2.4.3 Demand Forecast of Cebu Baseport

(1) Demand Forecast by Macro Analysis

Estimation of two cases as macro analysis are carried out; Case 1 is on the correlation between GRDP in the region and cargo volume through Cebu Baseport, and case 2 is based on containerization trends of total cargo.

1) Cargo Forecast in Case 1

a. Correlation between Cargo Volume and Regional GRDP by Macro Analysis

The correlation between Cargo Volume and GRDP of Region 7, Central Visaya, as socio economic indicator is used for estimating the cargo forecast volume in the macro analysis. The forecast is conducted in the different growth rate of regional GRDP such as low case, medium case and high case for the future GRDP as described in Table 2.4.3-1. This data is based upon the result of the socio-economic analysis in the previous chapter.

Table 2.4.3-1 GRDP Estimation for Cargo Demand Forecast of Cebu Baseport

Unit: Million Pesos

Year	Low	Medium	High
GRDP			
2010	97,191	118,677	143,019
2020	145,256	208,556	294,766
Growth Rate			
2000-2010	4.1%	6.2%	8.2%
2010-2020	4.1%	5.8%	7.5%

Correlation coefficient between GRDP and Cebu Baseport cargo is very high as 0.74 for inbound, 0.93 for outbound for domestic cargo, and 0.86 for import, and 0.86 for export of foreign cargo. Coefficient correlation equation is as follows.

Inbound	$Y=29.636x-923259$
Outbound	$Y=65.623x-1000000$
Import	$Y=26.501x-919180$
Export	$Y=6.9212x-180230$

b. Sensitivity of Low, Medium and High Cases of Demand Forecast

In the high case and low case, there is large difference in traffic forecast. The reason is considered due to higher growth rate of cargo volume compared with GRDP. Foreign cargo, especially, shows much difference as shown in Table 2.4.3-2.

Table 2.4.3-2 Summary of Ratio of Traffic Growth Rate to GRDP Growth Rate

Case	2000-2010			2010-2020		
	GRDP	Cargo	Cargo/GRDP	GRDP	Cargo	Cargo/GRDP
Domestic						
Low	4.1%	5.1%	1.24	4.1%	4.0%	1.0
Medium	6.2%	7.2%	1.16	5.8%	5.7%	1.0
High	8.2%	9.1%	1.11	7.5%	7.3%	1.0
Foreign						
Low	4.1%	5.4%	1.31	4.1%	5.8%	1.41
Medium	6.2%	8.4%	1.35	5.8%	7.4%	1.27
High	8.2%	11.2%	1.36	7.5%	9.0%	1.20

c. Result of Macro cargo forecast of Cebu Baseport

Table 2.4.3-3, Fig. 2.4.3-1 and Fig. 2.4.3-2 show the figure by domestic cargo and foreign cargo. Appendix Table A2.4.3-1 and A2.4.3-2 show inbound and outbound transport volume of domestic cargo, and import and export of foreign cargo more in details.

Table 2.4.3-3 Cargo Forecast by Macro Analysis, Cebu Baseport

Unit: Metric Tons

| Year	GRDP	Domestic	Foreign	Total
1990	47,193	3,572,696	550,872	4,123,568
1991	46,971	4,214,747	262,921	4,477,668
1992	47,086	4,160,424	487,843	4,648,267
1993	47,757	4,073,895	351,669	4,425,564
1994	49,663	4,320,846	491,737	4,812,583
1995	52,327	3,998,244	801,336	4,799,580
1996	56,615	4,468,156	747,829	5,215,985
1997	59,926	4,755,554	683,188	5,438,742
1998	60,771	5,821,570	853,290	6,674,860
1999	63,101	5,690,476	863,023	6,553,499
2000	65,031	5,515,566	1,144,631	6,660,198
Case		Domestic	Foreign	Total
a) Low Estimation				
2010	97,191	9,154,105	2,036,441	11,190,546
2020	145,256	13,718,592	3,579,609	17,298,201
b) Medium Estimate				
2010	118,677	11,194,462	2,726,247	13,920,710
2020	208,556	19,729,828	5,611,896	25,341,723
c) High Estimation				
2010	143,019	13,506,104	3,507,770	17,013,874
2020	294,766	27,916,798	8,379,758	36,296,556
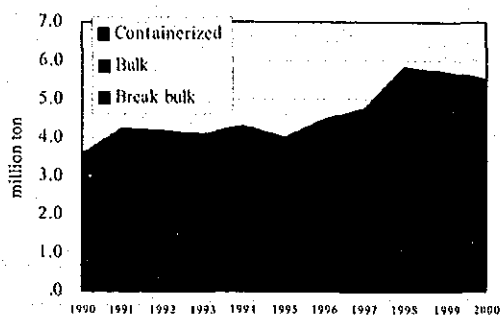
Fig. 2.4.3-1 Domestic Cargo, 1990 - 2000
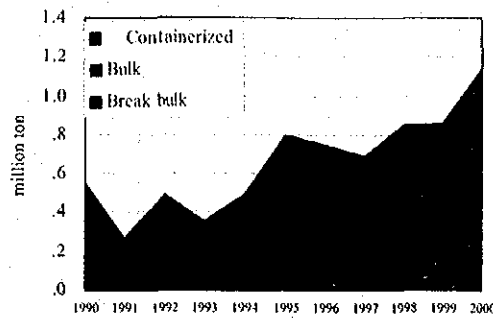

Fig. 2.4.3-2 Domestic Cargo, 1990 - 2000

(2) Demand Forecast of Conventional/Containerized Cargo Volume

1) Forecast of Containerized Cargo Volume

The other approach to estimate the total cargo volume is carried out as macro analysis based on the containerization of break bulk cargo and trend in the future ratio of containerization. The containerized cargo volume of inbound/outbound of domestic and import/export of foreign basis and the number of container (TEU) under the conditions of "with project" is estimated and considering the following impacts.

- Bulk cargo volume has been small quantity, tentatively it is included as parts of the conventional cargo
- Diversion of Manila Transit Cargo
- Diversion of Traffic from Visayas Region
- Influence of Development of the new San Remigio port and Toledo port

2) Containerization Ratio

Maritime container transport is highly developed throughout the world.   Vessels used in the Cebu Port are expected to be replaced with larger-sized ones and also will be containerized. Average containerization ratio of the Cebu Baseport for the year 2000 was 47% in domestic cargo and 60% in foreign cargo.

To estimate the volume of containerized cargo, the following containerization ratio is applied for inbound/ outbound domestic and import /export foreign cargo respectively.

Year	Domestic Cargo		Foreign Cargo	
	Inbound	Outbound	Import	Export
2000	50%	43%	50%	93%
2010	50%	50%	80%	93%
2020	65%	65%	85%	93%

These ratios were computed based on the containerized ratio of inbound / outbound of domestic cargo and the import / export of foreign trade from the actual ratio of each

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commodities between 1991 to 1999. The detailed containerization ratio of each commodity between 1991 to 1999 is shown in Appendix Table A2.4.3-16.

The respectively considered impacts are described as follows:

3) Conventional Cargo (break-bulk + bulk cargo)
Bulk cargo volume is small, about 1% of total domestic cargo and 5% of the total foreign cargo volume. Therefore tentatively it is included as part of conventional cargo in break-bulk cargo.

4) Diversion of Manila Transit Cargo
With project, transit cargo volume via Manila at present is 7% of the total container cargo. This is expected in the future to divert to foreign cargo with project. Consequently, the domestic inbound and outbound cargo volume will be shifted to foreign cargo import and export volume. This diversion is expected to gradually increase from year 2010 to 9% in 2020.

5) Estimation of Diverted Traffic from Visayas Region
Some containerized cargoes -- mainly domestic inbound cargo presently handled in ports such as Dumaguete, Iloilo, Tacloban and Tagbilaran as well as in other private ports in Visayas region -- is expected to divert to the new Cebu Baseport upon its completion

Thirty percent (30%) of the foreign cargo will be diverted to the new Cebu port in 2020 as in demand scale as containerized cargo volume indicates. This diversion is expected to gradually generate from year 2010 and reach 30% by year 2020. Cargo diversion is not expected to happen in the Mindanao area since new container handling port will be developed in Mindanao before 2020.

6) Influence of the New San Remigio and Toledo Ports
Cargo flow by sea transport from the Cebu Baseport and Bantayan Island will be affected upon the completion of the New San Remigio port. Furthermore, the Cebu Baseport-West Visayas area will also experience the same effect with the improvement of the Toledo port. As a result, cargo volume handling at Cebu Baseport will decrease since the cargo flow is expected to be diverted from sea transport to land transport.
Result of the estimation shows that the rate of decrease of domestic cargo is 1.6%-1.8% in Cebu Baseport- Bantayan Island and 3.9% in Cebu Baseport-West Visayas. This decrease is negligible since the volume is a small amount. Details of this condition are provided in the analysis of San Remigio port and Toledo port.

7) Summary of Demand Forecast of Conventional/containerized Cargo Volume
Under this exercise, the total cargo volume based on the forecast of containerization is also carried out at low, medium and high level conditions based on the anticipated growth rate of

regional / national development growth. Estimate varies within the range of 40%-50% between the low and high cases.

The recommended case is the medium growth rate because it will be the most realistically obtainable and reflective of past growth rates. Fig. 2.4.3-3 shows total cargo volume and Fig. 2.4.3-4 shows containerized cargo volume. Table 2.4.3-4 also shows low case, medium case and high case of cargo volume. Table 2.4.3-5 shows more in detail.
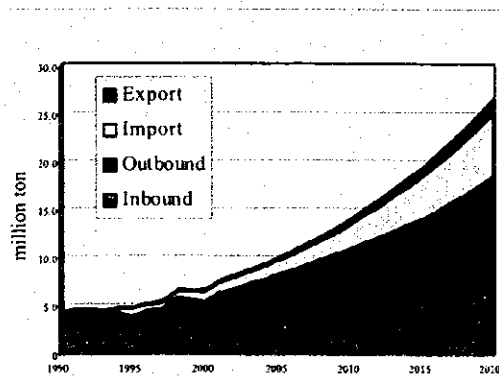
Total Containerized Cargo Volume (Medium Case) are shown below:

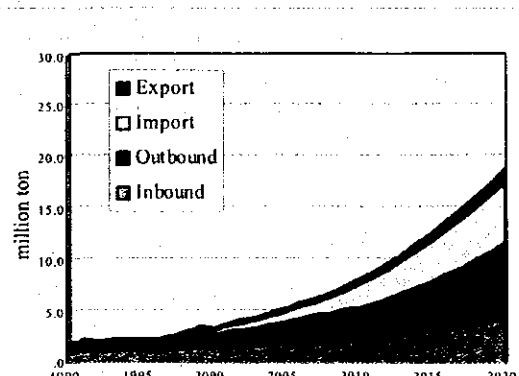| Forecast of Domestic Cargo	Containerized Cargo (tons)	Conventional Cargo(tons)
Year 2010.	5,379,419	5,597,231
Year 2020.	11,670,193	6,905,440
Forecast of Foreign Cargo		
Year 2010	2,663,075	477,024
Year 2020	7,258,169	756,369

Table 2.4.3-4 Summary of Containerized Cargo Volume Estimation, Cebu Baseport

Unit: Metric Tons

Case	Domestic Cargo			Foreign Cargo		
	Conventional	Containerized	Total	Conventional	Containerized	Total
Low Case						
2005	3,880,544	3,528,989	7,409,533	431,789	1,036,694	1,468,484
2010	4,577,052	4,421,240	8,998,293	355,622	1,962,957	2,318,579
2015	4,763,338	5,969,729	10,733,067	422,493	3,255,141	3,677,635
2020	4,801,507	8,114,547	12,916,054	481,833	4,718,033	5,199,865
Medium Case						
2005	4,295,514	3,972,536	8,268,050	511,687	1,224,848	1,736,535
2010	5,597,231	5,379,419	10,976,650	477,024	2,663,075	3,140,099
2015	6,317,440	7,867,940	14,185,379	614,783	4,753,612	5,368,395
2020	6,905,440	11,670,193	18,575,633	756,369	7,258,169	8,014,538
High Case						
2005	4,722,445	4,429,518	9,151,963	593,889	1,418,425	2,012,314
2010	6,753,052	6,452,732	13,205,783	614,567	3,485,568	4,100,135
2015	8,254,658	10,212,542	18,467,200	854,475	6,673,649	7,528,124
2020	9,770,879	16,512,786	26,283,665	1,130,271	10,718,225	11,848,496

