	2,481	1,937	544	2,481	4,962
2010	3,558	416	3,973	3,221	752	3,973	7,946
2018	6,632	684	7,316	6,151	1,165	7,316	14,632
Scenario	Export			Import			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
2							
2003	2,725	355	3,081	2,402	678	3,081	6,162
2010	4,807	562	5,369	4,343	1,026	5,369	10,738
2018	8,641	892	9,533	7,989	1,544	9,533	19,066
Scenario	Export			Import			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
3							
2003	2,099	273	2,372	1,852	520	2,372	4,744
2010	3,128	366	3,493	2,834	659	3,493	6,986
2018	4,839	499	5,338	4,503	835	5,338	10,676

**3.2.2 Macro forecast of container cargo traffic by major origin and destination in 2010**

17. The above estimated total container cargoes is the broken down by major origin and destination. Table 3.12 shows the results of the forecast on the basis of the historical cargo flow which is shown in detail in Table 3.13 and .14







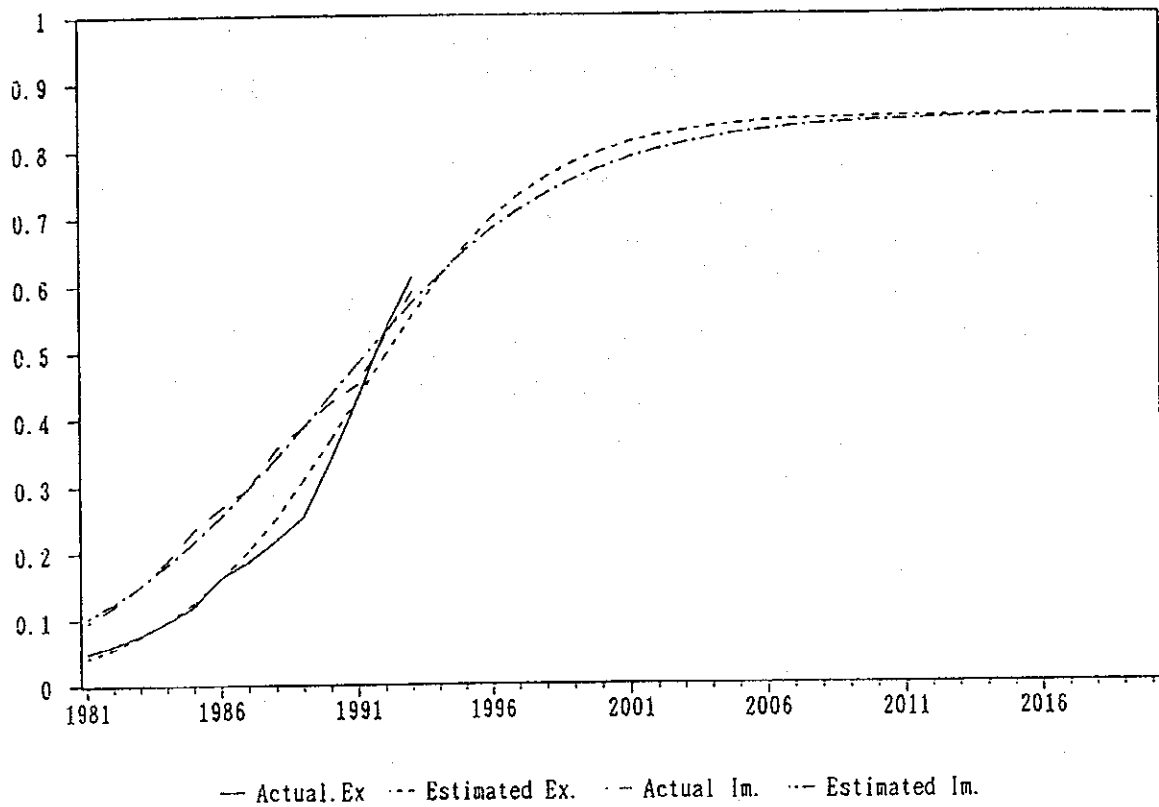
Table 3.8 Estimation for Container Volume of Exports by site Groups (Scenario 2)

Year	GDP Increase	Foodstuff Elasticity	Beverage and Toad Elasticity	Iron Materials Elasticity	Mineral Prod. Elasticity	Labor Elasticity	Non-Mineral Oil Elasticity	Chemicals Elasticity	Manufactured Goods Elasticity	Agriculture & Trans-shipment Elasticity	Domestic & Trade Elasticity	Total Cargo Volume Increase	Potential Container Capacity	Container Volume	Container Utilization	Customer Empty Cn.	Total
1991	2.18	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11
1992	2.17	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
1993	2.17	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
1994	2.16	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09
1995	2.16	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09	2.09
1996	2.15	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08	2.08
1997	2.14	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07
1998	2.14	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07
1999	2.13	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06
2000	2.13	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06	2.06
2001	2.12	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05
2002	2.12	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05
2003	2.11	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04
2004	2.11	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04	2.04
2005	2.10	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03
2006	2.10	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03	2.03
2007	2.09	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02
2008	2.09	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02
2009	2.08	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
2010	2.08	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
2011	2.07	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
2012	2.07	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
2013	2.06	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99
2014	2.06	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99
2015	2.05	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98
2016	2.05	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98
2017	2.04	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97
2018	2.04	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97	1.97
2019	2.03	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96
2020	2.03	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96

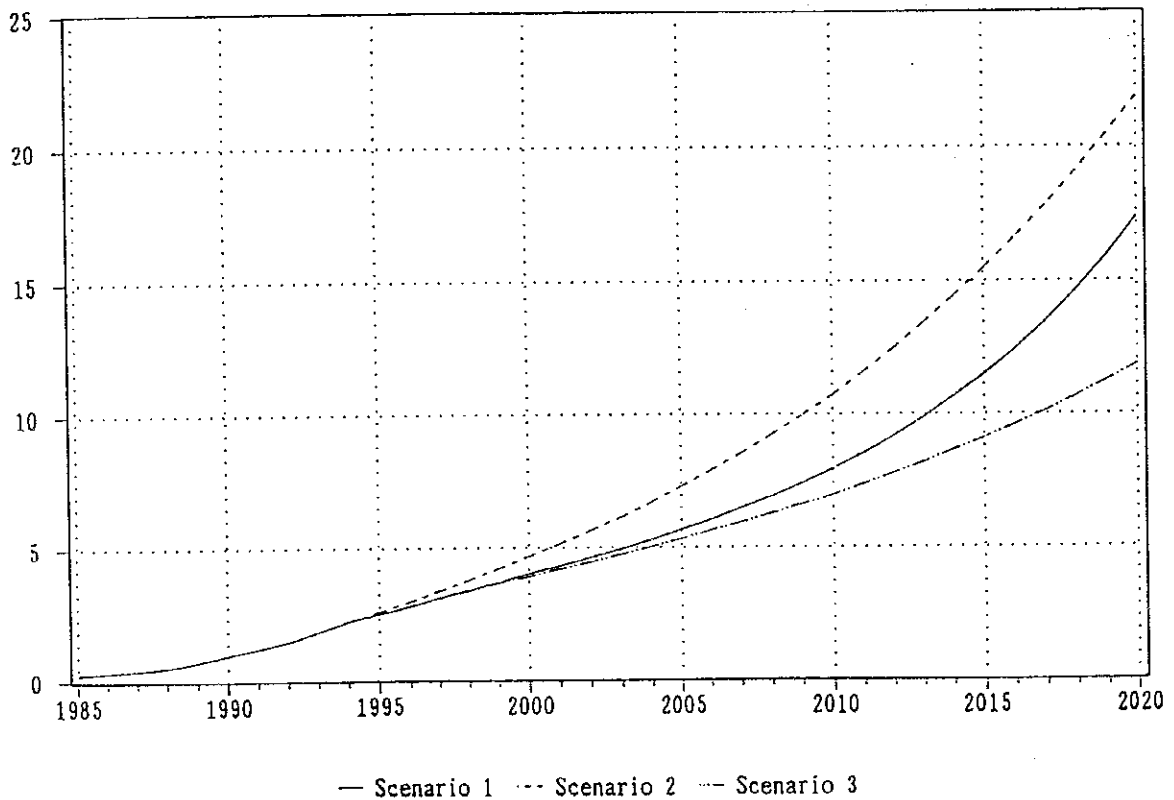








**Fig. 3.6 Containerized Ratio in Indonesia**



**Fig. 3.7 Forecast of International Container Traffic (Unit : Million TEU)**

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Table 3.12 Forecast on the Basis of the Historical Cargo Flow

(Unit: 1,000 TEU)

Scenario	Export			Import			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
1							
ASEAN	1,067	125	1,192	806	188	994	2,186
Asia	1,245	146	1,391	1,128	263	1,391	2,782
Africa	178	21	199	161	38	199	398
USA	356	42	398	322	76	398	796
Oceania	178	21	199	322	76	398	597
EC & oth	534	62	596	483	113	596	1,192
Total	3,563	416	3,979	3,222	757	3,979	7,958
Scenario	Export			Import			Total
2	Loaded	Empty	Total	Loaded	Empty	Total	
ASEAN	1,442	169	1,611	1,086	257	1,343	2,954
Asia	1,682	197	1,879	1,520	359	1,879	3,758
Africa	240	28	268	217	51	268	536
USA	481	56	537	434	103	537	1,074
Oceania	240	28	268	434	103	537	805
EC & oth	721	84	805	651	154	805	1,610
Total	4,807	562	5,369	4,343	1,026	5,369	10,738
Scenario	Export			Import			Total
3	Loaded	Empty	Total	Loaded	Empty	Total	
ASEAN	938	110	1,048	709	165	874	1,922
Asia	1,095	128	1,223	992	231	1,223	2,446
Africa	156	19	175	142	33	175	350
USA	313	37	350	283	67	350	700
Oceania	156	19	175	283	67	350	525
EC & oth	469	55	524	425	99	524	1,048
Total	3,132	366	3,493	2,835	663	3,493	6,986

Table 3.13 OD Table for Inter-island Cargo in 1992 (Without Oil & Coal)

(Unit : 1,000 ton)

	Belawan	Palembang	Panjang	Tj. Priok	Tj. Emas	Cilacap	Tj. Perak	Pontianak	Bitung	N. Sumatera	S. Sumatera	Kalimantan	Sulawesi	Nusa Tenggara	Maluku & Irian Jaya	Others	Total	
Belawan	1.4	19.0	8.5	639.9	1.0	0.0	270.5	0.0	5.3	7.1	28.3	2.9	6.4	0.5	10.6	0.2	-0.0	1,001.8
Palembang	98.6	1.1	19.5	214.0	45.3	320.7	642.5	69.2	23.6	0	51.0	33.7	24.5	0.0	40.4	0.0	-0.0	1,584.1
Panjang	0.0	0.0	0.0	4.5	0.0	0.0	5.1	0.0	0.0	0	0.0	4.7	0.0	0.0	0.1	0.0	0.0	14.4
Tj. Priok	379.6	160.0	77.4	50.7	5.4	0.1	36.1	34.2	195.7	31.1	224.0	212.3	198.3	22.5	89.0	47.2	0.0	1,813.6
Tj. Emas	4.9	5.3	2.1	0.0	5.6	0.0	1.1	0.0	73.7	0	24.9	12.9	41.0	0.3	0.2	5.3	0.0	177.3
Cilacap	0.0	26.9	0.0	0.5	0.0	1.8	20.8	0.0	1.2	4.1	25.2	0.0	0.6	4.5	10.5	3.0	-0.0	99.1
Tj. Perak	416.6	112.1	35.0	55.5	0.0	0.0	80.9	212.9	17.2	68	199.6	53.8	581.8	148.6	534.2	182.1	0.0	2,698.3
Uj. Padang	14.4	9.9	1.5	17.1	0.0	0.0	44.6	0.1	1.5	29.1	0.0	0.3	101.8	52.2	38.4	55.0	-0.0	375.9
Pontianak	0	0	0	140.3	65.3	0	3	0	25.6	0	1.9	0	108.9	0	3.8	0	0.0	348.8
Bitung	2	0	0	36.8	0.1	0	44	2.4	0	5.1	0.2	0.1	0.2	31.7	0.4	2.9	0.0	125.9
N. Sumatera	483.9	41.1	18.2	294.0	4.2	0.0	45.5	9.5	4.2	0	675.0	65.9	30.2	0.2	4.8	0.2	-0.0	1,676.9
S. Sumatera	0.0	5.9	1.8	305.2	20.4	0.0	87.4	0.8	2.5	0	20.7	39.4	0.9	0.0	0.0	1.7	0.0	436.7
Kalimantan	0.0	80.8	4.6	124.2	370.2	0.0	727.8	30.8	79.9	0	292.8	2.0	438.2	7.1	86.3	3.4	-0.0	2,248.1
Sulawesi	32.5	35.6	0.0	66.1	9.7	10.6	209.0	42.4	21.0	47.2	34.2	42.3	401.1	159.1	94.0	46.5	-0.0	1,252.1
Iriggara	12.0	0.1	0.1	5.8	0.0	0.1	208.5	2.7	1.2	1.3	0.3	0.0	9.0	7.1	79.8	8.0	0.0	336.0
Irian Jaya	1.0	0.0	0.0	5.0	0.2	0.0	139.1	7.1	14.8	0.9	3.6	0.0	37.9	11.8	8.5	62.4	0.0	292.3
Others	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	-0.0	-0.0	-0.0
Total	1,446.9	497.8	168.7	1,959.6	527.4	333.3	2,565.9	412.1	467.4	193.9	1,581.7	470.3	1,980.8	455.6	1,002.0	417.9	-0.0	14,481.3

Source : MGSC



Table 3.14 OD Table for Inter-island Container Cargo in 2010

	Belawan		Pulombau		Punjang		Tj. Priok		Tj. Enas		Cilacap		Tj. Perak		Uj. Padat		Pontianak		Bilung		N. Sumatra		S. Sumatra		Kalimantan		Sulawesi		Nusa Tenggara		Maluku		Total							
	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty						
Belawan	104	0	1,739	0	3,495	29,947	144	0	15,423	0	485	650	1,430	147	323	25	546	10	54,468	104,137	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Pulombau	1,472	0	20	0	1,604	2,003	1,305	0	7,327	5,109	432	0	515	341	248	0	408	0	26,653	43,932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Punjang	0	0	0	0	0	211	0	0	291	0	0	0	0	237	0	0	0	5	744	65,011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Tj. Priok	28,329	0	14,641	0	31,827	2,373	778	0	4,909	12,626	17,908	11,317	10,726	10,019	10,019	1,137	4,497	2,385	156,327	171,959	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Tj. Enas	366	0	485	0	864	0	807	0	63	0	6,744	1,258	1,258	652	2,071	15	10	268	13,602	77,328	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Cilacap	0	0	2,462	0	0	23	0	165	1,186	0	110	375	1,273	0	30	227	530	152	6,534	7,112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Tj. Perak	31,091	0	10,258	0	14,392	2,597	0	0	4,613	78,599	1,574	10,084	2,718	29,394	7,508	26,989	9,200	235,240	258,764	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Uj. Padat	1,075	0	906	0	617	800	0	0	2,543	37	137	2,663	0	15	5,143	3,143	1,940	21,798	112,538	134,336	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Pontianak	0	0	0	0	0	6,566	9,408	0	171	0	2,343	0	96	0	5,502	0	192	0	24,278	46,999	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Bilung	149	0	0	0	0	1,722	14	0	2,509	886	0	467	10	5	10	1,602	20	147	7,541	16,735	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
N. Sumatra	26,585	0	2,258	0	1,000	16,152	231	0	2,500	522	231	37,984	3,620	1,659	1,659	11	264	11	92,127	101,340	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
S. Sumatra	0	0	370	0	113	19,163	1,281	0	2,348	50	157	1,300	2,474	57	57	0	0	107	27,419	36,161	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Kalimantan	0	0	6,342	0	361	9,748	29,055	0	57,121	2,417	6,271	22,980	157	34,392	557	6,773	267	176,440	194,084	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Sulawesi	1,275	0	1,397	0	0	2,594	381	0	8,202	1,664	824	1,342	1,660	15,740	6,243	3,720	1,825	49,135	54,048	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Tenggara	753	0	6	0	6	364	0	0	13,091	170	75	19	0	0	565	446	5,010	502	34,038	55,134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Irian Jaya	63	0	0	0	0	314	13	0	8,734	446	929	226	0	0	2,380	741	534	18,353	23,699	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Loaded	91,262	40,884	54,278	94,577	43,417	6,405	131,030	192,526	38,220	15,213	88,934	22,752	107,533	21,655	51,439	931,754	447,695	1,379,450	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Empty	12,875	3,048	11,733	77,382	33,911	647	127,735	31,810	2,479	1,521	12,405	7,409	86,551	32,394	3,695	447,695	55,134	23,699	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	104,137	43,932	66,011	171,959	77,328	7,112	258,764	194,336	40,699	16,735	101,340	30,161	194,084	54,048	55,134	1,379,450	100,000	23,699	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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3.2.3 Macro forecast of inter-island container cargo traffic in 2010

18. The inter-island container cargo traffic in 2010 is estimated by adopting the 1992 OD table of inter-island cargo shown in Table 3.16 ( Oil and coal shipment are not included in these figures). The input data are the inter-island container cargo volume of the six major ports estimated in Chapter 3.3, calculated in Table 3.17 and summarized below.

