3. Evaluation of Long-term Plan

3.1 Economic Analysis for Long-term Plans

3.1.1 Framework of the Economic Analysis

(1) Subjects of the Analysis

This section covers economic analysis on the following projects:

* The new Cebu port Project,
* Cebu Baseport Project,
* Toledo port Project, and
* The new San Remigio port Project.

The long-term investment plans intend to meet potential traffic demands of the ports concerned until the year 2020. The plans are divided in two(2) phases: the first phase starts in2004/2005 and finishes in 2010 at latest, and the second phase starts around 2010 and ends in 2015 at latest.

As for the new Cebu port and Cebu Baseport, the investment plans at the first phase of the "Long-term Plans" will be evaluated as the "Short-term Plans" which will be presented in the Volume 2 of this Report. This means that contents and yearly amounts of the first phase project are common between the "Long-term Plans" and "Short-term Plans".

The two types of the plans do not generate any difference in the frameworks of the economic analyses, except the above-mentioned investment periods and amounts of the investments, and the project costs excluding the construction, rehabilitation and expansion costs of the facilities and flows of benefits which are affected by the investment periods and the amounts of the investments.

(2) Objective of the Analyses

The economic analyses are performed from the standpoint of the "Philippine economy and society". Aim of the analyses is to judge feasibility of the projects from this standpoint, based on investment efficiency of the projects. Accordingly, project costand benefits of the projects concerned are devised and evaluated from the standpoint.Financial analyses have the same aim as the one of the economic analyses, based on the same type of evaluation index for investment efficiency. However, the analyses are carried out from the standpoint of the "Business entity" concerned. As a result, "Revenue" and "Expenditure" of the business entity are adopted as basic elements for calculating the investment efficiency instead of the "Project cost" and "Benefits" of the economic evaluation.

(3) Premise on the Analytical Works

The economic analyses are basically performed based on the following data and information as prescribed in the previous chapters:

* Functions of the ports entailed after the rehabilitation, expansion and/or construction of the ports concerned,
* Technical unit values related to activities of the ports,
* Project cost, and
* Traffic demand of the ports in future.

However, in the finalization processes of the projects, tentative results of the economic analyses are reflected in values of the above items for their finalization.

Accordingly, it can be said that the values of the items and the tentative results of economic analyses are mutually dependent in the finalization processes of the projects. Based on the tentatively or finally estimated data and information, benefit items and estimation formulas of benefits expected from the project concerned are devised, amount of the benefits are calculated and finally, EIRRs (Economic Internal Rate of Return), i.e. indices of investment efficiency of the projects, are calculated. These tasks are main duties of the staff in charge of the economic analyses of the projects. Accordingly, it must be noted that the final results of the economic analyses, i.e., the EIRRs, are very sensitively affected by the above-mentioned data and information.

Detailed explanation on the data and information and estimation formulas of the amount of benefits which are applied for the economic analyses of the projects is provided in the corresponding sections/paragraphs presented hereinafter.

(4) Evaluation Method

1) Project Cost

a. Components of the project cost.

The components are tabulated in Table 3.1.1-1. Values of the components are converted from financial price basis onto economic price basis. Financial cost and taxes which are included in the components as the sub-cost items have to be excluded from values of the components, because they are "Transfer -cost items" and are not "Economic- cost items".

Table 3.1.1-1 Components of the Project Cost

Component	Definition
Construction cost	It consists of a new construction cost or reconstruction cost or rehabilitation cost of the facilities, and cost of large-scale equipment installed in the port facilities.
Replacement cost	It is a cost for replacing the large-scale equipment. It generates in the next year of life time of the equipment. The economic and/or physical life times are stipulated in a publicized "Depreciation life time table of facilities and equipment".
Maintenance cost	It is an annual cost for maintaining expected functions or throughput of the facilities and equipment.
Operation cost	It is an annual cost for operating the facilities and equipment. It is mainly composed of personal cost and material cost.

b. Sub-classification of the construction cost items.

The sub-classification from the standpoint of economic analysis is as follows:

a) Sub-classification:

* By components of the cost:
    * Personal cost by skilled and unskilled labor cost,
    * Material and fuel costs,
    * Purchasing cost of equipment,
    * Land acquisition cost, and
    * Compensation cost (Relocation cost of residents)
* By supplying methods of the materials and services:
    * Local portion, and
    * Foreign portion.