Fig. 2.4.3-3 Total Cargo Volume

Fig. 2.4.3-4 Containerized Cargo Volume

Table 2.4.3-5 Detailed Estimation of Containerized Cargo, Cebu Baseport

Unit: Metric Tons

Year and Cases		Domestic Cargo			Foreign Cargo		
		Inbound	Outbound	Total	Import	Export	Total
Detailed of Low Case							
2010	Conventional	1,899,964	2,677,089	4,577,052	329,006	26,616	355,622
	Containerized	1,835,285	2,585,955	4,421,240	1,536,929	426,027	1,962,957
2020	Conventional	1,827,709	2,973,799	4,801,507	436,133	45,700	481,833
	Containerized	3,088,828	5,025,720	8,114,547	3,764,068	953,965	4,718,033
Detailed of Medium Case							
2010	Conventional	2,217,807	3,379,424	5,597,231	441,877	35,147	477,024
	Containerized	2,131,503	3,247,916	5,379,419	2,092,727	570,348	2,663,075
2020	Conventional	2,483,203	4,422,236	6,905,440	685,536	70,833	756,369
	Containerized	4,196,614	7,473,580	11,670,193	5,806,958	1,451,212	7,258,169
Detailed of High Case							
2010	Conventional	2,577,911	4,175,141	6,753,052	569,756	44,811	614,567
	Containerized	2,463,267	3,989,465	6,452,732	2,745,639	739,929	3,485,568
2020	Conventional	3,375,951	6,394,929	9,770,879	1,025,209	105,062	1,130,271
	Containerized	5,705,357	10,807,429	16,512,786	8,589,261	2,128,964	10,718,225

8) Comparison of Demand Forecast by Macro in GRDP and Containerization Basis

Following is the comparison of cargo volume between GRDP basis macro analysis (case1) and containerization trend basis macro analysis with project (case 2) for the medium case.

Domestic/Foreign Cargo	Traffic Forecast Volume (tons/year)	
	Case 1	Case 2
Domestic Cargo Volume		
Year 2010	11,194,000	10,976,650
Year 2020	19,729,828	18,575,633
Foreign Cargo Volume		
Year 2010	2,726,247	3,140,099
Year 2020	5,611,896	8,014,538

Domestic cargo forecast volume is less in containerized basis analysis, while foreign cargo volume is more in GRDP basis analysis. In the low and high cases it was found the same. Volume of inbound and outbound, import and export containerized cargo volume by case of low, medium and high is shown in Appendix Tables A2.4.3-4 to A2.4.3-15. These tables are also shown number of containers (TEU).

(3) Forecast of Number of Container Cargo

1) Number of Full and Empty Containers at Cebu Base Port in 1998 to 2000

The number of container of inbound/outbound of domestic and import/export of foreign cargo with the sequence of 1) setting up containerization ratio, 2) cargo volume per TEU, and 3) ratio of "full" and "empty" of containers for the forecast. Actual ratio of full and empties of

domestic and foreign containers through Cebu Baseport from 1998 to 2000 is shown in Table 2.4.3-6.

Table 2.4.3-6 Number of Full and Empty Containers at Cebu Baseport

Domestic Cargo						
Year	Inbound			Outbound		
	Full	Empties	% of Full	Full	Empties	% of Full
1998	115,501	29,962	79%	79,501	50,384	61%
1999	131,885	33,850	80%	95,295	66,606	59%
2000	127,660	23,751	84%	83,231	65,676	56%
Foreign Cargo						
Year	Import			Export		
	Full	Empties	% of Full	Full	Empties	% of Full
1998	25,872	4,352	86%	25,356	6,855	79%
1999	32,642	5,611	85%	31,660	9,149	78%
2000	39,095	11,922	77%	42,759	10,167	81%

Source: CPA Data
Note: Total for years 1998, 1999, 2000 are summed up of 1-12 months of original data.

Based on the above ratio of full containers, the ratio of full container for 2020 is set as follows. The cargo volume ton per TEU of domestic and foreign container is set as follows for estimation of number of container boxes:

Table 2.4.3-7 Ratio of Full Containers and Cargo Volume per TEU

	Domestic (%)		Foreign (%)	
	Inbound	Outbound	Import	Export
1998-2000 (actual)	84.3	56	76.6	80.8
In 2020	61.9	90	85.0	43.4
	Domestic (ton/TEU)		Foreign (ton/TEU)	
	Inbound	Outbound	Import	Export
1997-2000 (actual)	11.2	13.8	11.4	5.6
2000-2020	11.2	13.8	11.4	5.6

2) Estimation of Number of Container

Number of containers is estimated by the use of empirical value for ton/TEU from the forecasted containerized cargo volume. The number of full and empty containers are estimated by considering the estimated containerized rate by commodities and trends of domestic and foreign trades. Due to the decrease trends of the amount of GRDP in year 1999 and 2000, the growth rate of GRDP for 2000 - 2020 has resulted in decrease trends. The reasonable estimate is taken from the medium case. Table 2.4.3-8 shows the result of low, medium and high cases forecast of the number of container at Cebu Baseport.

The most reasonable result is the medium case among the low, medium and high cases as follows.

Table 2.4.3-8 Number of Full and Empty Containers of Domestic and Foreign Trades in TEU Projection, Cebu Baseport
<div align="right">Unit: TEU</div>

Case	Domestic Cargo			Foreign Cargo		
	Full	Empty	Total	Full	Empty	Total
Low Case						
2005	282,160	72,456	354,616	115,334	50,532	165,866
2010	351,253	98,479	449,731	210,895	115,938	326,832
2015	472,370	130,461	602,831	347,354	192,001	539,355
2020	639,971	169,324	809,295	500,532	276,365	776,897
Medium Case						
2005	317,480	83,248	400,728	135,967	60,716	196,683
2010	425,669	139,186	564,855	285,420	159,604	445,024
2015	619,817	202,072	821,889	506,138	284,079	790,217
2020	916,261	287,214	1,203,475	768,527	430,019	1,198,547
High Case						
2005	353,877	94,293	448,170	157,194	71,194	228,388
2010	509,026	184,794	693,820	372,976	210,892	583,868
2015	801,947	290,418	1,092,365	709,603	402,027	1,111,630
2020	1,292,554	447,773	1,740,327	1,133,616	639,193	1,772,809

(4) Estimation of Cargo Volume by Commodity Items(Micro Analysis)

1) Selection of Major Commodities for Forecast
CPA classifies the handling cargo in to 35 commodities. Out of 35 commodities, 18 items are selected, which reaches to 91% of the total domestic cargo.

Cargo commodities handled in the past 10 years vary according to the year, and according to domestic and foreign cargo. For example, iron and steel, and transport equipment for domestic outbound cargo has the tendency to increase in recent years, but the inbound cargo rice and corns have decreased.

Major 18 commodities for micro analysis are selected based on 1999 actual cargo volume. The detailed breakdown of mode of transport of 18 commodities in 1999 is shown in Appendix Table A.2.4.3-17. Table 2.4.3-9 shows the 18 commodities in detail. Selected major commodities cover 90% of total domestic cargo volume and 12 commodities of the 18 commodities cover 94% of total foreign cargo volume in 1999. The percentage (%) of coverage of total cargo volume by these 18 items in 1999 is the same as during 1990 - 1998.

Table 2.4.3-9 Main 18 Commodity for Estimation at Cebu Baseport, 1999

Unit: Metric Tons

No.	Commodity	Total Cargo	%
1	Other General Cargo	1,701,845	26%
2	Iron & Steel	528,855	8%
3	Animal feeds	436,388	7%
4	Chemicals	388,616	6%
5	Corn	337,263	5%
6	Crude Minerals	293,039	4%
7	Manufactures of Metal	245,893	4%
8	Transport Equipment	245,602	4%
9	Palay & Rice	244,381	4%
10	Machine & Electric Equipment	233,066	4%
11	Bottled cargo	231,397	4%
12	Fruits & Vegetables	190,726	3%
13	Plywood & Veneer	164,823	3%
14	Furniture	164,515	3%
15	Lumber	157,589	2%
16	Cement	149,615	2%
17	Wheat	121,898	2%
18	Paper & Pulp	109,583	2%
	18 Total	5,945,095	91%
	Total cargo	6,553,449	100%

Source: CPA

2) Estimation Methodology by 18 Commodities

Estimation for the future volume of 18 commodities is based upon cargo volume of medium case of containerization basis by macro analysis. The estimation was carried out by the four steps as follows.

Step -1 After carrying out correlation analysis between data of handling volume in 1991-2000 by each commodity and by socio-economic data such as GRDP, agriculture, manufacture, construction, utilities and service of Region 7, higher socio-economic indicator of correlation coefficient, which is over 80, was selected. Then through regression analysis, volume of commodity was projected. Table 2.4.3-10 shows analysis result of commodities, which are found high correlation.

Step -2 As with commodities of low correlation with socio-economic indicators, average annual growth rate during 1991 - 2000 was calculated. Then elasticity was multiplied with the result to find future projection. Following elasticity was used. It is derived from macro analysis.

Domestic Commodities	Inbound: 2000-2010	0.7
	Inbound: 2100-2020	0.8
	Outbound: 2000-2010	1.6
	Outbound: 2100-2020	1.1
Foreign Commodities	Import: 2000-2010	1.5
	Import: 2100-2020	1.3
	Export: 2000-2010	1.2
	Export: 2100-2020	1.3

Step -3 Those 18 commodities amount to 91% of the total domestic cargo.   The remainder of 9% is classified as the "rest".   The inconsistency between the total of Step (1) and (2) and the cargo volume of micro analysis (medium case) is adjusted by the volume of the rest of commodities to meet the forecast volume by containerization basis analysis.

Step -4 Estimation result is corrected by supply and demand balance, potentiality and by future trend of production and consumption.

Table 2.4.3-10 Correlation Coefficient for Commodity Projection, Cebu Baseport Domestic Inbound and Outbound Commodity

Unit: Metric Tons

	Commodity Items		Growth Rate 1991-2000	Subject of Correlation	Correlation Coefficient	Regression Formula	Applied Growth Rate	
							2000-2010	2010-2020
1	Iron & Steel	Outbound	12.6%	GRDP	0.95	Y=7.5066x-294272	12.1%	8.0%
2	Animal feeds	Outbound	11.2%	GRDP	0.97	Y=9.3748x-330172	11.0%	7.7%
3	Chemicals	Inbound	17.5%	Manufacturing	0.93	Y=47.398x-69190	11.1%	8.8%
4	Chemicals	Outbound	25.7%	GRDP	0.94	Y=8.6544x-396260	14.4%	8.5%
5	Crude Minerals	Inbound	48.6%	Manufacturing	0.90	Y=55.986x-532717	12.1%	6.3%
6	Crude Minerals	Outbound	39.1%	GRDP	0.90	Y=2.7226x-112365	12.7%	8.1%
7	Manufactures of Metal	Inbound	35.1%	Construction	0.76	Y=33.178x-40578	10.6%	8.6%
8	Manufactures of Metal	Outbound	48.8%	Construction	0.93	Y=38.039x-65141	11.8%	9.0%
9	Transport Equipment	Outbound	6.3%	GRDP	0.91	Y=3.5706x-103715	9.7%	7.3%
10	Mach. & Elect. Equipt.	Inbound	6.5%	Manufacturing	0.88	Y=16.471x-134704	10.0%	5.8%
11	Mach. & Elect. Equipt.	Outbound	10.8%	Manufacturing	0.86	Y=16.555x-141768	10.5%	6.0%
12	Plywood & Veneer	Inbound	7.9%	Manufacturing	0.91	Y=15.288x-106047	8.7%	5.5%
13	Plywood & Veneer	Outbound	11.0%	Manufacturing	0.89	Y=10.494x-77862	9.1%	5.6%
14	Furniture	Inbound	1.2%	Manufacturing	0.81	Y=2.2748x-13609	7.8%	5.2%
15	Furniture	Outbound	4.5%	Manufacturing	0.88	Y=24.344x-192344	9.7%	5.8%
16	Lumber	Inbound	5.9%	GRDP	0.96	Y=2.5443x-50218	8.3%	6.8%
17	Lumber	Outbound	15.7%	GRDP	0.96	Y=1.6711x-65938	12.1%	8.0%
18	Paper & Pulp	Inbound	23.5%	GRDP	0.91	Y=2.5763x-107334	12.8%	8.1%
19	Paper & Pulp	Outbound	13.3%	GRDP	0.83	Y=1.539x-68732	14.0%	8.4%
Foreign Import & Export Commodity								
1	Iron & Steel	Import	58.0%	GRDP	0.88	Y=12.226x-580472	15.2%	8.6%
2	Animal feeds	Import	35.5%	Agriculture	0.95	Y=12.342x-87979	11.1%	5.8%
3	Chemicals	Import	21.5%	Agriculture	0.97	Y=61.385x-420610	9.7%	5.5%
4	Crude Minerals	Import	5.4%	Agriculture	0.80	Y=22.029x-154417	10.5%	5.7%
5		Export	33.8%	GRDP	0.96	Y=1.2172x-55570	14.4%	8.5%
6	Transport Equipment	Import	18.3%	GRDP	0.87	Y=2.7339x-94769	10.9%	7.6%
7	Mach. & Elect. Equipt.	Import	23.7%	GRDP	0.98	Y=4.7579x-202683	13.2%	8.2%
8		Export	9.0%	Agriculture	0.86	Y=2.4263x-15058	7.6%	4.8%
9	Plywood & Veneer	Import	97.4%	Agriculture	0.85	Y=9.6536x-68476	10.9%	5.8%
10	Furniture	Import	36.8%	GRDP	0.99	Y=0.2292x-10082	13.7%	8.3%
11	Paper & Pulp	Import	63.1%	GRDP	0.94	Y=0.7716x-36617	15.2%	8.6%