Table 3.15 Inter-island Container Cargo Volume

(Unit: 1,000 TEU)

	Loading			Unloading			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
2010	932	448	1,380	932	448	1,380	2,760



Table 3.17 OD Table for Inter-island Container Cargo in 2010

	Belawan		Palcabas		Pangjang		Tj. Priok		Tj. Emas		Cilacap		Tj. Perak		Uj. Padang		Pontianak		Bitung		N. Sumatera		Sulawesi		Nusa Tenggara		Maluku & Irian Jaya		Total		
	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	Loaded	Empty	
Belawan	104	1,739	3,495	29,947	144	0	15,423	0	485	650	1,430	147	323	25	546	10	54,468	49,659	104,137												
Palcabas	1,472	20	1,604	2,003	1,365	5,869	7,327	5,109	432	0	515	341	248	0	408	0	26,653	17,279	43,932												
Pangjang	0	0	0	211	0	0	291	0	0	0	0	237	0	0	5	0	744	95,267	66,011												
Tj. Priok	28,329	14,641	31,827	2,373	778	9	4,909	12,626	17,908	2,846	11,317	10,726	10,019	1,137	4,497	2,385	156,327	15,633	171,959												
Tj. Emas	366	485	864	0	807	0	63	0	6,744	0	1,238	652	2,071	15	10	268	13,602	63,726	77,328												
Cilacap	0	2,462	0	23	0	165	1,186	0	110	375	1,273	0	30	227	530	152	6,534	578	7,112												
Tj. Perak	31,091	10,258	14,392	2,597	0	0	4,613	78,599	1,574	6,223	10,084	2,718	29,394	7,508	26,989	9,200	235,240	23,524	258,764												
Uj. Padang	1,075	906	617	800	0	0	2,543	37	137	2,663	0	15	5,143	3,143	1,940	2,779	21,798	112,538	134,336												
Pontianak	0	0	0	6,566	9,408	0	171	0	2,343	0	96	0	5,502	0	192	0	24,278	16,421	40,699												
Bitung	149	0	0	1,722	14	0	2,509	886	0	467	10	5	10	1,602	20	147	7,541	9,194	16,735												
N. Sumatera	26,585	2,258	1,000	16,152	231	0	2,500	522	231	0	37,084	3,620	1,659	11	264	11	92,127	9,213	101,340												
S. Sumatera	0	370	113	19,163	1,281	0	2,348	50	157	0	1,300	2,474	57	0	0	0	27,419	2,742	30,161												
Kalimantan	0	6,342	361	9,748	29,055	0	57,121	2,417	6,271	0	22,980	157	34,392	557	6,773	267	176,440	17,644	194,084												
Sulawesi	1,275	1,397	0	2,594	381	416	8,202	1,684	824	1,852	1,342	1,660	15,740	6,243	3,720	1,825	49,135	4,913	54,048												
Tenggara	753	6	6	364	0	6	13,091	170	75	82	19	0	565	446	5,010	502	21,097	34,038	55,134												
Irian Jaya	63	0	0	314	13	0	8,734	446	929	57	226	0	2,380	741	534	3,918	18,353	5,316	23,669												
Loaded	91,292	40,884	54,278	94,577	43,417	6,465	131,030	102,526	38,220	15,213	88,934	22,752	107,533	21,655	51,439	21,569	931,754	447,695	1,379,450												
Empty	12,875	3,048	11,738	77,382	33,911	647	127,735	31,810	2,479	1,521	12,405	7,409	86,551	32,354	3,695	2,100	447,695														
Total	104,137	43,932	66,011	171,959	77,328	7,112	258,764	134,336	40,699	16,735	101,340	30,161	194,084	54,048	55,134	23,669	1,379,450														

### 3.3 MACRO FORECAST OF CONTAINER CARGO TRAFFIC FOR THE SIX MAJOR PORTS IN 2010

#### 3.3.1 Port of Belawan

(1) Socioeconomic framework of the hinterland

19. The hinterland of Belawan port is North Sumatera province, whose population will reach 13 million in 2010. According to the forecasted growth rate of GDP, the GRDP growth rate of the hinterland is estimated by applying the correlation between the GDP growth rate of Indonesia and the GRDP growth rate of North Sumatera province from 1984 to 1992.

20. The GRDP growth rate under each scenario is presented below.

**Table 3.18 GRDP Growth**

(Unit: %)

	1994-1998	199-2003	2004-2008	2009-2013	2014-2018
Scenario 1	8.4	8.6	9.0	9.6	10.3
Scenario 2	10.7	10.5	10.2	9.9	9.6
Scenario 3	8.1	8.1	8.1	8.1	8.1

(2) International container cargo traffic in 2010

21. Based on the statistics, international cargo is classified into export and import cargo, and further divided by cargo type such as liquid bulk cargo, dry bulk cargo, general cargo, bagged cargo, united cargo and container cargo. Elasticity between the increase rate of each cargo type and the GRDP growth rate is calculated, and by adopting this value, the future cargo volume of each cargo type is estimated for the three scenarios. The potential container cargo volume is estimated by assuming the final containerized ratio for each cargo type. The final containerized ratio for each cargo type is assumed as follows: 10 % of liquid bulk cargo will be containerized, dry bulk cargo will not be containerized, almost of general cargo will be containerized, 50 % of bagged cargo will be containerized and rest will change to dry bulk cargo. The growth of the

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containerized ratio is estimated from the correlation between the past trend and the logistic curve, and final containerized ratio is assumed 85 %, which is shown in Fig.3.8. The container cargo volume in the target year is forecast by multiplying the potential container cargo volume by the containerized ratio. The results are presented in Table 3.22 and .23 and summarized below.

**Table 3.19 International Potential Container Cargo Volume**

(Unit: 1,000 TEU)

Scenario	Export			Import			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
1							
2003	192	6	198	91	107	198	396
2010	324	10	334	187	147	334	668
2018	630	19	649	416	293	649	1,298
2							
2003	254	8	262	109	153	262	524
2010	465	14	479	240	239	479	958
2018	854	26	880	487	393	880	1,760
3							
2003	166	5	171	88	83	171	342
2010	245	7	252	171	81	252	504
2018	380	11	391	310	81	391	782

(3) Inter-island container cargo traffic in 2010

22. Based on the statistic, the inter-island cargo is classified into loading and unloading cargo, and further divided by cargo type such as liquid bulk cargo, dry bulk cargo, general cargo, bagged cargo, united cargo and container cargo. The elasticity

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between the increase rate of each cargo type and the GRDP growth rate is calculated, and by adopting this value, the future cargo volume of each cargo type is estimated for the three scenarios. The potential container cargo volume is estimated by assuming the final containerized ratio for each cargo type. The growth of the containerized ratio is estimated by the correlation between the past trend and the logistic curve. However, since inter-island container cargo has not yet been handled at the port of Belawan, the containerized ratio is estimated based on the actual ratio at Tanjung Priok, Tanjung Perak and Ujung Pandan (see Fig.3.9). The container cargo volume in the target year is forecast by multiplying the potential container cargo volume by the containerized ratio. The results are presented in The Table 3.24 and .25 and summarized the following Tables.

**Table 3.20 Inter-island Potential Container Cargo Volume**

(Unit: 1,000 TEU)

Scenario	Loading			Unloading			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
1							
2003	12	10	22	21	1	22	44
2010	54	50	104	102	2	104	208
2018	87	73	160	156	4	160	320
Scenario	Loading			Unloading			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
2							
2003	14	12	26	25	1	26	52
2010	68	63	131	128	3	131	262
2018	106	89	195	191	4	195	390
Scenario	Loading			Unloading			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
3							
2003	11	10	21	20	1	21	42
2010	49	45	94	92	2	94	188
2018	68	58	126	123	3	126	252

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23. The inter-island container cargo traffic in 2010 is further estimated by adopting the 1992 OD table of inter-island cargo shown in Table 3.16 [Oil and coal shipment are not included in these figures]. The inter-island container cargo volume through Belawan port is estimated in Table 3.17 and summarized below.

**Table 3.21 Domestic Container Cargo Volume**

(Unit: 1,000 TEU)

	Loading			Unloading			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
2010	54	50	104	91	13	104	208

### 3.3.2 Port of Panjang

(1) Socioeconomic framework of the hinterland

24. The hinterland of Panjang port is Lampung province, whose population will reach 16 million in 2010. The GRDP growth rate of the hinterland is estimated by applying the correlation between the GDP growth rate of Indonesia and the GRDP growth rate of Lampung province from 1984 to 1992.

25. The GRDP growth rate under each scenario is presented below.

**Table 3.26 GRDP Growth**

(Unit: %)

	1994-1998	199-2003	2004-2008	2009-2013	2014-2018
Scenario 1	7.5	8.1	8.1	8.1	8.2
Scenario 2	11.1	10.9	9.8	8.5	7.3
Scenario 3	7.2	7.3	6.8	6.4	5.6



Table 3.22 Forecast of Export Container Traffic Through The Port of Belawan  
(Scenario 1)

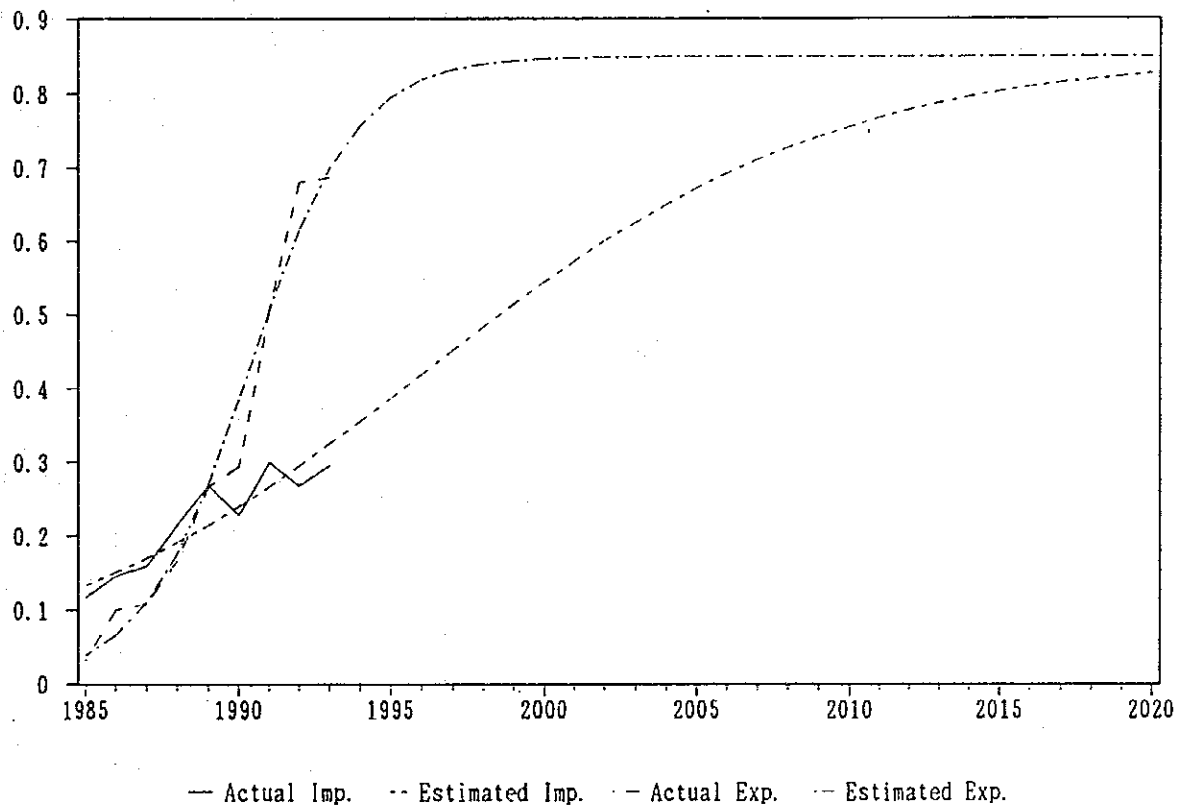
Year	GDP Increase Rate	Export GDP Ton	0.972 108.00%	105.57%	Petroleum		Liquid Bulk Cargo Ton	Accordit Agri. Ton	Dry Bulk Cargo Ton	Accordit Agri. Ton	General Cargo Ton	Potential Container Ton	Container Cargo Ton	share	Loaded TEU	Empty TEU	Total TEU	Average ton/TEU
					0.972	108.00%												
1985	4.04%														5,817	1,010	7,427	
1986	6.33%														171,561	479	14,249	
1987	8.71%														12,119	1,226	13,345	
1988	11.20%	2,437,077													17,937	1,089	19,026	
1989	9.60%	2,474,090	1.5%			178,201					1,664,405				28,348	1,026	29,974	
1990	8.32%	2,857,870	15.5%	10.1%		190,199	10.1%				1,623,970				28,348	1,026	29,974	
1991	7.62%	3,046,532	6.6%	13.0%		279,324	42.7%				1,743,049				37,409	2,059	40,168	
1992	8.52%	3,194,192	4.9%	83.8%		308,889	9.6%				1,380,653				51,321	1,448	52,769	
1993	8.70%	3,611,290	13.0%	-7.6%		643,674	109.7%				1,295,839				90,299	582	87,281	
1994*	8.70%	3,818,007	5.7%	33.2%		589,154	-8.5%				1,348,999				75,203	1,848	77,111	13.810
1995	8.58%	4,029,981	5.6%	4.9%		617,815	4.9%				1,445,091				83,888	2,517	86,405	13.5
1996	8.40%	4,246,720	5.4%	4.8%		677,453	4.7%				1,543,945				90,900	2,909	99,809	
1997	8.51%	4,479,492	5.5%	4.7%		709,402	4.7%				1,644,687				108,228	3,247	111,474	
1998	8.61%	4,729,070	5.6%	4.8%		743,405	4.8%				1,754,509				118,501	3,557	122,118	
1999	8.48%	4,988,111	5.5%	4.7%		778,458	4.7%				1,874,320				128,500	3,855	132,355	
2000	8.55%	5,263,848	5.5%	4.8%		815,448	4.8%				1,998,118				138,030	4,141	142,171	
2001	8.62%	5,558,227	5.6%	4.8%		854,490	4.8%				2,131,781				147,782	4,433	152,215	
2002	8.76%	5,873,319	5.7%	4.8%		895,788	4.8%				2,270,179				157,980	4,739	162,720	
2003	8.80%	6,210,829	5.7%	4.9%		939,472	4.9%				2,432,073				168,818	5,005	173,883	
2004	8.94%	6,572,624	5.8%	5.0%		985,709	4.9%				2,602,397				182,949	5,413	185,847	
2005	9.03%	6,960,745	5.9%	5.0%		1,034,671	5.0%				2,789,001				192,949	5,788	198,737	
2006	9.13%	7,377,426	6.0%	5.0%		1,080,544	5.0%				2,989,001				200,475	6,194	212,609	
2007	9.25%	7,826,880	6.1%	5.1%		1,141,678	5.1%				3,204,100				221,126	6,034	227,759	
2008	9.30%	8,312,180	6.2%	5.1%		1,200,314	5.1%				3,441,792				237,097	7,113	244,210	
2009	9.47%	8,836,731	6.3%	5.2%		1,262,718	5.2%				3,701,875				254,533	7,630	262,169	
2010	9.59%	9,404,397	6.4%	5.3%		1,329,170	5.3%				3,986,738				273,592	8,208	281,800	
2011	9.73%	10,019,097	6.5%	5.3%		1,400,001	5.3%				4,299,053				294,450	8,833	303,283	
2012	9.87%	10,687,660	6.7%	5.4%		1,475,685	5.4%				4,641,811				317,300	9,519	326,819	
2013	10.02%	11,415,661	6.8%	5.5%		1,556,629	5.5%				5,019,084				342,448	10,273	352,721	
2014	10.17%	12,209,415	7.0%	5.6%		1,643,273	5.6%				5,436,779				370,158	11,105	381,263	
2015	10.32%	13,076,038	7.1%	5.6%		1,736,959	5.6%				5,897,741				400,732	12,022	412,754	
2016	10.48%	14,023,525	7.2%	5.7%		1,835,038	5.7%				6,407,820				434,509	13,035	447,544	
2017	10.64%	15,060,879	7.4%	5.8%		1,942,469	5.8%				6,972,990				471,875	14,150	488,031	
2018	10.80%	16,198,251	7.6%	5.9%		2,059,234	5.9%				7,600,017				513,205	15,398	528,603	
2019	10.96%	17,447,110	7.7%	6.0%		2,180,638	6.0%				8,281,029				559,170	16,775	575,951	
2020	11.12%	18,820,430	7.9%	6.1%		2,313,455	6.1%				9,029,905				606,896	18,305	628,477	