The reasons of the sub-classification are as follows:

b) Reasons of the sub-classification:

Sub-classification		Reason
Sub-classified costs by the components of the cost.	:	Methods are applied for estimating opportunity costs of the unskilled labor and land acquisition cost from ones for the other sub-classified cost items.
Sub-classified costs by the supplying methods.	:	Economic values of the materials and services are different, depending on whether they are supplied domestically or from abroad.

2) Selection Processes of the Benefit Items, and Principles applied for Finalizing the Benefit Items and Estimation of Amounts of Benefits of the Projects

a. Reason why only the benefit items are especially discussed.

As mentioned in the previous sub-paragraph (3), basic data, except the benefit items, are given

for the economic analysis. The amounts of the benefits are fundamental elements of the evaluation as well as the project cost, and estimation of the amounts is one of most important works of the staff in charge.

a. Selection Processes.
The benefit items of the projects are commonly selected through the following processes:

Process 1: Initial device of the benefit items, based on the functions of the ports entailed after the rehabilitation, expansion and/or construction works,
Process 2: Settings of the "Without" and "With" project cases, based on the functions and introduction of premise or hypotheses for setting the "Without" project case,
Process 3: Finalizing the benefit items and device of estimation formulas for the amounts of each benefit item, individually.

b. Principles on which the benefit items and amounts of the benefits stand.
There are two categories of the principle: the selection of the benefit items and the estimation of amounts of the benefits.

As for the selection of benefit items, the following principles are considered:

- Avoidance principle of double count of the benefit items,
- Principle of counting indirect effects which would be brought about by the original functions or works for completion of the project concerned, which are expected to generate on other strong conditions and should not be counted in the economic evaluation. In this analysis, none of the double-counted benefits and the indirect effects are counted.

As for the estimation of the benefits, the following principles are considered:

- Principle of the "With" and "Without" project cases,
- Attribution principles of the benefits. The amount of the benefit concerned should be counted as the difference between the values in the "With" project case and in the "Without" project case. Amounts of all kinds of benefits are counted in compliance with the Principle in this analysis.

Attribution of the benefit concerned is decided on a situation of whether or not the beneficiary of the project belongs to the economy and society concerned. As to sub-parts of some benefit items in this analysis, e.g. the Benefit 4 of the new Cebu port project, the main beneficiaries are foreigners.

3) Evaluation Period
In this analysis, the year 2004 is the counting base year of the costs and benefits because the year is the commencing year of civil works of the new Cebu port construction project, and the year 2038 is adopted as the ending year of the evaluation period. About 30 years are taken

into account as the operation period within the evaluation period. The operation period seems to be a little short, compared with depreciation period of the civil works, while a little long, compared with the one of machinery and equipment.

4) Conversion of Project Cost from the Financial Price Basis onto the Economic Price Basis

a. Necessity of the conversion

The project cost expressed on the financial price basis are usually provided to the economic analysis. Therefore, it must be converted onto the economic price basis.

b. Conversion of unskilled labor cost and land acquisition cost from the financial price basis onto the economic price basis.

Usually, in an ordinary economic analysis, the costs are converted onto the opportunity cost basis (economic price basis) from on the financial price basis. These costs were generated in this analysis and occupied, however, a very small portion of the project cost. Accordingly, the conversion is not carried out in this analysis.

5) Numeraire and Base Year of Value-Expression adopted in the Analysis

a. Necessity of adoption of the numeraire.

Values of the project cost expressed on the economic price basis are obtained through the above-mentioned conversion processes.

However, as pointed out before, values of some parts of the sub-classified project cost items are measured on the Philippine domestic economic price basis, while values of the remaining parts are expressed on the foreign economic price basis.

The values expressed on the two bases are different for the Philippine economy, because the importance of the local currency is different from the one of foreign currency Therefore, it is indispensable for the all kinds of values to be expressed on one of the domestic or foreign economic price basis. The selected economic price basis is called "Numeraire".

b. Numeraire adopted in the evaluation.

a) The Philippine domestic economic price basis is adopted as the numeraire for expressing the values of the cost and benefits in this evaluation. There exists another type of numeraire: The Philippine border price basis, i.e. the Philippine foreign economic price basis.

The main beneficiaries of the projects discussed in this Masterplan are the Philippine economy and society. This is reason of adoption of the above-mentioned numeraire.