3) Estimation of Cargo Demands by Commodity Basis Analysis

With project, future volume projection of 18 items is listed on Table 2.4.3-11 for domestic cargo and Table 2.4.3-12 for foreign cargo. The detailed estimate of each commodity of domestic and foreign cargoes are shown in Appendix Table A2.4.3-18 "Estimation of Cargo volume by Commodity, Cebu Baseport", and Appendix Table A2.4.3-19 "Summary of Estimation of Cargo Volume by Non-container and Container, Cebu Baseport 2010 and 2020".

Table 2.4.3-11 Summary of Domestic Cargo Estimation by Commodity at Baseport

Unit: Metric Tons

	Commodity Items		2005	2010	2015	2020
1	Iron & Steel	Inbound	263,348	312,775	366,126	428,577
		Outbound	361,015	589,239	875,361	1,254,659
2	Animal feeds	Inbound	199,562	246,793	309,614	388,427
		Outbound	488,226	773,269	1,130,625	1,604,354
3	Chemicals	Inbound	264,720	397,413	530,215	691,789
		Outbound	359,621	623,092	953,403	1,391,280
4	Corn	Inbound	226,976	204,037	189,400	175,814
		Outbound	82,684	85,586	87,682	89,830
5	Crude Minerals	Inbound	371,039	570,409	769,944	1,012,708
		Outbound	124,817	207,157	310,387	447,233
6	Manufactures of Metal	Inbound	141,052	232,916	358,897	542,905
		Outbound	143,092	248,407	392,834	603,785
7	Transport Equipment	Inbound	54,866	48,302	43,885	39,872
		Outbound	207,803	316,205	452,107	632,264
8	Palay & Rice	Inbound	203,683	237,178	264,014	293,886
		Outbound	88,188	109,059	136,821	171,649
9	Mach. & Elect. Equipt.	Inbound	133,695	192,678	251,710	323,532
		Outbound	125,992	183,931	241,918	312,468
10	Bottled cargo	Inbound	44,702	30,548	22,979	17,285
		Outbound	188,927	216,402	239,845	265,826
11	Fruits & Vegetables	Inbound	147,612	177,415	201,966	229,913
		Outbound	76,124	93,965	109,008	126,460
12	Plywood & Veneer	Inbound	142,518	196,893	251,312	317,522
		Outbound	93,859	131,919	170,012	216,356
13	Furniture	Inbound	22,067	29,280	36,498	45,281
		Outbound	195,842	277,321	358,866	458,079
14	Lumber	Inbound	171,841	249,154	346,081	474,571
		Outbound	79,600	130,103	193,418	277,352
15	Cement	Inbound	2,449	425	147	51
		Outbound	214,716	327,157	428,802	562,025
16	Wheat	Inbound	40,409	36,471	33,950	31,603
		Outbound	78,175	79,970	81,253	82,557
17	Paper & Pulp	Inbound	117,510	195,796	293,944	424,053
		Outbound	65,669	112,506	171,227	249,069
18	Other Gen. Cargo	Inbound	844,133	900,447	923,184	946,496
		Outbound	957,794	1,137,558	1,195,585	1,256,572
19	Rest	Inbound	132,394	90,380	130,278	295,532
		Outbound	811,329	984,492	1,332,082	1,893,998
	Total	Inbound	3,524,576	4,349,310	5,324,144	6,679,817
		Outbound	4,743,474	6,627,340	8,861,235	11,895,816
		Total	8,268,050	10,976,650	14,185,379	18,575,633

Table 2.4.3-12 Summary of Foreign Cargo Estimation by Commodity at Baseport

Unit: Metric tons

	Commodity Items		2005	2010	2015	2020
1	Iron & Steel	Import	489,047	862,788	1,331,343	1,952,482
		Export	746	1,263	1,713	2,322
2	Animal feeds	Import	24,658	37,145	50,091	64,596
		Export	329	313	306	298
3	Chemicals	Import	139,138	200,925	264,983	336,753
		Export	16,577	24,024	29,958	37,358
4	Crude Minerals	Import	39,519	56,883	74,886	95,057
		Export	4,966	6,171	7,668	9,528
5	Manufactures of Metal	Import	31,296	38,007	42,656	47,874
		Export	50,614	87,559	133,877	195,279
6	Transport Equipment	Import	143,053	225,428	328,700	465,603
		Export	96	86	80	74
7	Mach. & Elect. Equipt.	Import	212,649	357,293	538,632	779,024
		Export	50,696	129,164	236,513	433,079
8	Fruits & Vegetables	Import	37,042	123,212	285,793	662,904
		Export	6,964	9,335	11,793	14,546
9	Plywood & Veneer	Import	19,636	29,411	39,546	50,900
		Export	33	30	28	26
10	Furniture	Import	9,900	16,845	25,552	37,095
		Export	60,828	72,398	80,564	89,651
11	Paper & Pulp	Import	30,814	54,337	83,829	122,924
		Export	154	199	230	266
12	Other Gen. Cargo	Import	157,763	251,777	363,142	523,767
		Export	79,424	114,023	162,935	232,828
13	Rest	Import	65,154	280,553	907,438	1,353,516
		Export	65,440	160,929	366,141	506,789
Total		Import	1,399,668	2,534,604	4,336,590	6,492,494
		Export	336,868	605,495	1,031,805	1,522,044
		Total	1,736,535	3,140,099	5,368,395	8,014,538

4) Sensitivity

The difference of forecast volume between the Commodity basis and Macro GRDP basis of domestic cargo are found very minimal, but for the foreign cargo there are some as shown in the Table 2.4.3-13 below.

Table 2.4.3-13 Comparison of Cargo forecast between Commodity Basis and Macro Basis

Domestic Cargo Forecast Volume (1,000 tons)				
Method	2010		2020	
	Inbound	Outbound	Inbound	Outbound
By Commodity basis	4,349	6,627	6,679	11,896
By Macro basis	4,436	6,758	7,095	12,635
Rate of Difference(C/M)	98.0%	98.1%	94.2%	94.2%

Foreign Cargo Forecast Volume (1,000 tons)				
Method	2010		2020	
	Import	Export	Import	Export
By Commodity basis	2,534	605	6,492	1,522
By Macro basis	2,210	517	4,571	1,042
Rate of Difference(C/M)	115%	117%	142%	146%

(C/M): Ratio of Commodity basis by Macro GRDP basis

In general, projection by commodity can be obtained from production trend, consumption trend, and supply and demand trend of each commodity.

Analysis based upon sector correlation and elasticity between cargo and indicators as undertaken in this study can make more correct projection of the volume. The cargo demand forecast derived from the commodities basis will be more accurate and projected trends of cargo and economic activities, which volume thus are taken for planning the project.

5) Demand Forecast of Cargo Traffic for the Study

There are transshipment cargoes in the domestic containerized cargo to the foreign cargo in the above table. After the planned project is implemented, it is anticipated that foreign container cargo will be directly delivered /collected from the New Cebu Port which at present are transported to/from Manila (North harbor) port for transshipment. Such transshipment of domestic containerized cargo is adjusted to the foreign containerized cargo. The demands forecast of cargo for the study of the project is shown below.

Table 2.4.3-14 Demand Forecast of Cargo Traffic for the Study

Domestic Cargo (1,000 tons)							
Year	Non-Containerized Cargo			Containerized Cargo			Total
	Inbound	Outbound	Total	Inbound	Outbound	Total	
2000	1,435	1,506	2,941	1,426	1,148	2,574	5,515
2010	2,218	3,379	5,597	2,132	3,248	5,380	10,977
2020	2,483	4,422	6,905	4,197	7,474	11,671	18,576

Foreign Cargo (1,000 tons)							
Year	Non-Containerized Cargo			Containerized Cargo			Total
	Import	Export	Total	Import	Export	Total	
2000	442	17	459	446	239	685	1,144
2010	442	35	477	2,093	570	2,663	3,140
2020	686	71	757	5,807	1,451	7,258	8,015

(5) Estimation of Passenger Traffic

1) Macro Forecast of Passenger Traffic
Estimation of two cases as macro analysis were carried out; Case 1 is on the correlation between population in the direct hinterland and passenger traffic through Cebu Baseport, and Case 2 is in the indirect hinterland.

a. Case 1, Regression Analysis by Direct Hinterland
Population in year 2000 is 5,701,064. Population growth rate for 10 years between 1990-2000 was 1.64% per annum. Passenger traffic in 2000 was 10,059,050. Its growth rate for 10 years between 1990-2000 was 9.4%.
Correlation between the population and passenger traffic, the correlation coefficient is 0.96, which is very high. Correlation equation: $Y=9.7774x-40000000$
(Y=Passenger traffic, x = population)
Elasticity between the population and traffic is based on correlation equation.

    2000-2010
-     Population growth rate : 1.59%
-     Growth rate of passenger traffic : 7.1%
-     Elasticity : 4.5

    2010-2020
-     Population growth rate : 1.10%
-     Growth rate of passenger traffic : 3.0%
-     Elasticity : 2.7

b. Case 2, Regression Analysis by Indirect Hinterland
Ten Regions as the indirect hinterland were selected according to Origin-Destination survey. Passenger traffic for each region for target years 2010 and 2020 was estimated based on the result of the elasticity figure. Population projection for each of the 10 regions is listed in Appendix Table A2.4.3-20 'Estimation of Population Growth Rate by Region, 1990 - 2020'.

Table 2.4.3-15 shows the estimation result. More detail is shows in Appendix Table A2.4.3-21 'Estimation of Passenger Traffic Correlation with Direct and Indirect Hinterland Population, Baseport'.

Table 2.4.3-15 Estimation of Passenger Demand at Cebu Baseport

Unit: No. Of Passenger

Year	Case I		Case 2		
	Population	Passenger	Population		Passenger
	Region 7		Share of Indirect Hinterland		Year 2000
1990	4,594,124	4,098,854	C. Visaya	31.4%	3,162,361
1991	4,694,378	3,890,632	E. Visaya	25.0%	2,513,257
1992	4,796,819	4,142,362	N. Mindanao	12.3%	1,233,819
1993	4,901,496	4,276,358	National Capital R.	8.8%	887,553
1994	5,008,458	5,246,008	C. Mindanao	8.4%	849,877
1995	5,117,753	6,334,552	Caraga	6.9%	693,713
1996	5,229,433	7,502,086	W. Visayas	4.4%	440,837
1997	5,343,551	9,517,438	Bicol	1.8%	179,203
1998	5,460,159	10,279,804	W. Mindanao	0.7%	71,703
1999	5,579,311	10,432,761	S. Mindanao	0.3%	26,725
2000	5,701,064	10,059,048		100.0%	10,059,048
Estimation					
2010	6,757,759	18,463,944			17,220,944
2020	7,628,918	24,711,548			22,902,114

d. Sensitivity

The projection of passenger traffic of Cases 1 and 2 are summarized below.