Source : PTP I and Estimated by The Study Team

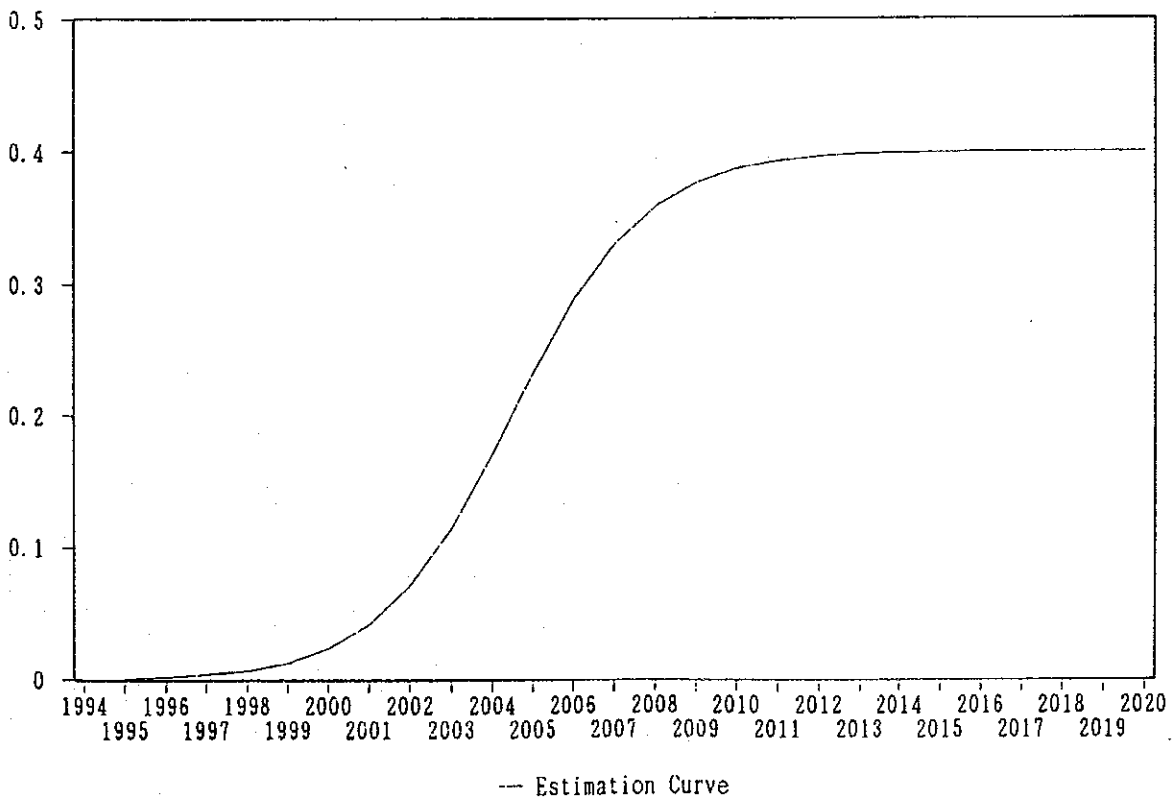
Table 3.23 Forecast of Export Container Traffic Through The Port of Belawan  
(Scenario 1)

Year	GDP Increase Rate	Import GDP Ton	0.989 107.42%	Liquid Bulk Cargo Ton	0.99 107.15%	Dry Bulk Cargo Ton	1.00 111.79%	General Cargo Ton	0.81 102.31%	Potential Container Cargo Ton	Container share	Loaded TEU	Empty TEU	Total TEU	Average ton/TEU
1985	4.04%											2,308	968	3,303	11.7%
1986	6.33%											4,182	2,085	6,867	14.5%
1987	8.71%											7,210	4,838	12,048	16.0%
1988	11.23%	774,618		16,325	105,924	13,07%		652,368				9,331	8,248	17,579	21.5%
1989	9.60%	1,085,401		17,975	110,622	10.74%		950,804	45.75%			12,018	17,422	29,440	26.9%
1990	8.32%	1,210,575		18,534	157,017	12.97%		1,030,832	8.85%			16,082	22,578	38,060	22.8%
1991	7.02%	1,030,383		20,082	192,390	18.67%		754,081	27.14%			15,043	34,145	49,768	30.0%
1992	8.52%	1,353,082		63,857	345,722	25.54%		858,135	13.80%			17,011	49,109	66,120	20.8%
1993	8.94%	1,500,734		35,605	386,478	25.75%		1,041,550	21.37%			22,795	52,908	75,403	29.5%
1994	8.70%	1,614,493		38,209	420,324	26.76%		1,105,901	6.18%			20,092	59,712	80,405	32.5%
1995	8.58%	1,733,991		40,995	456,375	26.58%		1,186,622	7.30%			31,346	68,521	99,869	35.5%
1996	8.40%	1,859,300		43,843	494,710	26.40%		1,270,747	7.03%			36,542	74,932	111,474	38.7%
1997	8.51%	1,995,608		46,935	530,789	26.51%		1,301,825	7.17%			42,391	79,727	122,118	41.9%
1998	8.61%	2,144,022		50,294	583,021	26.01%		1,460,707	7.25%			48,930	83,419	132,355	45.1%
1999	8.49%	2,300,833		53,832	632,509	27.71%		1,504,492	7.11%			56,098	80,075	142,171	48.2%
2000	8.55%	2,470,607		57,654	680,013	27.55%		1,676,340	7.15%			63,973	88,242	152,215	51.3%
2001	8.02%	2,654,532		61,786	745,801	28.02%		1,789,945	7.19%			72,593	90,127	162,720	54.4%
2002	8.70%	2,854,214		60,261	810,078	28.70%		1,927,275	7.25%			81,990	91,893	173,883	57.2%
2003	8.78%	3,071,170		71,112	881,845	28.76%		2,068,212	7.31%			92,195	93,653	185,847	60.0%
2004	8.80%	3,307,077		70,376	959,974	28.80%		2,220,727	7.37%			103,242	95,495	198,737	62.5%
2005	8.94%	3,563,793		82,090	1,045,814	29.94%		2,385,889	7.44%			115,173	97,490	212,669	64.9%
2006	9.03%	3,843,370		88,301	1,140,202	29.03%		2,504,874	7.50%			128,035	99,724	227,759	67.2%
2007	9.13%	4,149,044		95,075	1,244,353	29.13%		2,759,010	7.59%			141,920	102,290	244,210	69.2%
2008	9.25%	4,483,587		102,475	1,359,402	29.25%		2,971,711	7.65%			150,907	105,202	256,109	71.0%
2009	9.30%	4,850,132		110,564	1,480,029	29.30%		3,202,939	7.78%			173,091	108,709	281,800	72.7%
2010	9.47%	5,252,185		119,418	1,627,480	29.47%		3,455,280	7.88%			190,582	112,701	303,283	74.2%
2011	9.59%	5,693,680		129,120	1,783,592	29.59%		3,730,968	7.98%			209,507	117,312	326,819	75.5%
2012	9.73%	6,180,145		139,788	1,957,107	29.70%		4,033,190	8.10%			230,050	122,005	352,055	77.0%
2013	9.87%	6,716,888		151,534	2,150,424	29.87%		4,384,930	8.23%			252,408	128,854	381,263	78.7%
2014	10.02%	7,309,950		164,484	2,365,898	30.02%		4,729,548	8.35%			270,773	135,981	406,754	79.5%
2015	10.17%	7,966,101		178,783	2,600,465	30.17%		5,130,832	8.48%			303,387	144,157	447,544	79.5%
2016	10.32%	8,693,169		194,594	2,875,507	30.32%		5,573,068	8.62%			332,519	153,511	486,031	80.3%
2017	10.48%	9,499,970		212,102	3,176,768	30.48%		6,061,100	8.70%			364,477	164,189	528,666	80.9%
2018	10.64%	10,390,000		231,517	3,514,044	30.64%		6,600,445	8.90%			399,008	170,343	575,951	81.4%
2019	10.80%	11,394,578		253,081	3,894,168	30.80%		7,197,328	9.04%			438,310	190,107	628,417	81.9%
2020	10.90%	12,507,070		277,009	4,321,145	30.90%		7,858,857	9.19%			481,032	205,870	686,903	82.3%

Source : PIP1 and Estimated by The Study Team



**Fig. 3.8 Estimation of Export & Import Container Ratio**  
(Unit %)



**Fig. 3.9 Estimation for Container Ratio**  
(Unit : %)

Table 3.24 Forecast of Inter-island Container Cargo Traffic at Port of Belawan  
(Scenario 1)

Type of Trade Unloading

Port Unit	GDP Increase Rate	Belawan Ton	Petroleum Cargo			Form of Cargo			Total General Cargo Ton	Potential Container Ton	Container Cargo Ton	Ratio	Loaded Container TEU	Container Empty TEU	Total TEU
			Cargo Ton	Liquid Bu) Cargo Ton	Dry Cargo Ton	Bulk Cargo Ton	General Cargo Ton	General Cargo Ton							
1984	7.52%	0.955	0.955	1.065	0.932										
1985	4.04%	103.26%	103.20%	115.16%	100.79%										
1986	6.33%	108.09%	108.09%	108.09%	108.09%										
1987	8.71%														
1988	11.29%	3,873,496	1,246,254	94,653	454,543	2,078,046	2,078,046	2,078,046	2,087,511	1,414,859	0.11%	140	3	143	
1989	9.60%	3,984,921	1,372,129	104,213	500,453	2,008,127	2,008,127	2,008,127	2,018,548	1,498,318	0.21%	274	5	279	
1990	8.32%	4,272,609	1,312,924	260,302	720,991	1,978,392	1,978,392	1,978,392	2,004,422	1,581,931	0.38%	535	11	546	
1991	7.62%	4,235,452	1,361,002	144,080	775,365	1,955,005	1,955,005	1,955,005	1,969,413	1,609,611	0.71%	1,042	21	1,063	
1992	8.52%	4,419,431	1,426,254	204,767	1,560,156	1,228,254	1,228,254	1,228,254	1,248,731	1,950,890	2.35%	3,825	40	2,050	
1993	8.94%	4,547,833	1,458,491	191,723	1,584,908	1,312,711	1,312,711	1,312,711	1,391,883	2,051,343	4.17%	7,122	142	3,902	
1994	8.76%	4,725,212	1,514,397	209,612	1,607,306	1,475,442	1,475,442	1,475,442	1,498,318	2,156,144	7.11%	12,778	256	13,034	
1995	8.58%	4,901,350	1,569,834	228,766	1,627,314	1,557,007	1,557,007	1,557,007	1,581,931	2,265,513	11.47%	21,661	433	22,095	
1996	8.40%	5,075,782	1,624,649	249,240	1,644,886	1,642,428	1,642,428	1,642,428	1,669,611	2,498,869	17.12%	33,947	679	34,626	
1997	8.51%	5,261,542	1,683,018	271,827	1,664,269	1,731,964	1,731,964	1,731,964	1,761,641	2,581,591	23.27%	48,466	969	49,435	
1998	8.61%	5,458,479	1,745,204	296,770	1,685,542	1,822,020	1,822,020	1,822,020	1,854,381	2,753,892	28.85%	63,074	1,261	64,336	
1999	8.49%	5,658,372	1,807,613	323,609	1,705,130	1,915,579	1,915,579	1,915,579	1,950,890	2,890,922	33.12%	76,008	1,520	77,528	
2000	8.55%	5,868,057	1,873,387	353,101	1,725,989	2,012,790	2,012,790	2,012,790	2,051,343	2,890,922	35.98%	86,684	1,734	88,417	
2001	8.62%	6,089,236	1,942,742	385,531	1,748,172	2,114,018	2,114,018	2,114,018	2,156,144	2,890,922	37.73%	95,430	1,909	97,338	
2002	8.70%	6,323,326	2,016,123	421,263	1,771,923	2,219,446	2,219,446	2,219,446	2,265,513	3,034,774	38.75%	102,873	2,192	104,931	
2003	8.78%	6,571,238	2,093,813	460,664	1,797,315	2,329,292	2,329,292	2,329,292	2,379,677	3,185,817	39.32%	109,579	2,319	111,771	
2004	8.86%	6,833,952	2,176,114	504,148	1,824,427	2,443,651	2,443,651	2,443,651	2,498,869	3,344,425	39.63%	115,971	2,446	118,290	
2005	8.94%	7,112,534	2,263,358	552,178	1,853,347	2,562,796	2,562,796	2,562,796	2,623,323	3,511,593	39.80%	122,314	2,575	124,760	
2006	9.03%	7,408,138	2,355,901	605,275	1,884,166	2,687,473	2,687,473	2,687,473	2,753,892	3,687,814	39.94%	128,772	2,709	131,348	
2007	9.13%	7,723,754	2,454,684	664,181	1,917,416	2,817,901	2,817,901	2,817,901	2,890,922	3,873,589	39.94%	135,451	2,848	138,160	
2008	9.25%	8,061,024	2,560,216	729,607	1,953,241	2,954,538	2,954,538	2,954,538	3,034,774	4,069,423	39.97%	142,416	2,994	145,264	
2009	9.36%	8,421,752	2,673,055	802,359	1,991,800	3,097,481	3,097,481	3,097,481	3,185,817	4,275,814	39.98%	149,712	2,994	152,706	
2010	9.47%	8,807,916	2,793,816	883,353	2,033,266	3,247,822	3,247,822	3,247,822	3,344,425	4,493,245	39.99%	157,370	3,147	160,518	
2011	9.59%	9,221,690	2,923,171	973,630	2,077,827	3,404,135	3,404,135	3,404,135	3,511,593	4,722,175	40.00%	165,414	3,308	168,722	
2012	9.73%	9,667,191	3,062,409	1,074,581	2,126,067	3,569,051	3,569,051	3,569,051	3,687,814	5,216,113	40.00%	173,859	3,477	177,336	
2013	9.87%	10,147,383	3,212,448	1,187,631	2,178,253	3,742,147	3,742,147	3,742,147	3,873,589						
2014	10.02%	10,665,553	3,374,306	1,314,419	2,234,680	3,923,740	3,923,740	3,923,740	4,069,423						
2015	10.17%	11,225,360	3,549,119	1,456,828	2,295,673	4,114,111	4,114,111	4,114,111	4,275,814						
2016	10.32%	11,830,874	3,738,146	1,617,028	2,361,589	4,313,493	4,313,493	4,313,493	4,493,245						
2017	10.48%	12,486,637	3,942,793	1,797,526	2,432,824	4,522,054	4,522,054	4,522,054	4,722,175						
2018	10.64%	13,197,717	4,164,031	2,001,217	2,509,817	4,739,870	4,739,870	4,739,870	4,963,015						
2019	10.80%	13,969,785	4,405,412	2,231,456	2,593,047	4,966,900	4,966,900	4,966,900	5,216,113						
2020	10.96%	14,809,191	4,667,102	2,492,133	2,683,056										