For the rehabilitation, expansion and/or construction, replacement of the equipment and maintenance and operation of the port facilities concerned, both types of Philippine local-made and imported materials and services are planned to be used.

Values of the former are called "Local portion" and the ones of the latter, "Foreign portion".

The values of local-made materials and services converted onto the domestic economic price basis have been already expressed on the numeraire. It is because the domestic economic price basis is the numeraire adopted in this analysis. On the other hand, the values of imported materials and services have to be converted onto the ones expressed on the adopted numeraire.

b) Standard conversion: The foreign portion has to be converted onto the one at the domestic economic price basis. For the conversion, the following shadow exchange rate of the Peso is applied. The rate is the one of a potential exchange rate which could be expected in a situation of no limitation on the foreign trade to an actual exchange rate. The shadow exchange rate is theoretically equal to the reciprocal value of the Standard Conversion Factor (SCF).

The SCF of the Philippines in 2000 is estimated to be 0.967, applying the following simple approximate estimation equation and basic data:

* SCF = [X + M] / [X + M + D]

X : Commodity exports

M : Commodity imports

D : Import duty

* Basic data for estimation of the SCF from 1995 to 1999 is shown below.

(unit: million pesos at current prices)

	Commodity Exports (FOB)	Commodity Import (FOB)	Import Duty	SCF
1995	446,736	684,431	97,601	0.921
1996	538,627	851,887	104,566	0.930
1997	736,775	1,065,329	94,800	0.950
1998	1,187,997	1,213,732	76,005	0.969
1999	1,358,766	1,210,302	86,497	0.967

Source: 2000 Philippine Statistical Yearbook

c. Base year of the value expression adopted in the analysis.

The year 2001 constant prices are adopted for expression of the values of cost and benefits of the projects in the economic evaluation. When converting the values expressed at US dollars into the one at Philippine pesos, the exchange rate of 52.5 pesos/US dollar is used. The exchange rate is the one in June 2001.

6) Evaluation Indices

a. Evaluation indices.

The following evaluation indices are provided for measuring the investment efficiency of the projects:

* Economic Internal Rate of Return (EIRR),
* Cost Benefit Ratio (B/C) and
* Net Benefit (B-C)

The "EIRR" is a rate (unit: %/annum) which makes present value of the project cost equal to present value of the total amount of the benefits at the base year of the value expression. The EIRR means a real and gross profit ratio of the project concerned which is measured on the standpoint of the economy and society. The "B/C" is a ratio of the present value of the total amount of the benefits to the present value of the project cost. However, the present values are calculated, applying a given discount rate. In this analysis, the social discount rate or opportunity cost of capital in the Philippine, 15 %/annum, is an evaluation criterion for the EIRR and is used as the given discount rate.
The "B-C" is a residual present value of the total amount of the benefits, after subtracting the present value of the project cost. Unit of the B-C is "million pesos at 2001 economic prices" in the economic analysis.
Generally, the three(3) categories of the indices are used for comparison of the investment efficiency of the project concerned with ones of other projects. Among the three, the EIRR is the most significant index for evaluating the efficiency, because the B/C and B-C are only another expression of the EIRR.

b. Judgment processes of the investment efficiency of the project.
There are two(2) judgment processes for deciding whether or not the project should be finally adopted: first, judgment based on values of the investment-efficiency indices, and second, judgment based on not only the values of the indices but also other impacts of the project concerned to the economy and society. The second judgment is called "Integrated judgment".
In the first process, the project concerned can be judged to be economically feasible, when the value of the EIRR exceeds the social discount rate, or the B/C exceeds 1.0, as long as the project would not bring about significant negative impacts to the economy and society. The impacts can not be expressed in monetary term, i.e. in the form of the costs measured at monetary term or tangible benefits of the project.
The final process is required, when the values of the EIRR and B/C are below the judgment criterion, though the project is expected to bring about significant favorable impacts to the economy and society.
In this analysis, only the conclusions on whether or not the projects should be economically adopted, based on the evaluation indices, are presented and the ones on the "Integrated judgment" are not entered.