Case of Passenger Traffic	Traffic Volume	Remarks
Case 1		
Year 2010	18,463,944	1.85 times of 2000 traffic
Year 2020	24,711,548	2.47 times of 2000 traffic
Case 2		
Year 2010	17,220,944	1.72 times of 2000 traffic
Year 2020	22,902,114	2.29 times of 2000 traffic

Passenger traffic volume in Case 1, direct hinterland, was derived bigger than the case of indirect hinterland. Less passenger traffic volume by indirect hinterland is due to the fact that passenger traffic growth rate of using metro bus boats /small boats between Cebu Baseport and Mactan Island is rather low growth.

2) Forecast of Passenger Traffic by Type of Vessels

In micro analysis passenger traffic is estimated based on the traffic trends by type of vessel. The share of passenger traffic using each type of vessels in year 2000 are shown in Table 2.4.3-16. The presently operating type of vessels for transporting passengers in different purpose of services are described as follows:

Water Taxi (Metro Bus) and Small Craft: These types are operating between the Cebu Baseport and Mactan Island service. The trip takes about 15-20 minutes. Data in Table 2.4.3-16 show that around 23% of the passengers embark/disembark at the Cebu Baseport.

Metro bus compete with jeepneys that charge 7 pesos as compared with their charge of 8 to 10 pesos. Wooden vessel is mainly used, and the speed is slow and it is not very comfortable to ride. In the future it is not expected to increase because of income increase, motorization, and others. It is estimated that rate will be 0% every year. With the same reason, small craft will be decreased at the rate of minus 2% per year due to higher technology.

Large RORO: This type is mainly operating between Manila, Cagayan, and Nasipit service. The charge is expensive, but its traffic has been increasing at the rate of 16% annually from 1996 to 2000. As container cargo volume carried by this Ro-Ro increase, passenger traffic is expected to increase also. For the estimation of passenger of Large Ro-Ro, higher elasticity is applied based on macro estimation of Case 1.

Fast Craft and Convention ship: Fast ferry is the prime means of water transportation, that is offering fast, comfortable and convenience to passenger traffic. A large portion of the total passenger has an origin and destination to Tagbilaran, Bohol, and Ormoc. Data of passenger traffic for sightseeing is not available. However, number of tourists, beside daily passengers, is expected to increase in the future for there are many sightseeing resources in the hinterland and for income increase at the rate of 6% annually.

Competitors to fast craft are conventional cargo/ passenger ships, which transported 52% of total passenger in 2000. In the middle of 1990's, water ferry system was introduced and become popular and successful particularly in the Mindanao/Visayas region. It trimmed the transit time from slower conventional cargo/passenger ships by 50 to 70% since it only accommodate passengers. Future passenger forecast in terms of passenger growth rate is estimated at higher elasticity to fast craft than conventional ship.

Passenger traffic estimation by vessel type is listed below on comparison with the present traffic.

Table 2.4.3-16 Indicators for Estimation of Passenger by Vessel, Cebu Baseport

| Year	Macro Estimation		Estimation Indicator by Vessel Types					
	Case 1	Case 2	Large Ro-Ro	Fast Craft	Conventional	Metro Bus	Small Craft	Total
1) Share								
2000			7%	18%	52%	23%	0.8%	100%
2010			8%	22%	56%	14%	0.4%	100%
2020			10%	23%	56%	11%	0.3%	100%
2) Growth Rate:								
1996-2000	7.6%	7.6%	15.8%	5.82%	12.87%	-1.13%	-0.2%	7.61%
2000-2010	7.5%	6.1%	7.5%	7.5%	6.1%	0.0%	-2.0%	5.3%
2010-2020	3.0%	2.5%	4.0%	3.0%	2.5%	0.0%	-2.0%	2.4%
3) Passenger traffic Elasticity to Population								
1990-2000	4.6	4.6	9.6	3.5	7.9			4.6
2000-2010	5.4	4.4	5.4	5.4	4.4			3.8
2010-2020	2.7	2.3	3.6	2.7	2.3			2.2

2) Result of Passenger Traffic Forecast

Table 2.4.3-17 shows the estimation in details. Appendix Table A2.4.3-22 shows the original data of passenger traffic volume by each management office of the Cebu Baseport from 1996 to 2000.

Table 2.4.3-17 Summary of Passenger Traffic Forecast by Vessel Types, Cebu Baseport

Unit: No. of Passenger

Year	Large Ro-Ro	Fast Craft	Conventional	Metro Bus	Small Craft	Total
2000	668,575	1,799,617	5,217,768	2,288,979	84,109	10,059,048
2005	905,803	2,438,169	6,827,077	2,288,979	76,028	12,536,057
2010	1,227,207	3,303,298	8,932,743	2,288,979	68,723	15,820,949
2015	1,493,085	3,821,514	10,301,350	2,288,979	62,120	17,967,048
2020	1,816,566	4,421,027	11,879,645	2,288,979	56,152	20,462,368

The details of passengers traffic actually using type of vessels for 1996 to 2000 and forecast thereof according to the type of vessels till 2010 and 2020 is shown in Appendix Table A2.4.3-23.
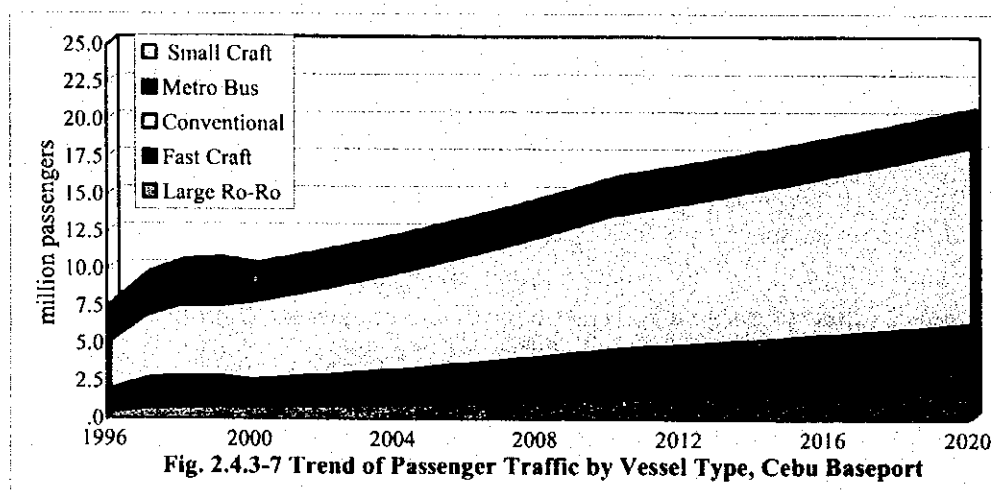
Fig. 2.4.3-7 Trend of Passenger Traffic by Vessel Type, Cebu Baseport

3) Sensitivity

Income increase does not always agree with passenger increase. Passenger traffic volume will be affected by characteristics of vessel types and by quality of service. Consequently, the projection by vessel types does not agree with the estimate derived from regression analysis based on population and passenger traffic as in Cases 1 and 2.

Case 1 is the projection on the correlation between population and passenger traffic in the direct hinterland while Case 2 is on the indirect hinterland, which was selected among 10 regions in the Origin-Destination survey. Micro analysis conducted resulted in very close estimates if compared with the results of the macro analysis of Case 2, as follows.

Year	Macro Projection Case 1 (Direct hinterland)	Macro Projection Case 2 (Indirect hinterland)	Micro Projection (By Vessel types)
2010	18,463,944	17,220,944	15,820,949
2020	24,711,548	22,902,114	20,462,368

Micro projection above proposes to use for the planning of the project and its evaluation, since passenger traffic volume will be sensitive to characteristics of vessel types and to quality of service. Although the projection does not agree with the estimate derived from regression analysis based on population and passenger traffic as calculated in the Cases 1 and 2.

2.4.4 Demand Forecast of Toledo Port

(1) Cargo Estimation

1) Components of Forecast in Cargo Volume

With project, cargo traffic demand of Toledo port consist of the following three different kind of traffic.

- Cargo traffic at the existing Toledo port, which is the normal traffic
- Diverted cargo traffic of Cebu Baseport-Visayas area to Toledo port
- Development traffic generated by new economic activities

2) Forecast of Cargo Volume at Toledo Port

The cargo handling volume at Toledo port has increased rapidly since 1997. Up to 1996, it was only 47,000 tons compared with 110,980 tons in 1997, 305,213 tons in 1999 which means an increase of 2.75 times in 1997 and 6.5 times within three years.

The rapid increase is due to additional traffic by vehicle transport. Table 2.4.4-1 shows breakdown of cargo traffic during 1990 - 1994. Table 2.4.4-2 shows breakdown of cargo in 1999. In 1999 vehicle transport accounted for 54% of the total cargo traffic. Thus, cargo traffic demand was estimated through regression analysis between GRDP of commodity sector in Region 7 and its cargo volume, after subtracting vehicle transport.

Table 2.4.4-1 Top 10 Main Commodity Throughput at Toledo Port, 1990 - 1994

Unit: Metric Tons

Inbound		Outbound		Total (Average tons/year)		
Commodity	%	Commodity	%	Commodity	Tons	%
Sugar	29%	Fertilizer	61%	Fertilizer	80,669	41%
Fish & Fish prep.	23%	Other Gen. Cargo	16%	Sugar	24,259	12%
Paddy & Rice	13%	Corn	5%	Other Gen. Cargo	20,614	10%
Fertilizer	13%	Animal feeds	4%	Fish & Fish prep.	20,403	10%
Crude Minerals	8%	Bottled cargo	4%	Palay & Rice	11,252	6%
Other Gen. Cargo	3%	Crude Minerals	3%	Crude Minerals	10,564	5%
Fruits & Vegetables	3%	Wheat	3%	Corn	6,110	3%
Live Animals	2%	Mach. & Elect. Equipt.	1%	Bottled cargo	4,788	2%
Cement	2%	Coconut Oil	1%	Animal feeds	4,467	2%
Bottled cargo	1%	Fish & Fish prep.	1%	Wheat	3,185	2%
Total	99%	Total	98%		186,311	94%

Source: PPA Annual Statistical Report

Table 2.4.4-2 Component of Main Commodity Throughput at Toledo Port, 1999

Unit: Metric Tons

Inbound Cargo		Outbound Cargo		Total			Exc. Vehicle
Buses	45%	Passenger car	55%	Passenger	105,557	35%	
Empty Bottle	15%	Bottles	25%	Bus	58,415	19%	
Rice	10%	Rice	10%	Bottles	63,322	21%	45%
Dried Product	8%	Fruit & Veg.	10%	Rice	30,521	10%	22%
Passenger car	7%			Vegetable & Product	24,031	8%	17%
Fruit & Veg.	5%			Others	23,367	8%	17%
Corn	5%						
Sugar	5%						
Total	100%	Total	100%	Total	305,213	100%	100%

Source: Interview Survey by JICA Team

3) Forecast of Diverted Traffic Volume from Cebu Baseport

It assumes road improvement of Trans Cebu highway between Cebu City and Toledo. There are two routes: one is 57 km from Cebu via municipality of Naga, and the other is 49 km from Cebu via Trabunok/Manipis mountainous road. According to Origin-Destination survey of sea transport, cargo transport volume amounts to 6.5% of the whole traffic from Cebu City to West Visaya Region by Vessel.

Since the whole cargo traffic may not be diverted to land transport, 60% of the 6.5% of West Visaya, that is 3.9%, was projected as the diverted traffic. Cargo traffic will depend on the development of RORO route of Cebu city-Trans Cebu-Toledo- San Carlos -land transport-Bacolod City (West Coast) -Iloilo

4) Forecast of Development Traffic by Regional Development

Development traffic was projected at 10% of Toledo port cargo volume. The Toledo city is located at the center of the West Coast Cebu province, and situated as the gate port to the East Coast of Negros island with San Carlos, facing with Tanan Strait.