Source : Statistics of The Port of Belawan and Estimated by the Study Team

Table 3.25 Forecast of Inter-island Container Cargo Traffic at Port of Belawan

(Scenario 1)

Loading

Port	GDP Increase Rate	Belawan		Form of Cargo			Total General Cargo Ton	Potential Container Ton	Container Cargo Ton	Ratio	Container		Total TEU
		Ton	Ton	Petroleum Cargo Ton	Liquid Bul Cargo Ton	Dry Bulk Cargo Ton					Loaded Container TEU	Empty Container TEU	
1984	7.52%			0.000	0.926	1.038	0.961						
1985	4.04%			0.00%	100.07%	112.19%	103.86%						
1986	6.33%			108.03%	108.03%	108.03%	108.09%						
1987	8.71%												
1988	11.29%	920,359		81,772	276,109	41,069	521,408	549,019					
1989	9.60%	1,269,659		90,031	303,996	45,218	830,414	860,813					
1990	8.32%	1,397,033		71,897	596,639	78,879	649,618	709,282					
1991	7.62%	1,280,948		10,953	534,435	55,441	680,119	733,562					
1992	8.52%	1,494,400			609,909	173,676	650,755	717,752					
1993	8.94%	1,276,510			535,151	111,372	629,987	683,502					
1994	8.76%	1,317,609		0	538,820	120,467	658,323	712,205					
1995	8.58%	1,358,504		0	541,613	130,101	686,790	740,952					
1996	8.40%	1,399,147		0	543,533	140,292	715,322	769,675					
1997	8.51%	1,443,176		0	545,992	151,419	745,705	800,364					
1998	8.61%	1,490,853		0	549,004	163,579	778,270	833,171					
1999	8.49%	1,539,188		0	551,309	176,527	811,262	866,402					
2000	8.55%	1,590,910		0	554,140	190,607	846,104	901,578					
2001	8.62%	1,646,270		0	557,235	205,928	883,107	938,830					
2002	8.70%	1,705,715		0	560,753	222,632	922,330	978,406					
2003	8.78%	1,769,567		0	564,707	240,857	964,003	1,026,474					
2004	8.86%	1,838,177		0	569,113	260,755	1,008,309	1,065,220					
2005	8.94%	1,911,931		0	573,986	282,497	1,055,447	1,112,846					
2006	9.03%	1,991,250		0	579,344	306,271	1,105,635	1,163,569					
2007	9.13%	2,077,064		0	585,338	332,358	1,159,368	1,217,902					
2008	9.25%	2,169,961		0	591,996	361,012	1,216,953	1,276,152					
2009	9.36%	2,270,592		0	599,351	392,518	1,278,723	1,338,658					
2010	9.47%	2,379,681		0	607,439	427,196	1,345,047	1,405,791					
2011	9.59%	2,498,030		0	616,297	465,406	1,416,333	1,477,962					
2012	9.73%	2,627,015		0	626,081	507,640	1,493,295	1,555,903					
2013	9.87%	2,767,712		0	636,847	554,381	1,576,484	1,640,169					
2014	10.02%	2,921,351		0	648,656	606,179	1,666,516	1,731,381					
2015	10.17%	3,089,311		0	661,579	663,058	1,704,074	1,830,232					
2016	10.32%	3,273,146		0	675,692	727,530	1,869,923	1,937,492					
2017	10.48%	3,474,004		0	691,079	798,005	1,984,919	2,054,027					
2018	10.64%	3,695,602		0	707,835	877,808	2,110,020	2,180,803					
2019	10.80%	3,938,557		0	726,061	966,196	2,246,301	2,318,907					
2020	10.96%	4,205,823		0	745,874	1,004,980	2,394,969	2,469,550					

Source : Statistics of The Port of Belawan and Estimated by The Study Team

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(2) International container cargo traffic in 2010

26. International cargo is classified into export and import cargo, and further divided by cargo type such as liquid bulk cargo, dry bulk cargo, general cargo, bagged cargo, united cargo and container cargo. Elasticity between the increase rate of each cargo type and the GRDP growth rate is calculated, and by adopting this value, the future cargo volume of each cargo type is estimated for the three scenarios. The potential container cargo volume is estimated by assuming the final containerized ratio for each cargo type. The growth of the containerized ratio is estimated from the correlation between the past trend and the logistic curve, which is shown in Fig.3.8. The container cargo volume in the target year is forecast by multiplying the potential container cargo volume by the containerized ratio. The results are presented in the Table 3.30 and .31 and summarized below.

**Table 3.27 International Potential Container Cargo Volume**

(Unit: 1,000 TEU)

Scenario	Export			Import			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
1							
2003	58	4	62	13	49	62	124
2010	99	7	106	17	89	106	212
2018	185	15	200	25	175	200	400
Scenario	Export			Import			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
2							
2003	76	5	81	19	62	81	162
2010	122	7	129	29	100	129	258
2018	180	9	189	40	149	189	378
Scenario	Export			Import			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
3							
2003	56	4	60	14	46	60	120
2010	75	4	79	18	61	79	158
2018	96	5	101	22	79	101	202

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(3) Inter-island container cargo traffic in 2010

27. The inter-island cargo is classified into loading and unloading cargo, and further divided by cargo type such as liquid bulk cargo, dry bulk cargo, general cargo, bagged cargo, united cargo and container cargo. The elasticity between the increase rate of each cargo type and the GRDP growth rate is calculated, and by adopting this value, the future cargo volume of each cargo type is estimated for the three scenarios. The potential container cargo volume is estimated by assuming the final containerized ratio for each cargo type. The growth of the containerized ratio is estimated by the correlation between the past trend and the logistic curve. However, since inter-island container cargo has not yet been handled at the port of Belawan, the containerized ratio is estimated based on the actual ratio at Tanjung Priok, Tanjung Perak and Ujung Pandan (see Fig.3.9). The container cargo volume in the target year is forecast by multiplying the potential container cargo volume by the containerized ratio. The results are presented in The Table 3.32 and .33 and summarized in the following Tables.

**Table 3.28 Inter-island Potential Container Cargo Volume**

(Unit: 1,000 TEU)

Scenario	Loading			Unloading			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
1							
2003	9	3	12	11	1	12	24
2010	47	19	66	63	3	66	132
2018	80	40	120	116	4	120	240
Scenario	Loading			Unloading			Total
2	Loaded	Empty	Total	Loaded	Empty	Total	
2003	12	4	16	15	1	16	32
2010	67	28	95	90	5	95	190
2018	110	57	167	162	5	167	334

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Scenario	Loading			Unloading			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
3							
2003	9	3	12	11	1	12	24
2010	41	17	58	55	3	58	116
2018	58	30	88	85	3	88	176

28. The inter-island container cargo traffic in 2010 is further estimated by adopting the 1992 OD table of inter-island cargo shown in Table 3.16 [Oil and coal shipment are not included in these figures]. The inter-island container cargo volume through Panjang port is estimated in Table 3.17 and summarized below.

**Table 3.29 Domestic Container Cargo Volume**

(Unit: 1,000 TEU)

	Loading			Unloading			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
2010	1	65	66	54	12	66	132



Table 3.30 Forecast of International Container cargo Traffic at Port of Panjang

(Scenario 1)

Type of Trade Export

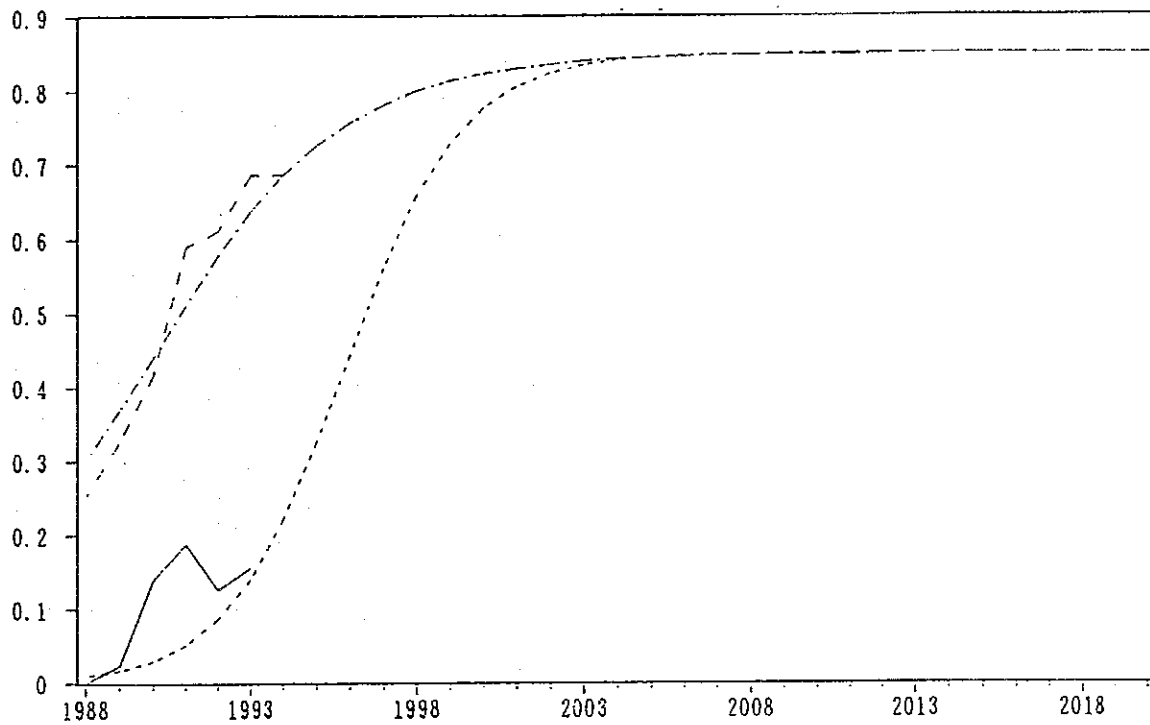
Year	GDP Increase Rate	Panjang Total Ton	Form of Cargo			General Cargo Ton	General Cargo Ton	General Cargo Ton	Potential Container Cargo Ton	Container Cargo Ton	Ratio	Loaded Container TEU	Empty Container TEU	Total TEU
			Bagged Cargo Ton	Dry Bulk Cargo Ton	Liquid Bulk Cargo Ton									
1978		369,488	0.927	0.957	0.929	0.981								
1979		486,404	98.41%	102.70%	99.68%	105.29%								
1980		409,887	107.33%	107.33%	107.33%	107.33%								
1981		377,519												
1982		240,344												
1983		306,823												
1984	11.87%	421,521												
1985	7.35%	503,973												
1986	9.92%	450,819												
1987	9.53%	697,255												
1988	7.53%	790,978												
1989	8.21%	1,181,707												
1990	7.84%	1,347,147												
1991	4.77%	1,039,358												
1992	7.61%	1,266,877												
1993	7.98%	1,341,564												
1994	7.82%	1,396,840												
1995	7.66%	1,452,343												
1996	7.59%	1,507,226												
1997	7.59%	1,567,226												
1998	7.69%	1,630,400												
1999	8.07%	1,702,273												
2000	8.08%	1,856,283												
2001	8.08%	2,025,154												
2002	8.09%	2,115,633												
2003	8.09%	2,210,412												
2004	8.10%	2,309,704												
2005	8.11%	2,413,762												
2006	8.11%	2,522,828												
2007	8.12%	2,637,158												
2008	8.12%	2,757,021												
2009	8.13%	3,152,814												
2010	8.14%	3,297,903												
2011	8.15%	3,509,935												
2012	8.16%	3,777,655												
2013	8.17%	4,138,611												
2014	8.18%	4,332,763												
2015														
2016														
2017														
2018														
2019														
2020														

Source : Statistics of Port of Panjang and Estimated by The Study Team

Table 3.31 Forecast of International Container Cargo Traffic at Port of Panjang  
(Scenario 1)

Port Year	GDP Increase Rate	Type of Trade	Import		Form of Cargo			General Cargo Ton	Container		Potential Container Ton	Container		Total TEU
			Panjang Total Ton	0.561 8.27% 4.64%	Conventional Cargo Ton	Repacked Cargo Ton	Dry Bulk Cargo Ton		Liquid Bul Cargo Ton	General Cargo Ton		Container Cargo Ton	Container Cargo Ton	
1978			63,125			0.949	0.964	0.946	0.977					
1979			87,863	39.19%		101.88%	103.49%	101.51%	104.90%					
1980			127,790	45.44%		107.33%	107.33%	107.33%	107.33%					
1981			62,995	-50.70%										
1982			147,151	133.59%										
1983			120,682	-17.99%										
1984	11.87%		98,330	-18.52%										
1985	7.35%		65,633	-32.17%										
1986	9.92%		70,234	-27.32%										
1987	7.59%		195,904	178.93%	195,904	107,215	6,000	57,321	25,367	?	84,707	?	?	?
1988	8.21%		212,217	8.33%	211,800	111,424	6,717	45,314	48,345	2,532	111,121	2,532	417	6,972
1989	7.84%		166,187	-21.69%	164,805	97,283	5,430	37,169	24,923	12,661	89,943	12,661	1,382	8,493
1990	4.77%		133,082	-19.92%	131,621	67,623	3,779	35,428	24,791	39,218	14,427	14,427	1,401	8,914
1991	7.61%		240,454	80.68%	238,842	117,681	13,371	61,772	46,018	61,984	15,966	15,966	1,612	12,792
1992	7.98%		189,917	-21.02%	188,068	88,717	7,122	47,884	44,345	61,612	17,267	17,267	1,849	19,987
1993	7.82%		211,952	11.60%		90,796	7,404	48,827	39,432	64,926	25,494	25,494	2,684	19,588
1994	7.60%		218,499	3.09%		92,784	7,685	49,713	29,294	68,317	119,680	39,023	4,108	21,420
1995	7.50%		224,963	2.96%		94,677	7,960	50,541	68,878	71,778	124,171	55,293	5,820	23,021
1996	7.59%		231,868	3.07%		96,604	8,264	51,429	56,564	75,462	128,971	72,407	7,622	24,677
1997	7.69%		239,246	3.18%		98,841	8,580	52,378	45,791	79,447	134,105	88,314	9,296	26,656
1998	8.07%		247,784	3.57%		101,399	8,941	53,534	37,935	83,916	102,171	139,966	10,755	29,217
1999	8.08%		256,687	3.59%		104,015	9,317	54,717	32,485	88,639	113,633	146,118	11,961	32,351
2000	8.08%		265,373	3.62%		109,472	9,708	55,927	29,367	93,631	123,210	152,577	12,969	36,079
2001	8.08%		275,662	3.64%		112,313	10,117	57,166	27,817	98,907	131,542	159,360	13,847	40,422
2002	8.08%		285,774	3.67%		115,231	10,543	58,435	27,314	104,484	139,169	173,967	14,949	48,424
2003	8.09%		296,331	3.69%		118,228	10,988	59,735	27,489	110,378	146,478	181,830	15,419	51,147
2004	8.10%		318,866	3.72%		121,309	11,452	61,063	28,102	116,610	153,728	181,830	16,182	54,015
2005	8.10%		330,896	3.75%		124,475	11,935	62,424	29,004	123,197	161,089	190,094	16,957	57,031
2006	8.11%		343,471	3.80%		127,730	12,440	63,819	30,108	130,162	168,674	198,782	17,755	60,202
2007	8.11%		356,019	3.83%		131,075	13,516	65,711	32,731	145,316	184,794	217,525	18,585	63,538
2008	8.12%		370,369	3.85%		134,515	14,090	68,211	34,205	153,554	193,427	227,632	19,452	67,050
2009	8.13%		384,753	3.88%		141,689	15,313	72,939	37,440	162,266	202,491	238,266	20,361	70,752
2010	8.13%		399,807	3.91%		145,431	15,965	76,748	39,199	171,482	212,019	249,459	21,315	74,655
2011	8.14%		415,567	3.94%		149,281	16,646	79,595	41,055	181,232	222,043	261,241	22,318	78,774
2012	8.14%		432,071	3.97%		153,242	17,358	82,924	43,012	191,548	232,593	273,548	23,373	83,122
2013	8.15%		449,357	4.00%		157,318	18,100	86,748	45,074	202,464	243,703	286,714	24,484	87,714
2014	8.15%		467,470	4.03%		161,513	18,876	90,636	47,248	214,015	255,403	300,478	25,653	92,566
2015	8.16%		486,452	4.06%		165,831	19,686	94,538	49,540	226,239	267,730	314,978	26,885	97,693
2016	8.17%		506,352	4.09%		170,275	20,533	98,538	51,955	239,178	280,719	330,259	28,182	103,112
2017	8.17%		527,219	4.12%		174,850	21,417	102,538	54,502	252,873	294,409	346,364	29,549	108,842
2018	8.18%		549,107	4.15%						267,371	308,841	363,343	30,990	114,900
2019													32,510	121,307
2020														

Source : Statistics of Port of Panjang and Estimated by The Study Team



— Actual Imp.    ··· Estimated Imp.    - - Actual Exp.    - - Estimated Exp.