Both ports have high potential for future development as industrial area and business district. Actually there are three routes connecting between Negros and Toledo port, among which Toledo route has the highest development potential from the viewpoint of economically favorable conditions of hinterland location.

There is a plan called West Industrial Park, an export oriented economic zone at Balamban with 209 ha. of land near Toledo port. This project is promoted by joint venture of the Aboitiz group and Tsuneishi. The project has planned the economic zone area as a possibility for shipbuilding, mining, and quarrying and marble mining. Park for tourism is also undergoing. Negros Island on the opposite side basically produces agriculture products, 44% of GRDP is produced in agricultural sector, with development in sugar industry. San Carlos Business Park of 40h has been completed.

5) Results of Forecast of Cargo Volume

Total amount of cargo demand was projected as follows. Table 2.4.4-3 shows more in details with breakdown of traffic.

- In year 2010   1,223,560 tons with growth rate of 8.2% between 2000-2010
- In year 2020   2,3321,290 tons with growth rate of 6.1% between 2010-2020

Table 2.4.4-3 Summary of Cargo Demand Projection of Toledo Port   Unit: Metric Tons

Year	Toledo Port Normal Traffic							Diverted Traffic 3.9%	Dev. Traffic 10%	Total
	Toledo Cargo	Empty Bottle	Rice	Fruit Veget.	Others	Private Car	Buses			
1990	31,923									
1991	64,087									
1992	63,279									
1993	39,927									
1994	37,687									
1995	42,325									
1996	47,814									
1997	51,359									
1998	111,375	45%	22%	17%	17%					
1999	140,586	63,028	30,380	23,920	23,259	104,456	58,756			
2000	108,102	70,971	31,758	25,005	25,875	113,932	64,087	215,107	10,810	557,545
2005	186,500	128,466	39,644	31,214	44,094	175,883	98,934	322,414	16,569	857,219
2010	298,515	232,539	49,490	38,966	75,142	271,519	152,730	436,584	25,395	1,282,365
2015	439,765	346,799	57,505	45,277	108,810	351,520	197,730	579,718	34,382	1,721,743
2020	627,901	517,201	66,819	52,611	157,564	455,093	255,990	769,463	46,550	2,321,291
Growth Rate of Cargo by Sector (Coefficient with GRDP of Region 7: 0.74)										
1990-2000	13.0%									
2000-2010	11.2%	12.6%	4.5%	4.5%	11.2%	12.0%	10.0%	7.3%	8.9%	8.7%
2010-2020	7.7%	8.3%	3.0%	3.0%	7.7%	7.0%	6.0%	5.8%	6.2%	6.1%

Fig. 2.4.4-1 Trend of Cargo Demand of Toledo Port
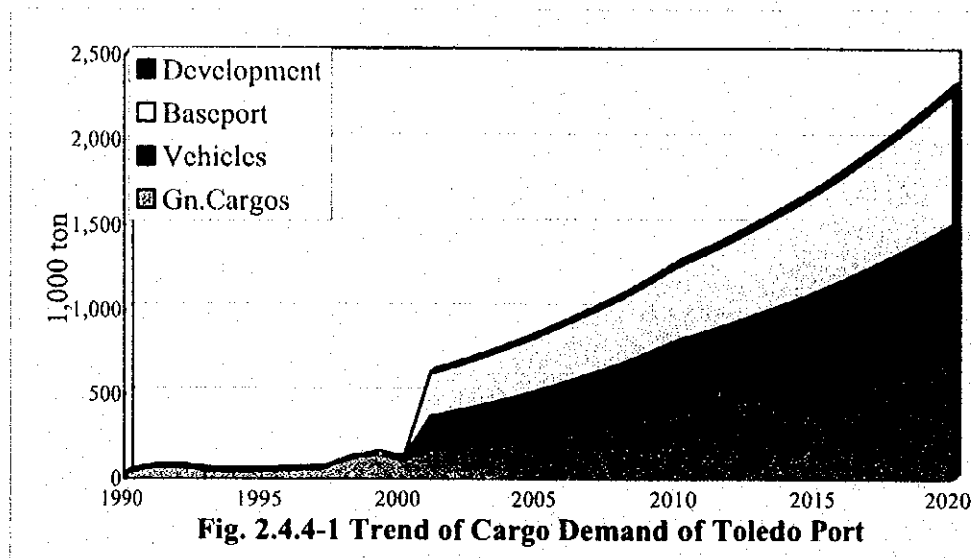
(2) Passenger Traffic Forecast

1) Hinterland Municipality and Population

Normal demand was estimated by regression analysis between the hinterland population and number of passenger at Toledo port. As to population of hinterland, the Third Region has 8 municipalities with population of 431,190 in 2000. Out of those 8 municipalities, 2 municipalities are served by two ports, Tuburan and Tabuelan. Thus, the population of two municipalities are subtracted. Therefore the population of hinterland with 6 municipalities was estimated at 371,420 in 2000.

Table 2.4.4-4 Hinterland Population of Toledo Port,1990 - 2000   Unit: No. of Person

Year	Aloguinsan	Asturias	Balamban	Barilli	Pinamungajan	Toledo City	Total
1990	19,213	30,378	45,896	47,709	40,023	119,774	302,993
1991	19,596	30,556	46,361	48,611	41,007	123,020	309,150
1992	19,986	30,735	46,830	49,530	42,015	126,355	315,450
1993	20,384	30,915	47,304	50,467	43,048	129,779	321,896
1994	20,789	31,096	47,783	51,421	44,106	133,297	328,492
1995	21,203	31,278	48,267	52,393	45,190	136,910	335,241
1996	21,626	31,461	48,755	53,384	46,301	140,621	342,147
1997	22,056	31,645	49,249	54,393	47,439	144,432	349,214
1998	22,495	31,831	49,748	55,421	48,605	148,347	356,447
1999	22,943	32,017	50,251	56,469	49,800	152,368	363,848
2000	23,400	32,205	50,760	57,537	51,024	156,498	371,423
Growth R.	2.0%	0.6%	1.0%	1.9%	2.5%	2.7%	2.1%

Source: Provincial Physical Framework Plan, 1993-2002

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2) Forecast of Diversion from Cebu Baseport and Development Traffic

According to Origin-Destination survey by National Statistic Office, passenger traffic by vessel between Cebu and Panay Island amounts to 4.1% of the total and passenger between Cebu-Negros amounts to 0.3%. Estimation is made that 70% of the passenger between Cebu and Panay will divert to Toledo port, while 100% passenger between Cebu-Negros uses Toledo port. Consequently diversion rate is calculated as 4.1% multiplied with 70% plus 0.3% equals to 3.2%.

With project, generated traffic in Regions 6 and 7 is projected at 30% of passengers in 2000 at Toledo port. For the growth rate of those two regions, figures of elasticity of the normal traffic was applied.

3) Result of Passenger Traffic Forecast

Total amount of passenger demand was estimated as follows.
Table 2.4.4-5 shows more details with breakdown of traffic.

Year	Traffic	Growth rate
In year 2010	1,088,830 (2,980/day)	3.9% between 2000-2010
In year 2020	1,283,160 (3,790/day)	2.4% between 2010-2020

Fig. 2.4.4-2 Trend of Passenger Traffic Demand of Toledo Port,
2000 - 2020
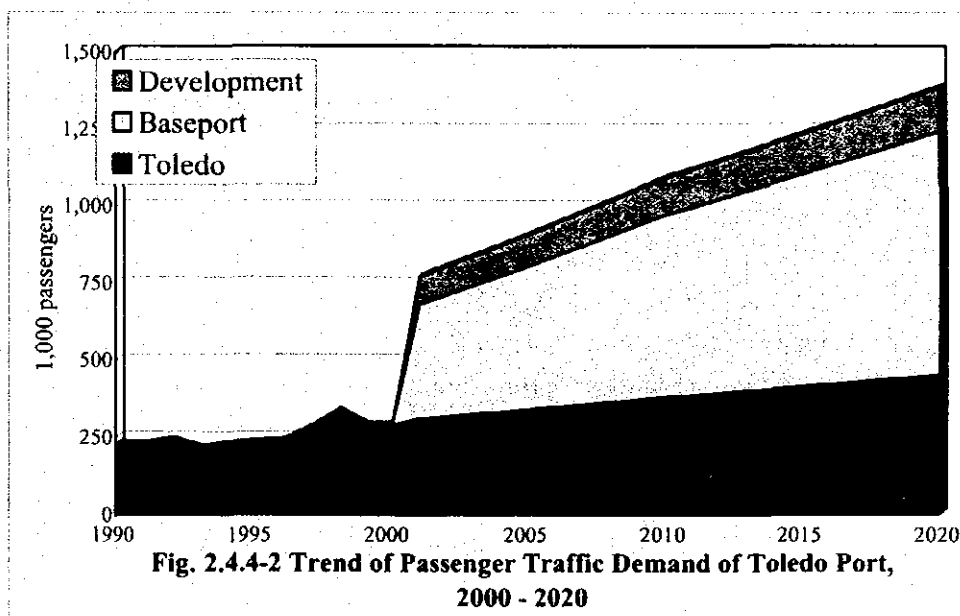
Table 2.4.4-5 Passenger Traffic Estimation, Toledo Port for 2010, 2020

Year	Normal traffic		Diverted Traffic		Development (RORO)			Total
	Hint.Popu	Toledo	Baseport	Toledo	Population		Toledo	
	Coefficient	0.78	Passenger	Divert	Reg.6	Reg.7	Divert	
1990	302,993	225,504	4,098,854		5,393,333	4,594,124		
1991	309,150	225,388	3,890,632		5,464,342	4,669,324		
1992	315,450	237,544	4,142,362		5,536,285	4,745,754		
1993	321,896	211,854	4,276,358		5,609,176	4,823,436		
1994	328,492	224,456	5,246,008		5,683,026	4,902,389		
1995	335,241	229,817	5,833,373		5,757,848	4,982,634		
1996	342,147	235,307	7,502,086		5,833,656	5,064,193		
1997	349,214	280,355	9,517,438		5,910,462	5,147,088		
1998	356,447	333,190	10,279,804		5,988,279	5,231,338		
1999	363,848	286,426	10,432,761		6,067,120	5,316,968		
2000	371,423	285,543	10,059,048		6,147,000	5,404,000		
2001	376,994	306,041	11,586,910	370,781	6,308,691	5,798,833	91,812	768,634
2005	400,128	336,388	14,513,871	464,444	6,724,875	6,206,965	103,807	904,638
2010	431,051	376,953	18,463,944	590,846	7,283,924	6,757,759	121,027	1,088,826
2015	457,542	411,704	21,493,081	687,779	7,716,284	7,180,139	131,921	1,231,404
2020	485,662	448,591	24,711,548	790,770	8,174,309	7,628,918	143,796	1,383,157
Growth Rate								
1990-2000	2.1%	2.4%	9.4%	0.0%	1.42%	2.18%		
2000-2010	1.50%	2.8%	6.3%	5.3%	1.61%	1.71%	3.1%	3.9%
2010-2020	1.20%	1.8%	3.0%	3.0%	1.16%	1.22%	1.7%	2.4%

4) Sensitivity

Besides from the Cebu Baseport there may be other diversion traffic such as those travelling from Tableland and Tuburan ports in the north of Toledo. Tuburan port located in 50km north of Toledo, in the opposite shore of Negros Island, is an access port to Escalate port. And CPA has a plan to improve service facilities of Tuburan port.

There may be some diversion traffic from non-government ports. For example, inbound coal from power company, materials for ship repairing from Tsuneishi ship repair industry, and outbound fertilizer from AFC company by break bulk to all over Philippines. Therefore estimation of diversion traffic may be below the actual volume. Appendix Table A2.4.4-1' Toledo Management Office, by Port, by Cargo Type and by Passenger,1990 - 2000' shows more in details of all ports under Toledo Management Office.

2.4.5 Demand Forecast of the New San Remigio Port

(1) Cargo Forecast

1) Components of Forecast in Cargo Volume
The cargo demand forecast of the new San Remigio port consist of the following three components.

- Diverted traffic from Hagnaya

- Diverted traffic from Santa Fe port, Baigad and from Cebu Baseport
- Generated traffic by development of RORO route networks

2) Number of Ports under Santa Fe Management Office
Santa Fe Management office is administrating 8 ports as listed below

Name of Port	Management	Handling Traffic	Location
Santa Fe port	Government	Cargo and Passenger	Bantayan Island
Bantayan port	Government	Cargo and Passenger	Bantayan Island
Hagnaya port	Government	Cargo and Passenger	109km North from Cebu City
Polambato port	Government	Cargo only	Near Bogo (East coast)
Bogo port	Government	Fishing only	11km East from Hagnaya (East coast)
Baigad port	Private	Cargo and Passenger	Bantayan Island
Caltex (Sta. Fe) port	Private	Cargo only	Bantayan Island
Medellin Sugar port	Private	Cargo only	Bantayan Island

3) Cargo Volume Ratio by Economic Sector at Hagnaya port

All cargo traffic through Hagnaya port is assumed to divert to the new port. Present cargo handling volume is very small. Main commodities are daily goods; more fish for inbound traffic and more commodities for outbound. Vehicles such as bus and truck are increasing recently as new commodities. Thus, the estimation was carried out according to classification by sectors as shown in Table 2.4.5-1.

Table 2.4.5-1 Cargo Volume Ratio by Sector, Throughput at Hagnaya Port

	Category	Hagnaya port			Sta Fe Port
		Inbound	Outbound	Total	Inbound
1	Agricultural and Fishery Products	71%	17%	40%	32%
2	Others	25%	45%	36%	21%
3	Light Industrial Products	1%	17%	10%	10%
4	Special Commodities	1%	14%	9%	24%
5	Chemical Industrial Products	2%	4%	3%	12%
6	Metal & Mechanical Industrial Products	1%	0%	1%	0%
7	Miscellaneous Industrial Products	0%	1%	1%	0%
8	Forest Products	0%	1%	0%	0%
9	Mineral Products	0%	0%	0%	0%
	Total	100%	100%	100%	100%
	Average Amount / year (Metric Tons)	10,532	14,000	24,532	61,671

Source: PPA

4) Cargo Forecast of Hagnaya Port

Cargo volume of year 2000 was 4,998 tons, which is very small amount. This volume was distributed to sectors as shown in Table 2.4.5-1. Growth rate estimation was obtained according to the following method. Elasticity was estimated for correlation of GRDP of Region 7 and cargo handling volume of Santa Fe Management Office during 1990 - 2000. This elasticity was multiplied with growth rate of GRDP of each sector to estimate future cargo volume of the new San Remigio port. Refer to Appendix Table A2.4.5-1 for GRDP by sector.

5) Estimation of Diverted Traffic from Santa Fe, Baigad and Cebu Baseport

Santa Fe and Baigad ports are located at Bantayan Island, on the opposite shore of the new port. With project, cargo between these ports, and cargo between Cebu Baseport and Bantayan Island are expected to divert to the new port. The distance by land transportation between Cebu City and the new port is 106km away. The diverted traffic volume was estimated at 50% of the total handling volume of two ports of which 60% is estimated from Cebu Baseport-Bantayan Island and 40% is estimated from Negros Occidental-Bantayan Island in year 2000. The growth rate applied for all cargoes in Santa Fe management office is assumed to be 11.2% up to 2010, and 7.7% up to 2020.

6) Generated Traffic by Development by RORO networks

In August 2000, "Feasibility Study for the Roll-on Roll-off Ferry Network Development Project for the Trans Visayas Intermodal Transport Network" was completed.

Routes related to the present study are; Tacloban - Leyte West Coast - Bogo - Highway - San Remigio new port - Bantayan Island - Cadiz - Conception - Iloilo. It is anticipated that the generated traffic will divert to the new San Remigio port. Cargo demands was estimated on the basis of number of vehicles. The growth rate thereof was estimated at 10% during 2000 - 2010, and 6% during 2010 - 2020.

7) Results of Forecast of Passenger Traffic

Total estimation of cargo volume in the target year is estimated and summarized as follows.

a	Diverted traffic from Hagnaya	
	Year 2010	11,800 tons
	Year 2020	20,420 tons
b	Diverted traffic from Three ports in Bantayan Island and Cebu Baseport	
	Year 2010	113,080 tons
	Year 2020	280,368ton
c	Generated traffic by RORO routes	
	Year 2010	37,630 tons
	Year 2020	687,710 tons
d	Total demand projection	
	Year 2010	382,132 tons

Year 2020   789,041 tons
e Growth rate
       2000-2010   11.0%
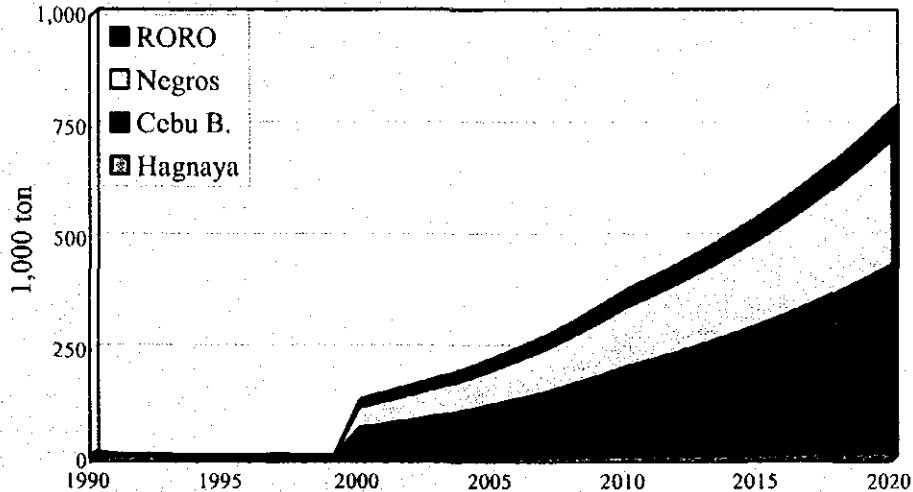   2010-2020   7.5%

Fig. 2.4.5-1 Trendo of Cargo Demand of San Remigio Port, 2000 - 2020

## Table 2.4.5-2 Cargo Demand Estimation of San Remigio Port in 2010, 2020

Unit: Million Tons

Year	Region 7 GRDP	Sta Fe MO Cargo	Diverted Cargo from Hagnaya Port						Diverted Cebu B domestic	Diverted Traffic		Development RORO		Total
	Coefficient ,0.89		Hagnaya Cargo	Agri-Culture	Cebu B. Industry	Others Domestic	Special Commo.	Rest		Sta Fe	Baigad	Vehicle	Cargo	
1990	47,193	120,131	13,064						3,572,696	28,822	47,692			
1991	46,971	82,295	8,803						4,214,747	13,069	28,043			
1992	47,086	127,579	10,044						4,160,424	23,042	62,761			
1993	47,757	54,978	5,431						4,073,895	13,241	19,931			
1994	49,663	48,318	391						4,320,846	21,827	24,173			
1995	52,327	100,606	-						3,998,244	-	-			
1996	56,615	150,786	-						4,468,156	-	-			
1997	59,926	193,507	8,375						4,755,554	80,392	92,711			
1998	60,771	219,201	1,687	40%	36%	10%	9%	5%	5,821,570	108,613	107,578			
1999	62,952	207,247	4,998	1,999	1,799	500	450	250	5,690,476	107,950	98,235	10,950	2,499	-
2000	65,000	233,020		2,090	1,962	556	500	278	68,807		45,872	12,045	2,722	134,832
2005	88,223	419,418		2,608	3,028	947	852	473	117,198		78,132	19,399	4,170	226,808
2010	119,742	676,030		3,255	4,673	1,613	1,452	806	199,622		133,081	31,242	6,388	382,132
2015	159,487	997,742		3,786	6,060	2,341	2,107	1,171	289,743		193,162	41,808	8,666	548,845
2020	212,425	1,424,219		4,404	7,858	3,398	3,058	1,699	420,551		280,368	55,949	11,756	789,041
	Growth Rate		Elasticity	Growth Rate										
90-1999	3.3%	6.2%	1.92											
00-2010	6.2%	11.0%	1.82	4.5%	9.1%	11.0%	11.0%	11.0	19%		11.0%	10.0%	9.1%	11.2%
10-2020	5.8%	7.5%	1.33	3.1%	5.3%	7.5%	7.5%	7.5%	11%		7.5%	6.0%	6.4%	7.6%

(2) Passenger Traffic

1) Important Feature in Passenger Service of Hagnaya port
As show in the Table 2.4.5-3, cargo handling volume amounts to less than 10% of the total cargo handled by both private and government ports under Santa Fe Management Office. On the other hand passenger traffic amounts to around 40%. For the new San Remigio port the function of the Hagnaya port for passenger traffic is primarily important. Appendix Table A2.4.5-2'Santa Fe Management Office, by Port, By Cargo Type and by Passenger, 1990 - 2000' shows more in details of all ports under Santa Fe Management Office.

Fig. 2.4.5-2 Trend of Passenger Traffic Demand of San Remigio Port, 2000 - 2020
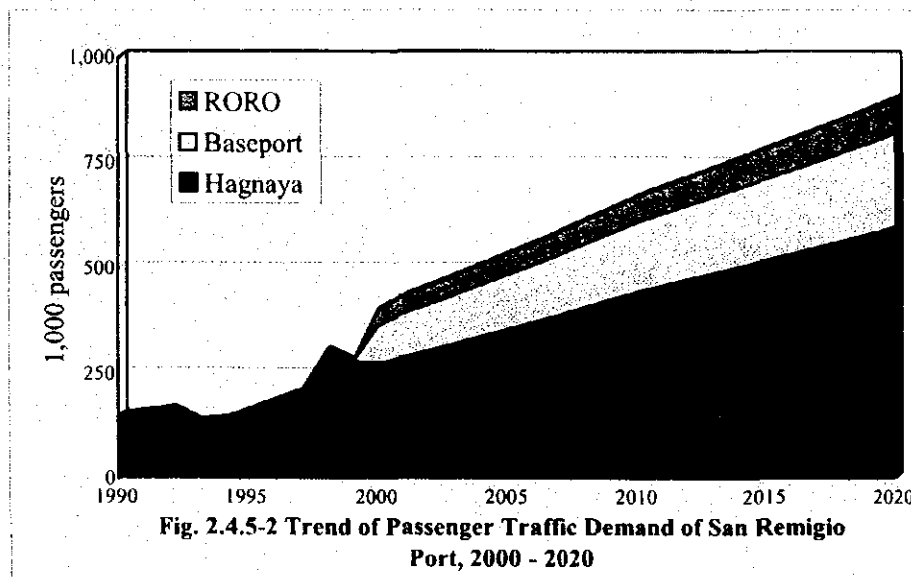
Table 2.4.5-3 Share of Traffic through the Hagnaya Port in Total Volume of Santa Fe Management Office   Unit: Metric tons & No. of Passenger

Year	Cargo	Passenger	Cargo %	Passenger %
1990	13,064	149,608	11.0%	50.2%
1991	8,803	157,034	12.2%	50.3%
1992	10,044	165,531	10.1%	49.7%
1993	5,431	135,288	8.9%	45.5%
1994	391	140,640	0.8%	45.2%
1997	8,375	206,573	4.0%	31.1%
1998	1,687	304,975	0.7%	42.7%
1999	4,998	276,618	1.4%	38.9%

Source: CPA
Note: No foreign cargo and no container cargo

2) Forecast of Diverted Passenger Traffic from Hagnaya Port

With project, 100% of the passenger traffic from Hagnaya port is diverted to the new port. Number of passengers is estimated from correlation established between the past hinterland population and passengers traffic volume. The correlation coefficient is worked out at 0.78. Hinterland consists of 8 municipalities with Bogo in the center. The population in year 2000 was estimated at 388,130 as shows in Table 2.4.5-4.