**Fig. 3.10 Forecast of Container Rate at Port of Panjang**  
(Unit: %)

Table 3.32 Forecast of Inter-Island Container Cargo Traffic at Port of Panjang

(Scenario 1)

Leading

Type of Trade

Port Unit	GDP Increase Rate	Panjang		Form of Cargo			General Cargo Ton	Potential Container Ton	Container Cargo Ton	Ratio	Container		Total TEU
		Bagged Cargo Ton	Dry Bulk Cargo Ton	Liquid Bul Cargo Ton	Loaded Container TEU	Empty Container TEU							
1978		67,330	0.960	0.947	1.005	0.995					57	13	70
1979		48,458	103.02%	101.61%	107.85%	106.73%	47,399	158,275	710	0.11%	111	27	138
1980		66,950	107.28%	107.28%	107.28%	107.28%	208,353	467,982	1,387	0.21%	217	55	271
1981		54,909					156,039	483,841	2,707	0.38%	422	112	534
1982		51,008					170,919	428,453	5,271	0.71%	818	228	1,047
1983		37,185					201,282	485,667	10,230	1.30%	1,569	458	2,027
1984	11.87%	58,241					270,350	569,985	19,617	2.35%	2,946	896	3,842
1985	7.35%	183,798					289,909	601,488	114,096	7.11%	9,128	3,010	12,137
1986	9.92%	572,658					310,604	633,986	180,655	17.12%	14,452	4,949	19,401
1987	9.53%	918,266					332,184	667,474	260,754	23.27%	20,860	7,408	28,268
1988	7.59%	1,357,345					355,577	703,574	343,283	28.85%	27,463	10,099	37,562
1989	8.21%	2,666,797					380,954	742,522	418,625	33.12%	33,490	12,737	46,227
1990	7.84%	3,644,210					409,588	786,654	483,309	35.98%	38,665	15,191	53,855
1991	4.77%	4,554,081					440,387	833,694	538,816	37.73%	43,105	17,474	60,579
1992	7.61%	5,090,688					473,514	883,850	588,400	38.75%	47,072	19,667	66,739
1993	7.98%	4,894,758					509,150	937,346	635,112	39.32%	50,809	21,856	72,665
1994	7.82%						547,486	994,422	718,949	39.63%	54,498	24,113	78,611
1995	7.66%						588,728	1,055,333	828,279	39.80%	58,262	26,491	84,753
1996	7.50%						633,098	1,120,356	833,816	39.89%	62,185	29,029	91,214
1997	7.59%						680,895	1,189,786	846,980	39.94%	66,323	31,761	98,084
1998	7.69%						732,204	1,263,955	883,816	39.97%	70,719	34,713	105,433
1999	8.07%						787,485	1,343,209	937,346	39.98%	75,409	37,911	113,320
2000	8.08%						846,980	1,427,918	979,933	39.99%	80,422	41,380	121,801
2001	8.08%						883,816	1,518,482	1,054,129	40.00%	85,788	45,144	130,932
2002	8.08%						937,346	1,615,334	1,134,008		91,537	49,231	140,769
2003	8.09%						994,422	1,718,949	1,220,013				
2004	8.10%						1,055,333	1,828,279	1,312,622				
2005	8.10%						1,120,356	1,948,521	1,412,622				
2006	8.11%						1,189,786	2,075,603	1,519,348				
2007	8.11%						1,263,955	2,211,706	1,635,423				
2008	8.12%						1,343,209	2,357,509	1,760,019				
2009	8.12%						1,427,918	2,513,745	1,894,237				
2010	8.12%						1,518,482	2,681,201	2,072,350				
2011	8.12%						1,615,334	2,860,730	2,263,624				
2012	8.13%						1,718,949	3,052,207	2,479,953				
2013	8.13%						1,828,279	3,263,624	2,707,346				
2014	8.14%						1,948,521	3,485,207	2,950,152				
2015	8.15%						2,075,603	3,728,279	3,211,706				
2016	8.15%						2,211,706	3,987,346	3,485,207				
2017	8.16%						2,357,509	4,263,624	3,771,348				
2018	8.17%						2,513,745	4,554,081	4,072,348				
2019	8.17%						2,681,201	4,854,081	4,385,207				
2020	8.18%						2,860,730	5,144,218	4,718,207				

Source : Statistics of Port of Panjang and Estimated by The Study Team

Table 3.33 Forecast of Inter-Island Container Cargo Traffic at Port of Panjang

(Scenario 1)

Type of Trade Unloading

Port	GDP Increase Rate	Panjang	Form of Cargo			General Cargo	Potential Container	Container Cargo	Ratio	Loaded Container	Container Empty	Total
Unit		Ton	Bagged Cargo	Dry Bulk Cargo	Liquid Cargo	Ton	Container	Ton		TEU	TEU	TEU
1978		559,034	0,986	1,000	0,988	1,024						
1979		613,532	105,77%	113,69%	105,97%	109,90%						
1980		654,841	107,28%	107,28%	107,28%	107,28%						
1981		580,939										
1982		617,906										
1983		513,172										
1984	11,87%	572,722										
1985	7,35%	710,821										
1986	9,92%	822,455										
1987	9,53%	920,021										
1988	7,59%	809,054	462,784	24,780	236,728	104,762	349,827					
1989	8,21%	879,959	462,929	27,906	200,859	200,859	451,150					
1990	7,84%	1,027,550	606,551	33,854	231,749	155,395	481,846					
1991	4,77%	1,035,947	532,242	29,740	278,842	195,123	489,123					
1992	7,61%	1,197,283	589,917	67,027	309,655	230,683	556,607					
1993	7,98%	1,242,712	586,221	47,060	316,408	293,024	617,775					
1994	7,82%		623,177	50,959	336,994	316,495	601,784					
1995	7,66%		661,473	55,095	358,384	341,325	707,899	793	0,11%	63	70	
1996	7,50%		701,091	59,474	380,571	367,549	756,152	1,571	0,21%	126	138	
1997	7,59%		743,735	64,260	404,487	396,144	808,461	3,111	0,38%	249	271	
1998	7,69%		789,673	69,497	430,288	427,352	885,217	6,142	0,71%	491	534	
1999	8,07%		841,420	75,441	459,357	462,688	929,334	12,085	1,30%	967	1,047	
2000	8,07%		896,581	81,896	490,402	500,960	998,291	23,490	2,35%	1,879	2,027	
2001	8,08%		955,384	88,906	523,560	542,413	1,072,461	44,678	4,17%	3,574	3,842	
2002	8,08%		1,018,078	96,519	558,978	587,315	1,152,251	81,945	7,11%	6,556	7,024	
2003	8,08%		1,084,920	104,788	596,811	635,955	1,238,090	142,054	11,47%	11,364	12,137	
2004	8,09%		1,156,190	113,770	637,226	688,648	1,330,465	227,752	17,12%	18,220	19,401	
2005	8,09%		1,232,183	123,525	680,401	745,731	1,429,863	332,789	23,27%	26,623	28,268	
2006	8,10%		1,313,216	134,122	726,526	807,576	1,536,836	443,415	28,85%	35,473	37,562	
2007	8,10%		1,399,641	145,635	775,813	874,588	1,651,990	547,144	33,12%	43,771	46,227	
2008	8,11%		1,491,822	158,144	828,481	947,206	1,775,966	639,023	35,98%	51,122	53,855	
2009	8,11%		1,590,148	171,735	884,766	1,025,903	1,909,453	720,521	37,73%	57,642	60,579	
2010	8,12%		1,695,035	186,504	944,819	1,111,191	2,053,201	795,599	38,75%	63,648	66,739	
2011	8,12%		1,806,928	202,534	1,009,212	1,203,630	2,208,015	808,140	39,32%	69,451	72,665	
2012	8,13%		1,926,317	219,998	1,077,940	1,303,835	2,374,787	941,134	39,03%	75,291	78,611	
2013	8,13%		2,053,715	238,959	1,151,416	1,412,466	2,554,466	1,016,986	39,80%	81,935	84,753	
2014	8,14%		2,189,670	259,570	1,229,975	1,530,243	2,748,075	1,096,274	39,89%	87,702	91,214	
2015	8,15%		2,334,768	281,978	1,313,973	1,657,943	2,956,724	1,180,977	39,94%	94,478	98,084	
2016	8,15%		2,489,630	306,340	1,403,796	1,796,415	3,181,612	1,271,654	39,97%	101,732	105,433	
2017	8,16%		2,654,946	332,829	1,499,855	1,946,579	3,424,038	1,369,041	39,98%	109,523	113,320	
2018	8,17%		2,831,418	361,634	1,602,591	2,109,437	3,685,405	1,473,830	39,99%	117,906	121,801	
2019	8,17%		3,019,821	392,960	1,712,479	2,286,076	3,967,235	1,586,702	40,00%	126,936	130,932	
2020	8,18%		3,220,980	427,029	1,830,027	2,477,679	4,271,172	1,708,358	40,00%	136,669	140,769	

Source : Statistics of Panjang and Estimated by The Study Team

### 3.3.3 Port of Tanjung Priok

#### (1) Socioeconomic framework of the hinterland

29. The hinterland of Tanjung Priok port is West Java province and the Special Capital District of Jakarta whose population will reach 63 million in 2010. The GRDP growth rate of the hinterland is estimated by applying the correlation between the GDP growth rate of Indonesia and the GRDP growth rate of hinterland from 1984 to 1992.

30. The GRDP growth rate under each scenario is listed below.

**Table 3.34 GRDP Growth**

	1994-1998	199-2003	2004-2008	2009-2013	2014-2018
Scenario 1	7.9%	8.4%	8.9%	8.1%	10.6%
Scenario 2	11.1%	10.8%	10.5%	8.5%	9.7%
Scenario 3	7.7%	7.6%	7.6%	7.4%	7.3%

#### (2) International container cargo traffic in 2010

31. International cargo is classified into export and import cargo, and further divided by cargo type such as liquid bulk cargo, dry bulk cargo, general cargo, bagged cargo, united cargo and container cargo. The elasticity between the increase rate of each cargo type and the GDP growth rate is calculated, and by adopting this value, the future cargo volume of each cargo type is estimated for the three scenarios. The potential container cargo volume is estimated by assuming the final containerized ratio for each cargo type. The growth of the containerized ratio is estimated from the correlation between the past trend and the logistic curve, which is shown in Fig.3.11. Container cargo volume in the target year is forecast by multiplying potential container cargo volume by the containerized ratio. The results are shown in Table 3.38 and .39 summarized below.

**Table 3.35 International Potential Container Cargo Volume**

(Unit: 1,000 TEU)

Scenario	Export			Import			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
1							
2003	1,028	248	1,276	1,182	93	1,276	2,552
2010	1,881	94	1,975	1,841	134	1,975	3,950
2018	4,085	136	4,221	3,330	891	4,221	8,442
Scenario	Export			Import			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
2							
2003	1,272	306	1,578	1,463	115	1,578	3,156
2010	2,525	126	2,651	2,471	180	2,651	5,302
2018	5,281	176	5,457	4,305	1,152	5,457	10,914
Scenario	Export			Import			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
3							
2003	984	237	1,221	1,132	89	1,221	2,442
2010	1,658	83	1,741	1,623	118	1,741	3,482
2018	3,004	100	3,104	2,448	656	3,104	6,208

(3) Inter-island container cargo traffic in 2010

32. The inter-island cargo is classified into loading and unloading cargo, and further divided by cargo type such as liquid bulk cargo, dry bulk cargo, general cargo, bagged cargo, united cargo and container cargo. The elastic value between the increase rate of each cargo type and the GRDP is calculated, and by adopting this value, future cargo volume of each cargo type is estimated for the three scenarios. The potential of container cargo volume is estimated by assuming the final containerized ratio for each cargo type. The growth of containerized ratio is estimated from the correlation between the past trend and the logistic curve which is shown in see Fig.3.12. Container cargo volume in the target year is forecast by multiplying the potential container cargo volume

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by the containerized ratio. The results are presented in Table 3.40 and .41 and summarized below.

**Table 3.36 Inter-island Potential Container Cargo Volume**

(Unit: 1,000 TEU)

Scenario	Loading			Unloading			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
1							
2003	56	7	63	30	33	63	126
2010	141	13	154	84	70	154	308
2018	328	18	341	209	132	341	682
Scenario	Loading			Unloading			Total
2	Loaded	Empty	Total	Loaded	Empty	Total	
2003	69	10	79	38	41	79	158
2010	192	17	209	114	95	209	418
2018	421	24	445	272	173	445	890
Scenario	Loading			Unloading			Total
3	Loaded	Empty	Total	Loaded	Empty	Total	
2003	53	7	60	29	31	60	120
2010	122	11	133	72	61	133	266
2018	224	13	237	144	93	237	474

33. The inter-island container cargo traffic in 2010 is further estimated by adopting the 1992 OD table of inter-island cargo shown in Table 3.16 [Oil and coal shipment are not included in these figures]. The inter-island container cargo volume through Tanjung Priok port is estimated in Table 3.17 and summarized below.