Table 2.4.5-4 Direct Hinterland and Population of San Remigio Port

Unit: No. of Population

Year	Hinterland Municipality								Total
	Bantayan	Bogo	Daan Bantayan	Madridejos	Medellin	San Remigio	Santa Fe	Tabogon	
1990	59,971	51,048	58,748	25,746	34,169	36,115	20,827	24,939	311,563
1991	61,358	51,999	60,212	26,559	34,777	36,864	21,412	25,272	318,455
1992	62,778	52,968	61,713	27,398	35,396	37,629	22,014	25,610	325,506
1993	64,230	53,954	63,252	28,264	36,027	38,409	22,632	25,952	332,720
1994	65,716	54,960	64,829	29,156	36,668	39,206	23,268	26,299	340,101
1995	67,236	55,983	66,445	30,077	37,321	40,019	23,922	26,650	347,653
1996	68,791	57,026	68,101	31,027	37,985	40,849	24,594	27,006	355,380
1997	70,383	58,089	69,799	32,007	38,662	41,696	25,285	27,367	363,287
1998	72,011	59,171	71,539	33,018	39,350	42,561	25,995	27,732	371,377
1999	73,677	60,273	73,322	34,061	40,051	43,444	26,726	28,103	379,656
2000	75,381	61,396	75,150	35,137	40,764	44,345	27,476	28,478	388,127
1990-2000	2.3%	1.9%	2.5%	3.2%	1.8%	2.1%	2.8%	1.3%	2.2%

Source: Provincial Physical Framework Plan, 1993-2002

3) Forecast of Diverted Traffic from Cebu Baseport and Generated Traffic from RORO Route

Diverted traffic from Cebu Baseport is 0.9% of the total passenger traffic according to Origin Destination Survey. As for new development traffic by RORO project, 10% of passenger traffic of Hagnaya port in 2000 is estimated for daily commuting passenger and 5% is estimated for tourists. The growth rate is estimated from population correlation in Regions 5, 6, 7 and 8. The details thereof is shown in Appendix Table A2.4.5-3' Population of Indirect Hinterland for RORO Projection'.

4) Result of Passenger Estimation

Total passenger traffic estimation, total of disembarking and embarking, is summarized as follows. Table 2.4.5-5 shows this estimation in more details.

A Diverted traffic from Hagnaya
      Year 2010   442,070 passengers
      Year 2020   595,000 passengers

b Diverted traffic from Three ports in Bantayan Island and Cebu Baseport
      Year 2010   166,180 passengers
      Year 2020   222,400 passengers

c Generated traffic by RORO routes
        Year 2010   20.510 passengers
        Year 2020   31,040 passengers
d Total demand projection
        Year 2010   669,760 passengers
        Year 2020   900,840 passengers
e Growth rate
        2000-2010   5.2%
        2010-2020   3.0%

Table 2.4.5-5 Passenger Traffic Estimation, New San Remigio Port, 2010, 2020

Year	Hinterland Population	Hagnaya Passenger	Diverted Traffic		Development (RORO)		Total
	Coefficient: 0.78		Baseport	0.9%	Daily	Tourist	
1990	311,563	149,608	4,098,854				
1991	318,455	157,034	3,890,632				
1992	325,506	165,531	4,142,362				
1993	332,720	135,288	4,276,358				
1994	340,101	140,640	5,246,008				
1995	347,653	150,580	6,334,552				
1996	355,380	161,223	7,502,086				
1997	363,287	206,573	9,517,438				
1998	371,377	304,975	10,279,804				
1999	379,656	276,618	10,432,761				
2000	388,127	270,932	10,059,048	90,531	27,093	13,547	402,103
2005	427,554	352,268	14,513,871	130,625	33,333	16,666	532,892
2010	472,055	442,069	18,463,944	166,175	41,009	20,505	669,758
2015	508,537	515,690	21,493,081	193,438	46,357	25,227	780,712
2020	547,839	595,001	24,711,548	222,404	52,402	31,036	900,844
Growth Rare							
1990-2000	2.2%	7.1%	9.4%				
2000-2010	2.0%	5.0%	6.3%	6.3%	4.2%	0.0%	5.2%
2010-2020	1.5%	3.0%	3.0%	3.0%	2.5%	0.0%	3.0%

2.4.6 Forecast of Vessel Size and Vessel Calls of the New Cebu Port and Cebu Baseport

(1) Forecast of Vessel Size

Forecast of future vessel size is done in consideration of the recent trend of the vessels types and sizes calling at Cebu Baseport and around the world.   The special conditions noted are 1) the currently large vessels sizes are limited by the confinement of the berth size, such as maximum draft of -8.5m, and 2) a large number of ferry boats are secondhand vessels from Japan.

1) Foreign Container Vessels
As a trend for the future foreign container vessel size, according to the interview surveys of the major shipping lines operating in this region, at present around 80 post panamax size of

container vessels are operating to transport containers in the major routes such as; Asia to Europe (traffic volume of around 6 million TEU in round trip in 2000), Asia to Pacific Coast countries (around 10.6 million TEU), and Europe to USA (3.3 million TEU) which was about 20% of the world total traffic volume of 97.4 million TEU. 274 vessels of the similar size of post panamax are fabricated and in 2002 they are coming to the market.

It is said that around 20% of the world containers are transported to/from the Asian regions. It is anticipated that after 2002 the presently operating post panamax size vessels will shift their service routes to the other routes such as, Asia-Middle East, Asia - South Africa, and within the South Asia region.   Under such trends of containers movement, the shipping lines companies expect that in future the major origin and destination of such container cargoes will be the Philippines, Thailand, Indonesia and Singapore.   They are planning to relocate presently operating post panamax size container vessels to these regions after 2002.

According to one of the shipping companies, they had operated in handling containers from Manila and Cebu to Japan (and vice versa) by using 400 TEU loading capacity vessels in middle of 1980, and at the end of 1980 they had introduced 1,500 TEU loading vessels.   At that time 750 to 800 TEU loading vessels were operated between Japan to USA, which are now operating as feeder services including South East Asia and South Asia regions.

Considering the above anticipated trends of container shipping industries and statistic data of vessel calls to Cebu port, the maximum size of foreign container vessels in 2020 is estimated at 40,000 DWT class carrying 3000 TEU.

2) Foreign Conventional Vessels
The present average size of foreign conventional vessels calling at Cebu Baseport is about 8,400 DWT. Though some large vessels, over 20,000 DWT, call at Cebu Baseport. these are tramper bulk carriers with low calling frequency. In many cases large bulk carriers call at specialized berths including private ports. Cebu Baseport mainly should cater for breakbulk carriers (general cargo vessels) as a public port. Most breakbulk carriers operated in the world are under 20,000 DWT. It is estimated that the average size of foreign conventional vessels will increase to 12,000 DWT in the next 10 years.   The maximum vessel size to be accommodated at the New Cebu Port is assumed to be 18,000 DWT.   Summary of the forecast vessel sizes is shown in Table 2.4.6-1.

Table 2.4.6-1 Forecast Vessel Sizes (Foreign Vessels)

Year	Container		Conventional	
	Average (DWT)	Maximum (DWT)	Average (DWT)	Maximum (DWT)
2000	12,516	29,213	8,423	45,222
2010	16,000	40,000	12,000	18,000
2020	17,000	40,000	12,000	18,000

3) Domestic Vessels

Since a large number of the vessels are secondhand vessels purchased from Japanese ship owners, the study team have studied the size of the vessels currently under use in Japan. Also taking into account of the fact that the size of the domestic vessels at Cebu Port have increased by 50 - 60% for the last 10 years, it is estimated that the vessels will be increased by 20 - 60% in the next ten years as shown in Table 2.4.6-2.

Table 2.4.6-2 Forecast Vessel Sizes (Domestic Vessels)

Year	Large RORO		Middle RORO		Container		Conventional Cargo		Passenger/Cargo	
	Average (GRT)	Maximum (GRT)	Average (GRT)	Standard (GRT)	Average (DWT)	Maximum (DWT)	Average (DWT)	Standard (DWT)	Average (GRT)	Standard (GRT)
2000	11,210	15,223	2,022	-	4,683	7,276	847	-	314	-
2010	12,000	18,000	3,000	4,000	6,000	7,000	1,200	2,000	500	500
2020	12,000	18,000	3,000	4,000	6,000	7,000	1,200	2,000	500	500

(2) Demand Forecast by Vessel Type

1) Cargo

Container and conventional cargoes are carried by different type of vessels. Containers are carried by Large RORO, Middle RORO and Container Vessels. Large RORO and Container vessels are mainly serving to/from Manila and Mindanao and their shares in 2000 are 38% and 27% while Middle RORO is serving rather shorter distance and to/from smaller ports in the islands such as Negros, Mindanao, Bohol and Leyte with its share of 35%. In the future, it is presumed that as the cargo volume becomes larger, the size of vessel becomes larger, consequently the share of middle RORO will become smaller. On the other hand, as transshipment of foreign containers at Manila decreases, due to the development of new route after the opening of the New Cebu port, the share of Container Vessels will also become smaller.

As for Conventional cargoes (breakbulk cargoes), they are carried by Middle RORO, Conventional vessel and Passenger and Cargo vessels with their shares 30%, 40% and 30%. Again it is presumed that as the vessel becomes larger, the share of Passenger/Cargo vessels will be smaller. The present and future cargo share by vessels is shown in Table 2.4.6-3.

Table 2.4.6-3 Share of Cargo by Vessel Type (Domestic Cargo)

Year	Container Cargo			Conventional Cargo		
	Large RORO	Middle RORO	Container	Middle RORO	Conventional	P/C
2000	38%	35%	27%	30%	40%	30%
2010	50%	30%	20% (10%)*	40%	50%	10%
2020	50%	30%	20% (10%)*	40%	50%	10%

Note: It is anticipated that 10% of the container cargo by container vessels are handled at the New Cebu Port.

From the forecasted cargo demand with present and estimated future cargo share by vessel type, cargo demands by vessel type are forecasted. The result is shown in Table 2.4.6-4.

Table 2.4.6-4 Cargo Demand Forecast by Vessel

Year	Domestic Cargo					Foreign Cargo	
	Large RORO	Middle RORO	Container	Conventional	P/C	Container	Conventional
	TEU	1,000 ton	TEU	1,000 ton	1,000 ton	TEU	1,000 ton
2000	113,000	1,783	82,000	1,177	882	104,000	459
2010	283,000	3,853	57,000	2,799	560	502,000	477
2020	602,000	6,263	120,000	3,453	691	1,319,000	756

Note: After the completion of the new port, it is presumed that 10% of the domestic container cargoes, carried by container vessels, will be handled at the foreign terminal. Therefore it is included in the volume of foreign cargo in this table.

2) Passenger

Passenger traffic demand is forecasted by vessel type based on CPA's vessel classification as shown in Table 7.4.3-17 and the table does not show the passenger by Middle RORO and Passenger Cargo vessel, which are included in Conventional vessel. Here the traffic by those two vessels are estimated by dividing the traffic.

According to CPA, 40% of the passengers by conventional vessels are transported by Middle RORO and 60% by P/C vessel. In the future, it is anticipated that as the traffic increases, the share of larger vessels (Middle RORO) will increase. The forecasted passenger traffic by vessel type is shown in Table 2.4.6-5.

Table 2.4.6-5 Passenger Demand Forecast by Vessel

Unit: No. of Passenger

Year	Large RORO	Fast Craft	Middle RORO	P/C	Metro Bus	Small Craft	Total
2000	668,575	1,799,617	2,120,751	3,181,126	2,288,979	84,109	10,059,048
2005	905,803	2,438,169	3,068,047	3,835,058	2,288,979	76,028	12,536,057
2010	1,227,207	3,303,298	4,500,733	4,500,733	2,288,979	68,723	15,820,949
2015	1,493,085	3,821,514	5,699,909	4,664,562	2,288,979	62,120	17,967,048
2020	1,816,566	4,421,027	7,161,478	4,774,319	2,288,979	56,152	20,462,368

(3) Forecast of Vessel Calls

Number of future vessel calls are a result of forecast cargo volume and vessel's load factor [vessel call = cargo volume / factor cargo volume (passenger) handled by each vessel]. One of the characteristics of the current operation at Cebu Port is a low loading factor, ie. small cargo volumes (passengers) compared with the capacity of the vessels. The average load volume (passenger) per vessel are estimated, in consideration that the loading factor will be increased, as shown in Tables 2.4.6-6 and 10.