**Table 3.37 Domestic Container Cargo Volume**

(Unit: 1,000 TEU)

	Loading			Unloading			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
2010	156	16	172	95	77	172	344



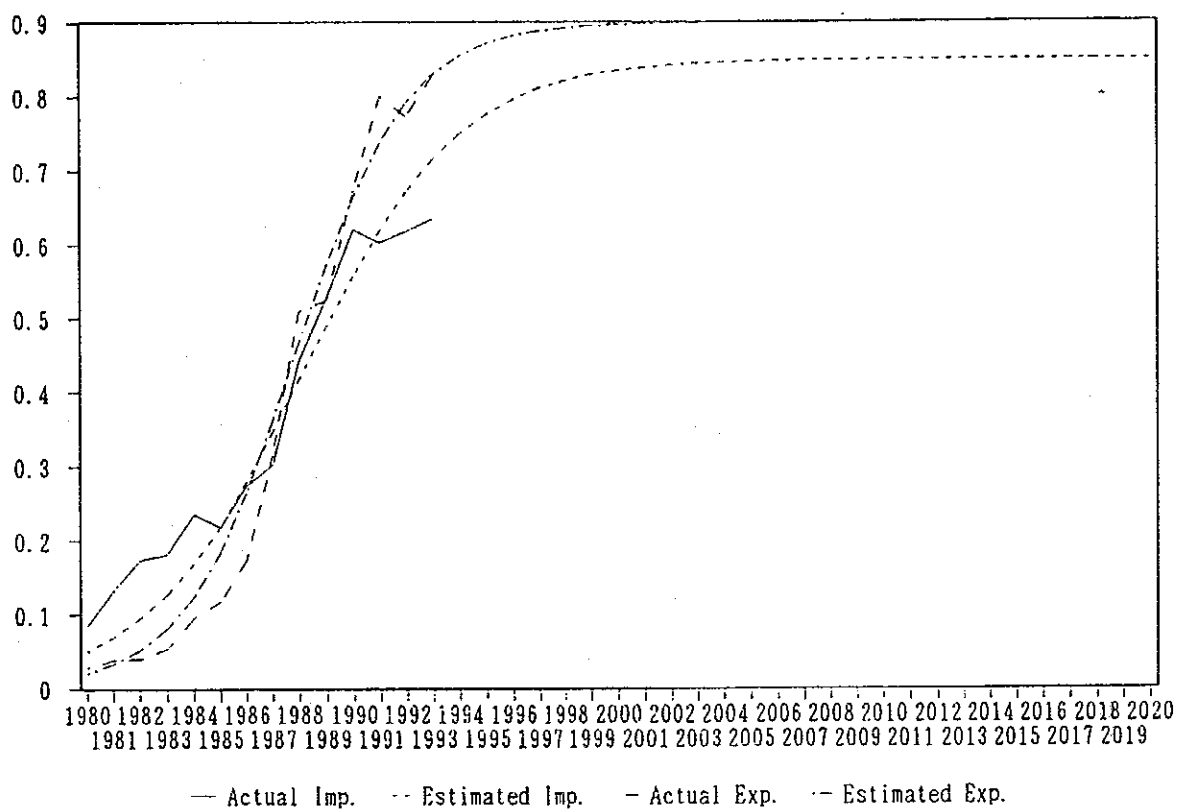
Table 3.38 Forecast of Caontainer cargo Traffic at Port of Tanjung Priok (Scenario 1)

(Scenario 1)

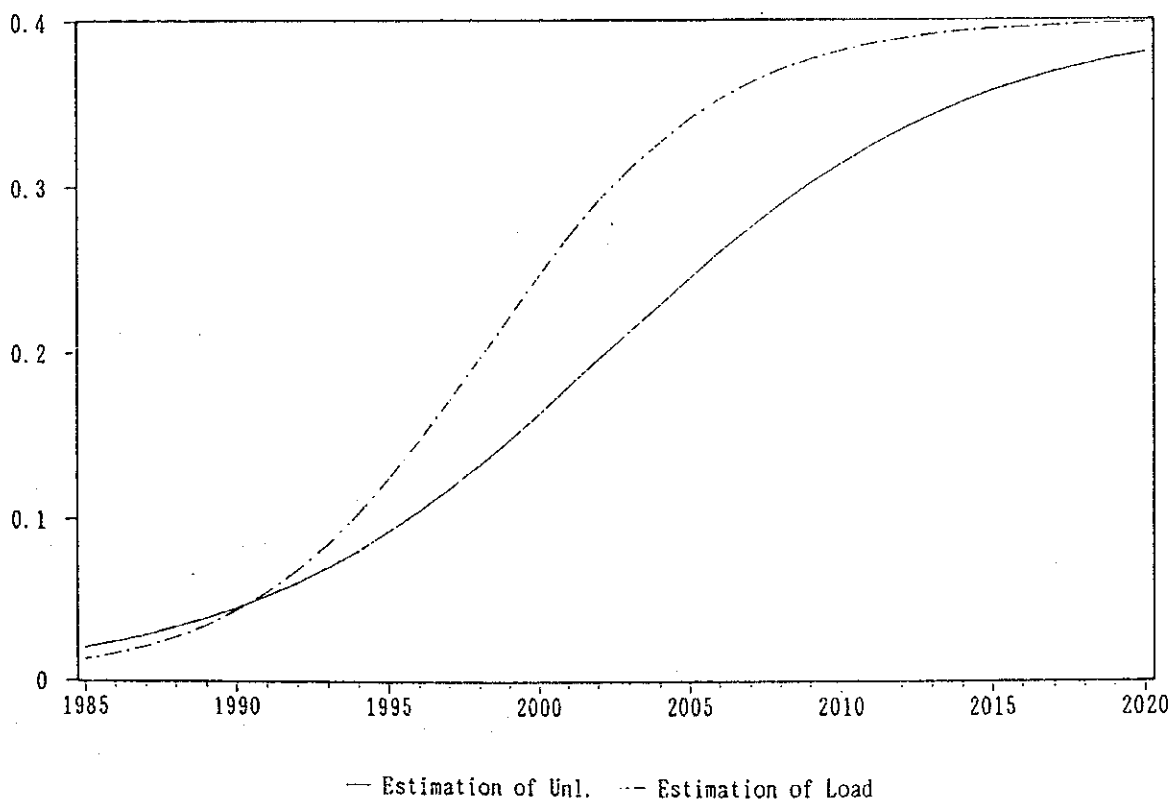
Type of Export

Part	C/U	Container Contribution Sub Total		Conventional		Form of Cargo		Dry Bulk		General		T.P. Priok		CTI & CTH		Potential		Container Cargo		0.80%	CTI & CTH Loaded	Empty Container	Total Loaded	Empty Container	Total	
		Container	Sub Total	Conventional	Ton	Form of Cargo	General	T.P. Priok	General	General	General	General	General	General	General	General	General	General	General							General
1978		7,270													452	708					0.20%		452	708	452	1,220
1979		77,323	0.875	1,020	0.899	0.976	0.946	0.934	0.934	1,077,530	205,780	1,283,230	1,000	1,000	9,505	16,172	1,038	1,061	1,038	1,061	2.76%	9,505	16,172	9,505	4,505	15,077
1980		79,427	92.38%	198,85%	95.88%	104,15%	101,42%	100,00%	100,00%	1,120,100	259,193	1,379,293	1,016	1,016	8,131	21,814	110,73%	113,21%	110,73%	113,21%	2.85%	8,131	21,814	8,131	8,131	23,745
1981		108,419	106.71%	106.71%	106.71%	106.71%	106.71%	106.71%	106.71%	1,083,97%	390,69%	1,474,66%	108.37%	108.37%	9,983	38,951	106.71%	106.71%	106.71%	106.71%	3.88%	9,983	38,951	9,983	38,951	48,935
1982		189,078								1,066,71%	579,840	1,646,550	106.71%	106.71%	10,317	49,086	106.71%	106.71%	106.71%	106.71%	3.91%	10,317	49,086	10,317	49,086	59,402
1983		151,353								1,466,631	346,798	1,813,429			12,788	50,873					5.43%	12,788	50,873	12,788	50,873	63,661
1984	6.98%	268,179								3,990,780	732,160	4,722,940			19,701	55,910					9.62%	19,701	55,910	19,701	55,910	75,611
1985	5.80%	327,802								4,417,042	853,327	5,270,369			17,238	60,042					17.23%	17,238	60,042	17,238	60,042	77,280
1986	5.80%	381,820								5,181,443	1,000,885	6,182,328			28,459	90,042					17.23%	28,459	90,042	28,459	90,042	118,501
1987	5.80%	880,787								5,181,443	1,000,885	6,182,328			81,271	35,719					31.61%	81,271	35,719	81,271	35,719	116,990
1988	5.79%	1,215,169	2,815,007	4,030,776	2,815,007	577,974	277,391	766,952	766,952	1,420,929	2,786,180	4,207,109	3,029,424	3,029,424	96,498	29,686	2,786,180	2,786,180	2,786,180	2,786,180	51.00%	96,498	29,686	96,498	29,686	126,184
1989	7.46%	1,547,291	3,992,364	5,540,655	3,992,364	953,691	562,155	1,515,846	1,515,846	3,439,645	1,808,484	5,248,129	3,880,274	3,880,274	127,830	32,024	3,439,645	3,439,645	3,439,645	3,439,645	52.52%	127,830	32,024	127,830	32,024	160,858
1990	7.24%	1,806,730	2,910,975	4,717,708	2,910,975	715,983	342,089	798,854	798,854	3,201,210	2,197,428	5,398,638	3,584,985	3,584,985	153,996	73,767	3,201,210	3,201,210	3,201,210	3,201,210	87.38%	153,996	73,767	153,996	73,767	218,764
1991	6.90%	2,430,878	1,460,631	3,891,509	1,460,631	346,798	141,213	998,011	998,011	3,199,239	2,563,098	5,762,337	3,959,519	3,959,519	231,120	60,340	3,199,239	3,199,239	3,199,239	3,199,239	89.11%	231,120	60,340	231,120	60,340	291,460
1992	6.29%	3,553,771	2,979,838	6,533,609	2,979,838	479,851	219,005	788,737	788,737	4,761,042	3,036,098	7,797,140	4,615,019	4,615,019	308,070	71,198	4,761,042	4,761,042	4,761,042	4,761,042	86.18%	308,070	71,198	308,070	71,198	379,296
1993	6.60%	4,160,825	1,939,106	6,100,931	1,939,106	378,324	184,516	623,359	623,359	5,362,153	3,181,158	8,543,311	5,362,153	5,362,153	417,826	83,210	5,362,153	5,362,153	5,362,153	5,362,153	82.82%	417,826	83,210	417,826	83,210	496,036
1994	6.40%	4,677,942	187,866	4,865,808	187,866	467,942	187,866	655,808	655,808	6,008,885	4,797,755	10,806,640	6,008,885	6,008,885	479,775	107,000	6,008,885	6,008,885	6,008,885	6,008,885	85.54%	479,775	107,000	479,775	107,000	586,775
1995	6.30%	5,111,477	188,303	5,300,780	188,303	467,942	187,866	655,808	655,808	6,248,920	5,063,738	11,312,658	6,248,920	6,248,920	529,652	192,400	6,248,920	6,248,920	6,248,920	6,248,920	81.18%	529,652	192,400	529,652	192,400	722,052
1996	6.20%	5,577,682	189,216	5,766,898	189,216	472,824	189,216	662,040	662,040	6,547,162	5,776,817	12,324,979	6,547,162	6,547,162	577,682	218,641	6,547,162	6,547,162	6,547,162	6,547,162	88.20%	577,682	218,641	577,682	218,641	796,323
1997	6.28%	6,039,571	190,712	6,230,283	190,712	498,571	190,712	689,283	689,283	7,074,048	6,286,666	13,360,714	7,074,048	7,074,048	628,567	236,019	7,074,048	7,074,048	7,074,048	7,074,048	86.30%	628,567	236,019	628,567	236,019	864,586
1998	6.30%	6,555,243	192,364	6,747,607	192,364	485,243	192,364	677,607	677,607	7,857,114	7,048,729	14,905,843	7,857,114	7,857,114	680,138	248,530	7,857,114	7,857,114	7,857,114	7,857,114	89.31%	680,138	248,530	680,138	248,530	928,668
1999	6.46%	7,077,942	194,775	7,272,717	194,775	472,900	194,775	667,675	667,675	8,493,050	7,413,109	15,906,159	8,493,050	8,493,050	741,314	258,406	8,493,050	8,493,050	8,493,050	8,493,050	89.57%	741,314	258,406	741,314	258,406	1,000,720
2000	6.52%	7,651,623	196,153	7,847,776	196,153	451,623	196,153	647,776	647,776	9,187,443	8,061,247	17,248,690	9,187,443	9,187,443	804,142	259,977	9,187,443	9,187,443	9,187,443	9,187,443	89.70%	804,142	259,977	804,142	259,977	1,064,119
2001	6.60%	8,111,477	198,303	8,309,780	198,303	511,477	198,303	710,780	710,780	9,946,262	8,723,388	18,670,650	9,946,262	9,946,262	872,339	259,554	9,946,262	9,946,262	9,946,262	9,946,262	89.84%	872,339	259,554	872,339	259,554	1,121,893
2002	6.70%	8,555,144	200,659	8,755,803	200,659	532,618	200,659	733,277	733,277	10,777,502	9,407,477	20,184,979	10,777,502	10,777,502	948,748	255,406	10,777,502	10,777,502	10,777,502	10,777,502	89.90%	948,748	255,406	948,748	255,406	1,177,254
2003	6.80%	9,039,571	202,231	9,241,802	202,231	559,144	202,231	761,375	761,375	11,689,125	10,281,464	21,970,589	11,689,125	11,689,125	1,028,148	247,650	11,689,125	11,689,125	11,689,125	11,689,125	89.94%	1,028,148	247,650	1,028,148	247,650	1,224,899
2004	6.90%	9,579,160	206,029	9,785,189	206,029	579,160	206,029	785,189	785,189	12,609,057	11,173,759	23,782,816	12,609,057	12,609,057	1,117,376	236,321	12,609,057	12,609,057	12,609,057	12,609,057	89.98%	1,117,376	236,321	1,117,376	236,321	1,281,697
2005	7.00%	10,094,799	209,003	10,303,802	209,003	604,799	209,003	813,802	813,802	13,788,004	12,153,401	25,941,405	13,788,004	13,788,004	1,215,340	221,298	13,788,004	13,788,004	13,788,004	13,788,004	89.98%	1,215,340	221,298	1,215,340	221,298	1,337,646
2006	7.10%	10,632,178	212,346	10,844,524	212,346	632,178	212,346	844,524	844,524	14,957,789	13,030,408	27,988,197	14,957,789	14,957,789	1,323,046	202,378	14,957,789	14,957,789	14,957,789	14,957,789	89.99%	1,323,046	202,378	1,323,046	202,378	1,445,424
2007	7.20%	11,169,623	215,952	11,385,575	215,952	661,623	215,952	877,575	877,575	16,333,187	14,420,088	30,753,275	16,333,187	16,333,187	1,442,004	179,290	16,333,187	16,333,187	16,333,187	16,333,187	89.99%	1,442,004	179,290	1,442,004	179,290	1,524,294
2008	7.37%	11,749,271	219,401	11,968,672	219,401	693,271	219,401	912,672	912,672	17,819,271	15,736,031	33,555,302	17,819,271	17,819,271	1,573,892	151,609	17,819,271	17,819,271	17,819,271	17,819,271	89.99%	1,573,892	151,609	1,573,892	151,609	1,675,501
2009	7.51%	12,324,979	224,214	12,549,193	224,214	727,500	224,214	951,714	951,714	19,446,247	17,193,748	36,640,995	19,446,247	19,446,247	1,710,375	118,793	19,446,247	19,446,247	19,446,247	19,446,247	89.90%	1,710,375	118,793	1,710,375	118,793	1,829,168
2010	7.65%	12,904,160	228,914	13,133,074	228,914	764,968	228,914	993,882	993,882	21,260,690	18,810,769	40,071,459	21,260,690	21,260,690	1,881,077	141,054	21,260,690	21,260,690	21,260,690	21,260,690	90.00%	1,881,077	141,054	1,881,077	141,054	2,022,131
2011	7.80%	13,479,160	234,029	13,713,189	234,029	804,160	234,029	1,038,189	1,038,189	23,275,742	20,007,029	43,282,771	23,275,742	23,275,742	2,060,700	154,807	23,275,742	23,275,742	23,275,742	23,275,742	90.00%	2,060,700	154,807	2,060,700	154,807	2,215,507
2012	7.97%	14,047,430	239,640	14,287,070	239,640	847																				





**Fig. 3.11 Estimation of Container Rate at Port of Tanjung Priok  
(Unit %)**



**Fig. 3.12 Forecast of Container RATE of Inter-island  
(Unit %)**

Table 3.40 Forecast of Inter-island Container cargo Traffic at Port of Tanjung Priok

(Scenario 1)

Type of Trade Loading

Unit	Type of Trade		Loading		Form of Cargo		General Cargo		Total General Cargo Ton	Container Ratio		Loaded Container TEU	T. Priok Empty Container TEU	Total TEU
	Leaving	Arriving	Liquid Bulk Cargo Ton	Dry Bulk Cargo Ton	General Cargo Ton	Container Cargo Ton	Potential Container Cargo	Container Cargo		Container Ratio				
1978									1.042					
1979									112.71%					
1980									108.18%					
1981														
1982														
1983														
1984	13.72%													
1985	5.64%													
1986	5.80%													
1987	4.89%													
1988	7.33%													
1989	8.96%													
1990	9.01%													
1991	7.36%													
1992	8.01%													
1993	8.41%													
1994	8.24%													
1995	8.07%													
1996	7.90%													
1997	8.00%													
1998	8.10%													
1999	8.26%													
2000	8.35%													
2001	8.43%													
2002	8.53%													
2003	8.63%													
2004	8.73%													
2005	8.84%													
2006	8.94%													
2007	9.08%													
2008	9.22%													
2009	9.37%													
2010	9.51%													
2011	9.66%													
2012	9.84%													
2013	10.02%													
2014	10.20%													
2015	10.39%													
2016	10.58%													
2017	10.78%													
2018	10.98%													
2019	11.19%													
2020	11.40%													

Source : PPII II and Estimated by The Study Team

Table 3.41 Forecast of Inter-island Container cargo Traffic at Port of Tanjung Priok

(Scenario 1)

Type of Trade Unloading

Year	GRDP Increase Rate	Type of Trade	Unloading			Form of Cargo			Total		Container Ratio		Tj. Priok		Total TEU
			Ton	Ragged Cargo Ton	Liquid Bul Cargo Ton	Dry Bulk Cargo Ton	General Cargo Ton	Container Cargo Ton	General Cargo Ton	Container Cargo Ton	Potential Container Cargo	Container Cargo	Loaded Container TEU	Empty Container TEU	
1978				0.930	0.930	0.975			0.983						
1979				100.56%	107.06%	105.48%			106.31%						
1980				108.18%	108.18%	108.18%			108.18%						
1981															
1982															
1983	13.72%		2,034,600	401,950	180,727	583,886	820,331	47,706	808,037	1,087,085	47,706	3,033	2,355	5,388	
1984	7.33%		2,457,185	605,090	229,777	823,691	710,672	87,958	798,630	1,124,153	87,958	6,747	5,392	12,139	
1985	8.93%		3,185,102	883,478	422,103	975,645	828,728	75,148	903,876	1,387,825	75,148	3,331	2,176	5,507	
1986	9.01%		3,037,751	779,484	315,578	873,305	1,000,404	68,920	1,009,384	1,490,683	68,920	4,664	3,661	8,325	
1987	7.30%		3,042,780	621,605	323,103	997,494	1,034,839	65,749	1,109,579	1,443,692	65,749	3,019	2,788	5,807	
1988	8.01%		3,119,312	618,844	301,826	1,019,659	1,116,681	62,302	1,178,984	1,518,588	62,302	3,146	3,124	6,270	
1989	8.41%			622,644	323,287	1,076,684			1,254,966	1,597,717	72,069	5,814	3,024	8,837	
1990	8.24%			625,485	345,730	1,133,850			1,331,837	1,679,152	88,463	7,077	4,169	11,246	
1991	8.07%			627,371	369,162	1,192,877			1,412,253	1,762,855	107,230	8,578	5,567	14,145	
1992	7.90%			629,843	394,545	1,256,133			1,498,904	1,853,280	129,688	10,375	7,813	18,188	
1993	8.00%			632,914	422,067	1,323,977			1,592,354	1,951,018	156,429	12,514	10,626	23,140	
1994	8.10%			636,962	452,191	1,397,590			1,694,191	2,057,891	188,202	15,056	14,048	29,104	
1995	8.20%			641,528	484,837	1,476,440			1,803,922	2,173,170	225,576	18,046	18,068	36,114	
1996	8.35%			646,627	520,244	1,556,942			1,922,251	2,297,589	269,234	21,539	22,633	44,172	
1997	8.43%			652,366	558,748	1,651,795			2,050,221	2,432,279	319,895	25,592	27,651	53,242	
1998	8.53%			658,767	600,660	1,749,562			2,188,745	2,578,195	378,234	30,259	32,995	63,254	
1999	8.63%			665,859	648,325	1,854,864			2,338,833	2,736,395	444,865	35,591	38,527	74,118	
2000	8.73%			673,871	696,127	1,968,384			2,501,602	2,908,050	520,425	41,634	44,118	85,752	
2001	8.84%			682,235	750,494	2,090,876			2,678,293	3,094,459	605,371	48,430	49,667	98,097	
2002	8.94%			691,784	810,132	2,223,807			2,871,099	3,298,004	700,370	56,030	55,133	111,163	
2003	9.08%			702,372	875,637	2,368,242			3,081,756	3,520,506	805,918	64,473	60,510	124,983	
2004	9.22%			714,058	947,682	2,525,369			3,312,214	3,704,011	922,503	73,800	65,837	139,637	
2005	9.37%			726,909	1,027,023	2,696,519			3,564,663	4,030,819	1,050,639	84,051	71,195	155,246	
2006	9.51%			740,997	1,114,526	2,883,185			3,841,569	4,323,520	1,190,907	95,273	76,697	171,970	
2007	9.66%			756,574	1,211,427	3,087,734			4,146,650	4,646,080	1,344,303	107,544	82,500	190,044	
2008	9.84%			773,748	1,318,910	3,312,227			4,483,311	5,002,076	1,511,801	120,944	88,707	209,711	
2009	10.02%			792,637	1,438,349	3,558,996			4,855,429	5,395,581	1,694,600	135,568	95,678	231,246	
2010	10.20%			813,376	1,571,280	3,830,689			5,267,423	5,831,240	1,894,175	151,534	103,431	254,965	
2011	10.39%			836,114	1,719,491	4,130,317			5,724,349	6,314,355	2,112,317	168,985	112,239	281,224	
2012	10.58%			861,018	1,885,032	4,461,311			6,231,985	6,850,998	2,351,183	188,095	122,333	310,428	
2013	10.78%			888,274	2,070,263	4,827,582			6,796,963	7,448,126	2,613,347	209,068	133,972	343,040	
2014	10.98%			918,092	2,277,910	5,233,604			7,426,897	8,113,734	2,901,848	232,148	147,440	379,588	
2015	11.19%			930,704	2,511,122	5,684,500			8,130,554	8,857,018	3,220,261	257,621	163,061	420,682	
2016	11.40%														

Source : PPII and Estimated by The Study Team

**3.3.4 Port of Tanjung Emas**

(1) Socioeconomic framework of the hinterland

34. The hinterland of Tanjung Emas port is Central Jawa province whose population will reach 30 million in 2010. The GRDP growth rate of the hinterland is estimated by applying the correlation between the GDP growth rate of Indonesia and the GRDP growth rate of hinterland from 1984 to 1992.

The GRDP growth rate under each scenario is listed below.

**Table 3.42 GRDP Growth**

(Unit: %)

	1994-1998	199-2003	2004-2008	2009-2013	2014-2018
Scenario 1	6.5	7.1	7.2	7.2	7.2
Scenario 2	9.6	9.7	8.7	7.5	6.5
Scenario 3	6.3	6.5	6.0	5.5	5.0

(2) International container cargo traffic in 2010

35. International cargo is classified into export and import cargo, and further divided by cargo type such as liquid bulk cargo, dry bulk cargo, general cargo, bagged cargo, united cargo and container cargo. The elasticity between the increase rate of each cargo type and the GRDP growth rate is calculated, and by adopting this value, the future cargo volume of each cargo type is estimated for the three scenarios. The potential container cargo volume is estimated by assuming the final containerized ratio for each cargo type. The growth of the containerized ratio is estimated from the correlation between the past trend and the logistic curve, which is shown in Fig.3.13. Container cargo volume in the target year is forecast by multiplying potential container cargo volume by the containerized ratio. The results are shown in Table 3.46 and .47 and summarized below.

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**Table 3.43 International Potential Container Cargo Volume**

(Unit: 1,000 TEU)

Scenario	Export			Import			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
1							
2003	96	9	105	96	9	105	210
2010	147	27	174	164	10	174	348
2018	235	71	305	295	10	305	610
Scenario	Export			Import			Total
2	Loaded	Empty	Total	Loaded	Empty	Total	
2003	120	12	132	121	11	132	264
2010	200	36	236	223	13	236	472
2018	309	94	403	389	14	403	806
Scenario	Export			Import			Total
3	Loaded	Empty	Total	Loaded	Empty	Total	
2003	92	9	101	92	9	101	202
2010	129	24	153	144	9	153	306
2018	176	54	230	222	8	230	46

(3) Inter-island container cargo traffic in 2010

36. The inter-island cargo is classified into loading and unloading cargo, and further divided by cargo type such as liquid bulk cargo, dry bulk cargo, general cargo, bagged cargo, united cargo and container cargo. The elasticity between the increase rate of each cargo type and the GRDP growth rate is calculated, and by adopting this value, the future cargo volume of each cargo type is estimated for the three scenarios. The potential container cargo volume is estimated by assuming the final containerized ratio for each cargo type. The growth of the containerized ratio is estimated by the correlation between the past trend and the logistic curve. However, since inter-island container cargo has not yet been handled at the port of Tanjung Emas, the containerized

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ratio is estimated based on the actual ratio at Tanjung Priok, Tanjung Perak and Ujung Pandan (see Fig.3.9). The container cargo volume in the target year is forecast by multiplying the potential container cargo volume by the containerized ratio. The results are presented in The Table 3.48 and .49 and summarized following Tables.

**Table 3.44 Inter-island Potential Container Cargo Volume**

(Unit: 1,000 TEU)

Scenario	Loading			Unloading			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
1							
2003	4	23	27	24	3	27	54
2010	15	62	77	71	6	77	154
2018	26	75	101	95	6	101	202
Scenario	Loading			Unloading			Total
2	Loaded	Empty	Total	Loaded	Empty	Total	
2003	5	30	35	31	4	35	70
2010	20	86	106	97	9	106	212
2018	34	100	134	127	7	134	268
Scenario	Loading			Unloading			Total
3	Loaded	Empty	Total	Loaded	Empty	Total	
2003	4	23	27	23	4	27	54
2010	14	55	69	63	6	69	138
2018	20	57	77	73	4	77	15

37. The inter-island container cargo traffic in 2010 is further estimated by adopting the 1992 OD table of inter-island cargo shown in Table 3.16 [Oil and coal shipment are not included in these figures]. The inter-island container cargo volume through Tanjung Emas port is estimated in Table 3.17 and summarized below.

**Table 3.45 Domestic Container Cargo Volume**

(Unit: 1,000 TEU)

	Loading			Unloading			Total
	Loaded	Empty	Total	Loaded	Empty	Total	
2010	14	63	77	43	34	77	154



Table 3.46 Forecast of Container Cargo Traffic at Port of Tanjung Emas

(Scenario 1)

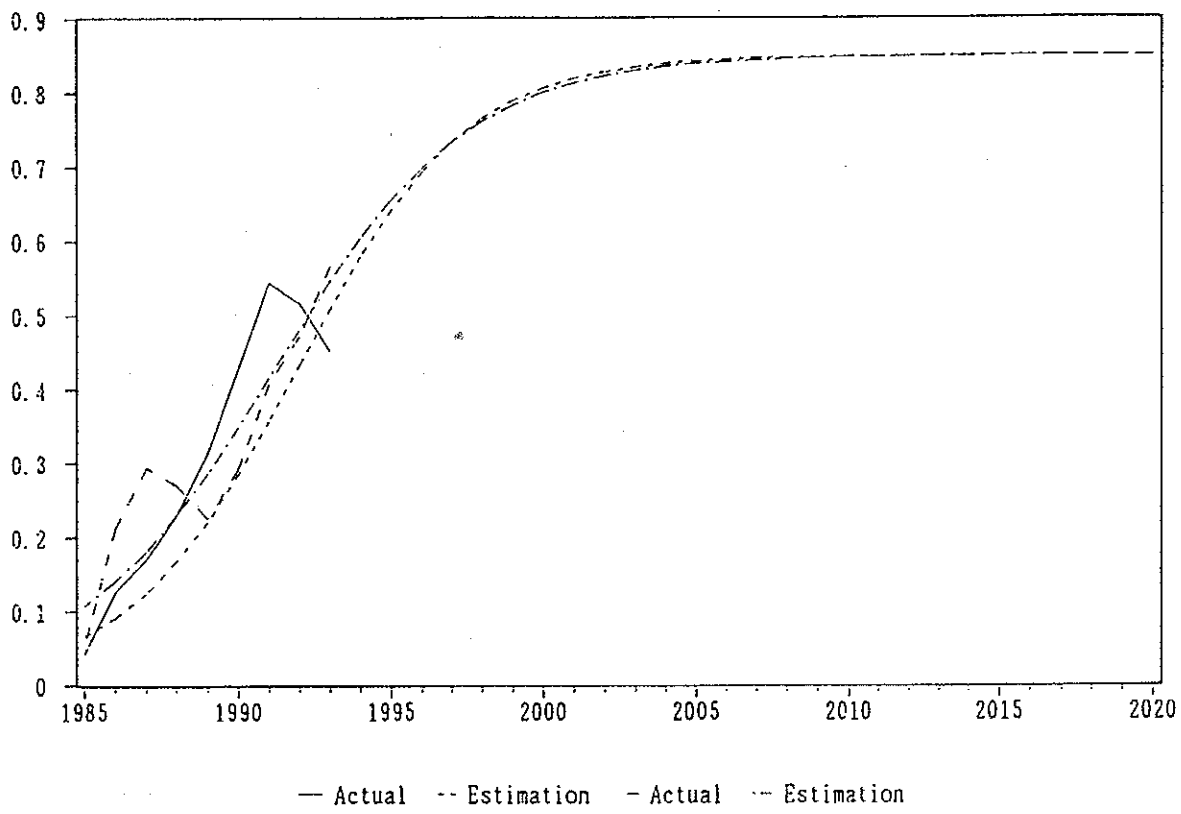
Port	Type of Trade		Export		Form of Cargo		Liquid Rail		With Con.		Potential		Container		Container Empty Container (TEU)
	GP Increase Rate	TJ-Emas Ton	Container Cargo Ton	Conventional Cargo Ton	Rough Cargo Ton	Dry Bulk Cargo Ton	0.989	1.022	General Cargo Ton	General Cargo Ton	Container Cargo Ton	Container Cargo Ton	Ratio	Leased Container (TEU)	
1985	8.34%	208,240	9,706	198,534	35,952	2,873	38,825	1,423	158,286	167,992	186,111	9,706	5.22%	645	294
1986	6.07%	186,167	36,621	149,546	25,911	499	20,410	247	122,889	159,510	172,490	36,621	21.23%	2,963	1,237
1987	5.88%	237,037	61,372	175,665	41,004	6,399	48,403	785	126,597	187,969	208,998	61,372	29.35%	5,034	1,536
1988	6.35%	457,076	108,890	348,186	39,043	26,876	65,919	6,939	275,267	384,157	404,379	108,890	26.93%	9,402	2,122
1989	6.40%	758,034	144,233	613,801	117,477	35,243	152,720	25,845	435,236	579,469	640,792	144,233	22.51%	12,386	2,614
1990	7.00%	782,896	172,520	610,376	99,320	61,716	161,044	92,007	357,325	529,845	588,710	172,520	29.30%	15,586	5,222
1991	7.16%	739,381	234,787	504,594	75,429	100,288	175,717	27,568	301,309	536,096	576,567	234,787	40.72%	21,865	6,854
1992	6.59%	920,783	348,526	572,257	70,347	108,476	178,823	42,530	350,904	609,430	738,857	348,526	47.17%	30,897	5,704
1993	6.92%	886,558	417,752	468,806	41,586	94,769	136,346	30,849	296,111	713,863	738,291	417,752	56.58%	37,256	3,064
1994	6.78%				42,438	101,572	144,010	39,667	283,361	753,650	778,836	470,289	60.38%	42,754	4,275
1995	6.64%				43,251	108,655	151,906	43,232	257,136	794,613	820,562	537,478	65.50%	48,862	4,886
1996	6.50%				44,024	116,005	160,029	47,056	233,851	836,728	863,445	602,877	69.82%	54,807	5,233
1997	6.58%				44,844	123,872	168,716	51,256	214,726	881,751	909,298	667,025	73.30%	60,639	5,527
1998	6.66%				45,715	132,298	178,013	55,878	199,923	929,918	958,364	729,995	76.17%	66,363	5,776
1999	7.12%				46,804	141,828	188,632	61,178	189,639	984,946	1,014,466	795,007	78.37%	72,273	6,005
2000	7.13%				47,920	151,970	199,890	66,982	183,504	1,043,268	1,073,919	859,696	80.05%	78,154	6,200
2001	7.13%				49,065	162,761	211,826	73,339	180,404	1,105,058	1,136,924	924,654	81.35%	84,059	6,307
2002	7.14%				50,238	174,244	224,483	80,302	180,050	1,170,557	1,203,706	990,507	82.29%	90,046	6,307
2003	7.14%				51,441	186,462	237,904	87,929	182,118	1,239,380	1,274,494	1,057,862	83.00%	96,169	6,293
2004	7.15%				52,675	190,460	252,136	96,283	186,274	1,313,568	1,349,534	1,127,294	83.53%	102,481	6,293
2005	7.15%				53,941	213,288	267,229	105,436	192,239	1,391,571	1,429,085	1,199,332	83.92%	109,030	6,293
2006	7.15%				55,239	227,997	283,236	115,402	199,790	1,474,360	1,513,425	1,274,470	84.21%	115,861	6,293
2007	7.15%				56,570	243,645	300,215	126,448	208,759	1,561,936	1,602,866	1,353,177	84.42%	123,016	6,293
2008	7.16%				57,937	260,292	318,228	138,486	219,016	1,654,906	1,697,723	1,435,890	84.58%	130,535	6,293
2009	7.16%				59,339	277,999	337,339	151,677	230,409	1,753,496	1,798,333	1,523,027	84.69%	138,457	6,293
2010	7.17%				60,775	296,836	357,615	166,134	243,058	1,858,052	1,905,055	1,614,994	84.77%	146,818	6,293
2011	7.18%				62,256	316,872	379,128	181,977	256,745	1,968,943	2,018,269	1,712,197	84.83%	155,654	6,293
2012	7.18%				63,774	338,187	401,961	199,343	271,517	2,086,577	2,138,398	1,815,060	84.88%	165,005	6,293
2013	7.19%				65,332	360,892	426,194	218,380	287,374	2,211,376	2,265,881	1,924,003	84.91%	174,909	6,293
2014	7.20%				66,933	384,984	451,917	239,250	304,330	2,343,788	2,401,179	2,039,457	84.94%	185,405	6,293
2015	7.20%				68,577	410,647	479,224	262,131	322,412	2,484,287	2,544,789	2,161,875	84.95%	196,534	6,293
2016	7.21%				70,267	437,947	508,214	287,220	341,656	2,633,383	2,697,238	2,291,726	84.97%	208,339	6,293
2017	7.22%				72,002	466,991	538,994	314,731	362,106	2,791,614	2,859,088	2,429,508	84.97%	220,864	6,293
2018	7.22%				73,786	497,891	571,677	344,901	383,812	2,950,556	3,030,939	2,575,743	84.98%	234,158	6,293
2019	7.23%				75,619	530,766	606,385	377,989	406,836	3,137,822	3,213,431	2,730,987	84.99%	248,272	6,293
2020	7.24%				77,504	565,742	643,246	414,282	431,239	3,327,065	3,407,245	2,895,820	84.99%	263,257	6,293