Table 2.4.6-6 Forecast Average Cargo Volume (Foreign Vessels)

Year	Container		Conventional	
	Average (DWT)	Average Load Volume (TEU/vessel)	Average (DWT)	Average Load Volume (ton/vessel)
2000	12,516	362	8,423	2,961
2010	16,000	450	12,000	8,400[1]
2020	17,000	600	12,000	8,400[1]

Note 1: 70% of the capacity

Table 2.4.6-7 Forecast Average Load Volume (Domestic Vessels)

Year	Large RORO		Middle RORO		Container		Conventional Cargo	
	Average (GRT)	Ave. load (teu/vessel)	Average (GRT)	Ave. load (ton/vessel)	Average (DWT)	Ave. load (teu/vessel)	Average (DWT)	Ave. load (ton/vessel)
1998 - 2000	11,210	138	2,022	383	4,683	212	847	884
2010	12,000	219	3,000	490[1]	6,000	250	1,200	865
2020	12,000	288[2]	3,000	490	6,000	280[1]	1,200	960[3]

Note: 1: 70% of the capacity x 2 (loading and unloading)
2: 80% of the capacity x 2 (loading and unloading)
3: 80% of the capacity (loading or unloading only)

Table 2.4.6-8 Forecast Average Passenger (Domestic Vessels)

Year	Passenger/Cargo		Fast Craft		Metro Bus Ferry	
	Average (GRT)	Ave. passenger (pas/vessel)	Average (GRT)	Ave. passenger (pas/vessel)	Average (GRT)	Ave. passenger (pas/vessel)
1998 - 2000	314	219	500	260	30	134
2010	500	320	500	400	30	134
2020	500	420[1]	500	490[1]	30	134

Note 1: 70% of the capacity x 2 (embarking and disembarking)

Out of those vessels carrying both cargoes and passengers, cargoes are considered as factors to determine vessel calls for Large RORO and Middle RORO ferries whereas passengers are more critical for P/C vessels.

With the above considerations and the demand forecast described in the previous sections, number of vessel calls are forecast as shown in Tables 2.4.6.6 and 7.

Table 2.4.6-9 Forecast of Vessel Calls (Foreign Vessels)

Year	Container	Conventional
2000	287	155
2010	1,120	57
2020	2,200	90

Table 2.4.6-10 Forecast of Vessel Calls (Domestic Vessels)

Year	Large RORO	Middle RORO	Cargo		Passenger/ Cargo	Fast Craft	Metro Bus Ferry
			Container	Conventional			
2000	816	3,553	344	1,492	14,559	6,099	17,122
2010	1,292	7,860	228	3,240	14,065	8,260	17,122
2020	2,090	12,800	429	3,600	11,367	9,020	17,122

2.4.7 Forecast of Vessel Size and Number of Vessel Calls at Toledo Port

(1) Introduction

In order to determine the required facilities and dimensions for Toledo Port, it is essential to estimate the future vessel size and number of vessel calls.

It is assumed that until the new terminal facilities are completed by around 2007 - 2008, the existing vessels will continue to operate and after the completion, new vessels will be introduced and these new vessels together with the present vessels will transport all the traffic.

(2) Assessment of Future Vessel size and vessel calls

1) Service between Toledo and San Carlos
Currently RORO ferries and fast crafts are serving between Toledo and San Carlos Port to transport vehicles and passengers.

The sailing schedule thereof will be as follows:

- Loading time for all ships coming to the port will be 0.5 hours by fast craft and 1 hour by ferry.
- Sailing time, for fast craft: 30 minutes
               for ferry boat: 1.0 hour
- Trip time of one-way trip, by fast craft: 1.0 hour
               by ferry boat: 2.0 hours
- Berth available time (5:30 to 18:30):   13.0 hrs. per day
- Number of trips, by fast craft: 8 trips/day (round-trip)
               by ferry boat: 4 trips /day (round-trip)
- Number of RORO vessels: 2 vessels

Upon construction of the new terminal, it is assumed that 2 new RORO vessels will be introduced to make 8 daily services (2920 calls/year). As shown in Table 2.4.7-2, the average handling volume is 395 ton/vessel or 50 trucks/vessel (one truck = 8 ton). On the assumption that the current vessels (480 GRT) will carry the same number of vehicles as

present (292 ton = 36 trucks), the new vessels will be required to carry 50 trucks/vessel (inbound and outbound). For this demand, it is estimated the required size of the new RORO vessels is 2,000 GRT class (boarding capacity: 800 passengers, 84 PCU (Passenger Car Unit)).

To cope with the cargo demand, it is anticipated that RORO vessel service will increase. On the other hand, as the economy grows, there is a tendency that more passenger will prefer better (faster) services. Here it is assumed that the share of passenger by fast craft remains constant in the future.

Passenger by Ro-Ro: Passenger by Fast Craft= 57:43

Further, on assumption that average load and vessel calls of fast craft are assumed to grow equally, the number of vessel calls is estimated as shown in Table 2.4.7- 3.

2) Conventional Cargo Vessels

According to the shipping data of 1999 and 2000 from CPA, approximately 10% of cargoes, mostly outbound fertilizer in bag from ATC to Mindanao or other ports in Visayas, are transported by conventional vessels. In order to forecast future vessel size, more accurate data on ATC's traffic, future demand and demand for other general cargoes was done. In this estimate, the following factors are assumed constant as 2000:

- Cargo by Ro-Ro : Cargo by Conventional = 90 : 10
- Load factor of Conventional Vessel is 75%

The estimation of average and maximum size vessels and the number of vessel calls are summarized in Tables 2.4.7- 1 through 3.

Table 2.4.7-1 Estimation of Average and Maximum size Vessels (Cargo)

	Ro-Ro (GRT)		Conventional (DWT)	
	Ave	Max	Ave	Max
1999	480	489	1,200	2,400
2010	1240	2000	1,600	2,000
2020	2000	2000	2,000	2,000

Table 2.4.7-2 Number of Vessel Calls at Toledo Port (Cargo)

Year	Total Cargo Traffic (ton)	Ro-Ro Vessel			Conventional Vessel		
		(ton)	Average Load ton/Vessel	Vessel Calls	(ton)	Average Load ton/Vessel	Vessel Calls
1999	31,923		47.8	645	31,923	1,365	23
2000	233,672	210,305	292	721	23,367	894	26
2010	1,282,366	1,154,129	878	1,460	128,237	1,200	107
2020	2,321,291	2,089,162	715	2,920	232,129	1,500	155

Table 2.4.7-3 Number of Vessel Calls at Toledo Port (Passenger)

Year	Passenger Traffic	Ro-Ro Vessel				Fast Craft[2]			
		Passenger by Ro-Ro	Average Load Pass/Vessel[1]	Vessel Calls per year	per day	Passenger by Fast Craft	Average Load Pass/Vessel[1]	Vessel Calls per year	per day
1999	225,504	225,504				213,664	96	2,220	6.1
2000	285,543	285,543	396	721	2.0				
2010	1,088,826	620,631	425	1,460	4.0	468,195	142	3,297	9.0
2020	1,383,157	788,399	270	2,920	8.0	594,758	160	3,717	10.2

Note: 1: Total of embarkation and disembarkation
2: Figures in 1999 are estimation.

2.4.8 Forecast of Vessel Size and Number of Vessel Calls at San Remigio Port

(1) Introduction

In order to determine the need for development of infrastructure at the new port in San Remigio area it is essential to identify the existing cargo movement between the Bantayan Island and Cebu main island through Hagnaya port. A new port in San Remigio area will function to serve for passengers travelling between Cebu Island and Bantayan Island regularly and also for cargo vessels and Ro-Ro vessels, which may come from Leyte and Masbate Islands.

(2) Present Traffic in 1999 through Hagnaya Port

Currently there is practically very minimal cargo operation (4,998 tons in 1999) and 2 or 3 passenger vessels are serving to/from Santa Fe port 4 - 5 times a day. The GRT of the vessels are between 91.5 and 219.4.

The cargoes to/from Bantayan Island are transported mainly from/to Cebu Baseport and Negros Island. The gate to Cebu Island is Santa Fe port and Baigad port while Bantayan port is for Negros Island. In 1999, Santa Fe and Baigad port handled 103,000 tons and 98,000 tons of cargo respectively. As for passengers in 1999 approximately 400,000 passengers (both disembarkation and embarkation) have used Santa Fe port, among which almost all are from Cebu Island and approximately 70% are through Hagnaya port. In July 2001, there is a regular passenger and cargo service between Cebu Baseport and Santa Fe port, 5 trips a week. The particulars of the vessels are shown in Table 2.4.8-1.

Table 2.4.8-1 Particulars of Regular Vessels at Hagnaya Port and Santa Fe Port

	Type of Vessel	Number of Trips	GRT	DWT	Breadth m	LOA m
Hagnaya Port						
Island Express 1	Passenger		91.50	114.0	6.0	24.5
Island Express 3	Passenger	4 - 5 trips/day	192.43	240.5	7.0	28.8
Island Express 5	Passenger		219.39	275.0	7.2	26.1
Santa Fe Port						
Don Martin Sr. 6	RORO (P/C)	5 trips/week	499.61	749.32	11.20	52.65
Don Martin Sr. 3	P/C		240.68	300.70	7.24	42.60

Table 2.4.8-2 Traffic Volume of Hagnaya, Santa Fe and Baigad Port in 1999

Hagnaya Port	Total
- Passenger (Person per year)	276,618 persons
- Cargo (ton per year)	4,998.0 tons
- Average number of passenger per day	758 persons
Santa Fe Port	
- Passenger (Person per year)	402,510 persons
- Cargo (ton per year)	107,950 tons
- Average number of passenger per day	1,103 persons
Baigad Port	
- Cargo (ton per year)	98,235 tons

(3) Assessment of Future Vessel size

After the completion of New San Remigio Port, it is anticipated that a large portion of the cargoes and passengers currently transported from/to Cebu Baseport to/from Bantayan Island is shifted to truck - RORO route via the New San Remigio Port. As a consequence, RORO ferry serving between Cebu Baseport and Santa Fe port (500 GRT) will be transferred to San Remigio - Santa Fe route. It is also anticipated that current passenger vessels will be replaced by fast crafts.

The sailing schedule thereof will be as follows:

- Loading time for all vessels coming to the port will be 40 minutes by fast craft and 1 hour and 20 minutes by ferry boat.
- Sailing time, for fast craft: 20 minutes
             for ferry boat: 40 minutes
- Trip time of one-way trip, by fast craft: 1 hour
                  by ferry boat: 2 hours
- Berth available time (5:30 to 20:00):   14.5 hrs. per day

(4) Forecast of Vessel Call

To estimate the number of vessel call, the following assumptions are made based on the data on Toledo Port:

- Average load per trip of RORO vessel is 300 ton
- All the cargoes are transported by RORO vessels.
- The number of passengers on RORO : Fast Craft is 57 : 43 in 2020
- The average passenger on Fast Craft is 100 passenger/vessel

Accordingly the vessel calls of RORO vessel are estimated at 1,274 calls/year in 2010 and 2,631 calls/year in 2020 whereas the vessel calls of the fast craft are estimated at 2,624 calls/year in 2010 and 3,874 calls/year in 2020. The summary is shown in Table 2.4.8-3 through 5.

Table 2.4.8-3 Estimation of Average and Maximum size Vessels

	Ro-Ro (GRT)		Conventional (DWT)		Fast Craft (GRT)	
	Ave	Max	Ave	Max	Ave	Max
1999	-	-	182.5	275.0	-	-
2010	500	500	-	-	150	150
2020	500	500	-	-	150	150

Table 2.4.8-4 Number of Vessel Calls at the New San Remigio Port (Cargo)

Year	Total Cargo Traffic (ton)	Ro-Ro Vessel		
		(ton)	Average Load ton/Vessel	Vessel Calls
1999	4,998	-	-	-
2010	382,132	382,132	300	1,274
2020	789,041	789,041	300	2,631

Table 2.4.8-5 Number of Vessel Calls at the New San Remigio Port (Passenger)

Year	Passenger Traffic	Ro-Ro Vessel				Passenger vessel or Fast Craft			
		Passenger by Ro-Ro	Average Load Pass/Vessel[1]	Vessel Calls		Passenger by Pass. vessel (Fast Craft)	Average Load Pass/Vessel[1]	Vessel Calls	
				per year	per day			per year	per day
1999	276,618	-	-	-	-	276,618		1,625	4.5
2010	669,760	407,360	320	1,274	3.5	262,400	100	2,624	7.2
2020	900,840	513,480	195	2,631	7.2	387,360	100	3,874	10.6

Note 1: Total of embarkation and disembarkation

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