Source : Statistics of Port of Tanjung Emas and Estimated by The Study Team

Table 3.47 Forecast of Container Cargo Traffic at Port of Tanjung Emas  
(Scenario 1)

Port Unit	Type of Trade	Import													
		GP Increase Rate	Total TEU	Container Cargo Ton	Concentrated Cargo Ton	Reefered Cargo Ton	Dry Bulk + Bagged Cargo Ton	Dry Bulk Cargo Ton	Liquid Bulk Cargo Ton	General Cargo Ton	With Gen. Cargo Ton	Container Cargo Ton	Ratio	Loaded Container TEU	Empty Container TEU
1985	6.55%	247,073	9,091	237,982	43,096	3,443	1,006	0.984	189,737	1,004	9,091	4.12%	997	569	1,500
1986	8.34%	319,043	37,073	281,970	48,856	940	49,796	1,406	231,708	107.02%	37,073	12.04%	3,239	1,910	4,855
1987	5.88%	397,141	58,587	338,554	80,760	12,332	93,093	1,474	243,987	106.55%	58,587	17.03%	4,950	1,870	6,820
1988	6.35%	460,262	92,514	367,748	41,236	28,385	69,621	7,392	290,725		92,514	22.87%	7,753	4,395	12,148
1989	6.46%	509,221	138,433	370,788	70,966	21,290	92,256	15,613	262,910		138,433	31.58%	11,888	3,923	15,811
1990	7.00%	650,331	219,551	430,780	70,102	43,557	113,659	64,935	252,180		219,551	42.77%	19,835	3,015	22,850
1991	7.18%	604,597	269,953	334,644	50,024	60,510	116,534	18,283	199,820		269,953	54.36%	25,140	3,052	28,192
1992	6.59%	726,992	305,939	420,953	51,752	79,802	131,555	31,288	258,150		305,939	51.59%	27,127	5,245	32,392
1993	6.92%	803,815	289,318	514,497	45,639	103,990	149,635	39,892	324,970		289,318	45.13%	25,802	12,139	37,941
1994	6.78%				46,064	114,623	160,686	41,935			658,804	50.85%	31,714	15,315	47,029
1995	6.64%				46,431	125,897	172,328	44,024			733,238	57.90%	38,594	15,154	53,748
1996	6.50%				46,742	137,835	184,577	46,159			782,780	64.09%	45,067	14,432	60,499
1997	6.58%				47,091	150,757	197,848	48,434			808,013	69.25%	52,050	13,510	66,100
1998	6.66%				47,479	164,759	212,238	50,860			865,657	73.37%	59,062	12,477	72,139
1999	7.12%				48,077	180,579	228,656	53,639			931,413	76.54%	66,838	11,421	78,279
2000	7.13%				48,683	197,367	246,051	56,571			1,002,193	78.92%	74,057	10,297	84,354
2001	7.13%				49,299	216,124	265,423	59,665			1,078,382	80.67%	81,330	9,097	90,426
2002	7.13%				49,925	236,057	285,982	62,930			1,160,402	81.93%	88,702	8,870	97,638
2003	7.14%				50,560	257,583	308,143	66,376			1,248,704	82.84%	96,442	9,020	105,482
2004	7.14%				51,204	280,829	332,034	70,014			1,343,773	83.48%	104,458	9,138	113,595
2005	7.15%				51,859	305,330	357,189	73,853			1,446,131	83.94%	112,890	9,237	122,127
2006	7.15%				52,525	333,032	385,556	77,906			1,556,342	84.20%	121,818	9,322	131,140
2007	7.16%				53,201	362,297	415,498	82,185			1,675,031	84.48%	131,316	9,399	140,715
2008	7.16%				53,888	393,898	447,787	86,703			1,802,859	84.75%	141,457	9,470	150,929
2009	7.17%				54,587	426,020	482,908	91,474			1,940,536	84.94%	152,311	9,537	161,847
2010	7.17%				55,298	464,805	520,103	96,513			2,088,832	84.82%	163,950	9,601	173,551
2011	7.18%				56,022	504,048	560,069	101,834			2,248,570	84.86%	176,449	9,684	186,113
2012	7.18%				56,757	547,009	604,360	107,455			2,420,681	84.91%	189,884	9,727	199,611
2013	7.19%				57,507	594,003	651,509	113,393			2,606,121	84.94%	204,336	9,791	214,129
2014	7.20%				58,269	644,104	702,374	119,667			2,806,943	84.96%	219,891	9,854	229,745
2015	7.20%				59,046	698,212	757,258	125,297			3,021,281	84.97%	236,639	9,919	246,557
2016	7.21%				59,837	758,648	816,484	133,302			3,253,359	84.98%	254,677	9,984	264,661
2017	7.22%				60,643	819,700	880,403	140,705			3,503,499	84.99%	274,110	10,051	284,160
2018	7.22%				61,463	887,927	949,300	148,530			3,773,132	84.99%	295,048	10,118	305,167
2019	7.23%				62,299	961,556	1,023,855	156,801			4,063,801	84.99%	317,614	10,188	327,802
2020	7.24%				63,151	1,041,088	1,104,240	163,544			4,377,177	85.00%	341,936	10,258	352,194

Source : Statistics of Port of Tanjung Emas and Estimated by The Study Team



**Fig. 3.13 Estimation of Container Ratio**  
(Unit: %)

Table 3.48 Forecast of Container Cargo Traffic at Port of Tanjung Emas

(Scenario 1)

Unloading

Type of Trade

Port Unit	GRDP Increase Rate	T. Emas Ton	Form of Cargo			General Cargo Ton	Potential Container Cargo Ton	Container Cargo Ratio	Loaded Container TEU	Container Empty TEU	Total TEU
			Bagged Cargo Ton	Dry Bulk Cargo Ton	Liquid Cargo Ton						
1984	12.77%	1,063	0.972	0.977	1.154	0.965	1,020				
1985	8.34%	113.23%	103.56%	104.06%	122.93%	102.79%	109.58%				
1986	6.07%	106.55%	106.55%	106.55%	106.55%	106.55%	106.75%				
1987	5.88%	702,059	127,134	10,158	5,032	559,735	623,805				
1988	6.35%	855,157	148,169	2,852	1,413	702,723	776,949				
1989	6.46%	1,198,075	285,795	43,641	5,216	863,423	1,006,842				
1990	7.00%	1,659,441	186,079	128,089	33,359	1,311,914	1,408,289				
1991	7.16%	1,513,260	289,627	86,889	63,718	1,073,027	1,224,212				
1992	6.59%	1,735,254	282,384	175,454	261,569	1,015,848	1,183,196				
1993	6.92%	1,781,090	266,245	353,992	97,308	1,063,545	1,206,398				
1994	6.78%	2,022,632	248,641	383,405	150,322	1,240,264	1,379,617				
1995	6.64%	1,896,440	168,226	383,328	147,042	1,197,844	1,296,661				
1996	6.50%	1,966,087	174,584	399,732	158,538	1,233,833	1,336,979	1,497	120	30	150
1997	6.58%	2,037,154	180,946	416,292	170,677	1,269,240	1,376,780	2,861	229	54	282
1998	6.66%	2,107,741	187,299	432,981	183,475	1,303,987	1,415,984	5,448	436	96	532
1999	7.12%	2,182,829	194,023	450,685	197,407	1,340,714	1,457,466	10,345	828	171	999
2000	7.13%	2,262,754	201,145	469,477	212,585	1,379,546	1,501,378	19,525	1,562	304	1,866
2001	7.14%	2,356,274	209,428	491,163	230,058	1,425,625	1,553,345	36,551	2,924	535	3,459
2002	7.15%	2,454,182	218,059	513,864	248,975	1,473,284	1,607,211	66,956	5,356	922	6,278
2003	7.16%	2,556,718	227,051	537,630	269,457	1,522,581	1,663,052	118,272	9,462	1,530	10,992
2004	7.17%	2,664,151	236,422	562,514	291,635	1,573,580	1,720,955	197,456	15,796	2,402	18,198
2005	7.18%	2,776,753	246,189	588,570	315,650	1,626,344	1,781,003	304,877	24,390	3,486	27,876
2006	7.19%	2,894,810	256,368	615,855	341,657	1,680,936	1,843,286	429,010	34,321	4,612	38,932
2007	7.20%	3,018,650	266,977	644,428	369,822	1,737,422	1,907,893	550,474	44,038	5,563	49,601
2008	7.21%	3,148,583	278,035	674,351	400,326	1,795,872	1,974,922	654,099	52,328	6,214	58,542
2009	7.22%	3,285,004	289,565	705,696	433,368	1,856,375	2,044,494	735,644	58,852	6,570	65,421
2010	7.23%	3,428,295	301,588	738,534	469,164	1,919,009	2,116,719	798,732	63,899	6,706	70,604
2011	7.24%	3,578,881	314,125	772,938	507,944	1,983,854	2,191,711	849,270	67,942	6,703	74,645
2012	7.25%	3,737,139	327,200	808,985	549,962	2,050,992	2,269,588	892,349	71,388	6,621	78,009
2013	7.26%	3,903,593	340,837	846,756	595,490	2,120,510	2,350,478	931,500	74,520	6,497	81,017
2014	7.27%	4,078,756	355,063	886,344	644,831	2,192,517	2,434,532	968,952	77,516	6,354	83,870
2015	7.28%	4,263,166	369,906	927,841	698,310	2,267,109	2,521,893	1,006,044	80,484	6,202	86,685
2016	7.29%	4,457,399	385,393	971,341	756,279	2,344,386	2,612,711	1,043,571	83,486	6,048	89,533
2017	7.30%	4,662,075	401,555	1,016,946	819,120	2,424,454	2,707,144	1,082,014	86,561	5,895	92,456
2018	7.31%	4,877,856	418,423	1,064,703	887,249	2,507,421	2,805,358	1,121,073	89,734	5,745	95,478
2019	7.32%	5,105,451	436,028	1,114,903	961,118	2,593,402	2,907,528	1,162,749	93,020	5,598	98,618
2020	7.33%	5,345,625	454,405	1,167,484	1,041,220	2,682,516	3,013,841	1,205,390	96,431	5,456	101,887
2021	7.34%	5,599,196	473,590	1,222,631	1,128,088	2,774,887	3,124,491	1,249,715	99,977	5,317	105,295
2022	7.35%	5,867,043	493,620	1,280,475	1,222,304	2,870,645	3,239,685	1,295,790	103,663	5,183	108,846

Source : Statistics of Port of Tanjung Emas and Estimated by the study team

Table 3.49 Forecast of Container Cargo Traffic at Port of Tanjung Emas

(Scenario 1)

Loading

Type of Trade

Port Unit	GRDP Increase Rate	T. J. Emas		Form of Cargo			General		Container		Ratio	Container		Total TEU
		Ton	Ton	Bagged Cargo Ton	Dry Bulk Ton	Liquid Bul Ton	General Cargo Ton	Potential Container Ton	Container Cargo Ton	Loded Container TEU		Container Empty TEU		
		0.951	0.870	1.098	1.040	0.924								
		101.50%	92.84%	117.18%	111.04%	98.59%								
		106.75%	106.75%	106.75%	106.75%	106.75%								
1984														
1985	8.34%	231,253	41,877	3,346	1,657	184,372	205,477							
1986	6.07%	235,791	40,855	786	390	193,761	214,227							
1987	5.88%	300,003	71,564	10,928	1,306	216,205	252,117							
1988	6.35%	308,741	34,620	23,831	6,206	244,083	262,014							
1989	6.46%	315,470	60,379	18,114	13,283	223,694	255,212							
1990	7.00%	267,211	43,484	27,018	40,279	156,430	182,200							
1991	7.16%	404,395	60,451	80,374	22,094	241,477	273,912							
1992	6.59%	311,226	38,259	58,995	23,130	190,842	212,284							
1993	6.92%	260,470	23,105	52,649	20,196	164,520	178,092							
1994	6.78%	274,456	21,455	56,565	21,619	174,816	187,705							
1995	6.64%	289,225	19,896	60,686	23,112	185,531	197,790							
1996	6.50%	304,785	18,427	65,016	24,674	196,688	208,349							
1997	6.58%	321,778	17,080	69,713	26,364	208,622	219,798							
1998	6.66%	340,310	15,843	74,813	28,191	221,462	232,203							
1999	7.12%	361,737	14,759	80,664	30,281	236,633	246,441							
2000	7.13%	384,820	13,750	86,975	32,526	251,570	261,997							
2001	7.13%	409,667	12,810	93,782	34,938	268,136	278,935							
2002	7.13%	436,395	11,935	101,126	37,531	285,802	295,523							
2003	7.14%	465,130	11,120	109,050	40,318	304,642	314,234							
2004	7.14%	496,007	10,361	117,599	43,313	324,735	334,247							
2005	7.15%	529,173	9,654	126,822	46,532	346,104	355,644							
2006	7.15%	564,783	8,996	136,775	49,992	369,020	378,517							
2007	7.15%	603,014	8,383	147,516	53,713	393,402	402,964							
2008	7.16%	644,048	7,812	159,110	57,713	419,413	429,090							
2009	7.16%	688,083	7,281	171,623	62,014	447,165	457,007							
2010	7.17%	735,331	6,785	185,131	66,640	476,775	486,832							
2011	7.18%	786,021	6,324	199,713	71,614	508,370	518,694							
2012	7.18%	840,405	5,895	215,458	76,964	542,089	552,733							
2013	7.19%	898,751	5,495	232,459	82,719	578,078	589,097							
2014	7.20%	961,344	5,122	250,820	88,910	616,482	627,944							
2015	7.20%	1,028,494	4,776	270,649	95,571	657,498	669,443							
2016	7.21%	1,100,533	4,452	292,068	102,788	701,274	713,774							
2017	7.22%	1,177,818	4,151	315,204	110,451	748,012	761,133							
2018	7.22%	1,260,736	3,871	340,199	118,751	797,916	811,726							
2019	7.23%	1,345,701	3,610	367,204	127,683	851,204	865,777							
2020	7.24%	1,445,160	3,367	396,383	137,298	908,112	923,525							

Source : Statistics of Port of Tanjung Emas and Estimated by The study Team