(5) Remarks on Contents of the Report on the Economic Analyses

1) Entry of Estimation Formulas of Amounts of Benefits and Values of Variables in the Estimation Formulas

As mentioned in sub-paragraph (1), the formulas and almost all kinds of the values are common in the economic analyses on the "Long-term Plans" and "Short-term Plans" except some modifications caused by the differences in the investment plans. For avoidance of duplication of the entries, these are entered in the section 8.1, i.e. the section "Economic Analyses for Long-term Plans". The values of the variables particular to the analyses on the "Short-term Plans" such as traffic demands which are the first portions of the ones of the "Long-term Plans" will be again entered in the section 3.1 in the Report Volume 2.

2) Cases of Sensitivity Analyses

Results of sensitivity analyses on the EIRR for each project (simulation of the EIRRs) are presented in the subsequent sub-sections. Phrases "Base case", "10% down", "20% up" and etc are entered in the Tables concerned. The "Base case" is a standard case where the EIRR is calculated, applying the exogenous variables which are given to the economic analyses, e.g. traffic demand and project cost, and the endogenous variables, e.g. amount of benefit that is estimated, based on given traffic treatment structure of the port concerned and through the estimation formulas.

The "10% down" case is a case where the EIRR is calculated, applying the project cost or total amount of the benefits which is smaller by 10% from one of the standard case. The "20% up" case is a similar case of the "10% down" case, except only the percentages of the changes are different.

3) Entry of Time Series of Project Cost Items expressed on Economic Price Basis

Only the construction, rehabilitation and expansion costs of facilities of the ports concerned by construction works ,and financial and economic price bases are shown in independent Tables. However, the values expressed only on economic price basis and in the form of a time series of the construction costs, replacement cost, maintenance cost and operation cost are tabulated in Tables of "Cash Flows of the Project" due to economic usage of the entry space.

4) Data Sources

When data provided by public organizations and other study teams are cited, the data sources are entered. Otherwise, they are not entered.

5) Appendices on Intermediate Calculation Results of the Amounts of Benefits

As will be presented in the subsequent sections, there are several cases where a benefit consists of a few of sub-classified benefits. In these cases, results of calculation by the sub-classified benefits are tabulated in the "Appendices" concerned.

6) Data on Traffic Treatment Structures of Expanded Toledo Port and the New San Remigio Port

Some data on the structures e.g. available ship sizes are scarce. Accordingly, these data are estimated, based on the supposed structures of Cebu Baseport which would be rehabilitated and expanded.

7) Construction Cost of Cebu Baseport

As pointed out in the previous chapter, projects for Cebu Baseport development are comprised of the on-going projects, projects planned by private sector and projects proposed by the Study Team. Only the total construction cost of the projects proposed by the Study Team is adopted and tabulated in the Table. The on-going projects and projects planned by private sector are regarded as "given" projects and evaluation of the projects are not carried out in this analysis.

8) Yearly Replacement Cost, Maintenance Cost, Operation Cost and Amount of Benefits for Period 2020-2038

The yearly values of the first three(3) costs for the period are estimated , based on the contents of the investment plans, and are counted by the short-term and long-term investment plans, respectively. On the other hand, the amounts of the benefits for the period are fixed at the ones in 2020.

9) Evaluation of Residual Value of the Port Facilities

As mentioned in the sub-paragraph (4)-3), the evaluation period of the projects adopted in this analysis is a little short, compared with the depreciation periods of the facilities. Usually, in this situation, the residual values of the facilities and equipment which are values to be subtracted from the initial values of the facilities and equipment, i.e. a kind of the benefit item of the project, are counted at the end of the evaluation period. However, the values are not counted in this analysis, making much of general principle that economic evaluation of a project should be made conservatively, (i.e. the evaluation should be carried out , based on the values of the variables and introduced assumptions which have high possibilities of realization).

10) Establishment of Estimation formulas of Amount of Benefit

More than ten (10) estimation formulas of amounts of benefits relating the four (4) ports are devised. The following issues are taken into consideration in the device:

* Content of the benefit concerned, which is clarified through comparison of the functions of the port entailed after construction and expansion and the "Without" and "With" project cases, and
* Availability and reliability of basic data required for adaptation of the estimation formula concerned.

As a result, some kinds of the benefit items of the projects which can be surely recognized as the benefit items are not enumerated in this analysis. This situation is consistent with the above-mentioned general principle.

3.1.2 Economic Analysis on the New Cebu Port Project

(1) Conclusion and Summary of the Analysis

1) Conclusion on Investment Efficiency of the New Cebu Port Project

EIRR (Economic Internal Rate of Return) of the base case of the long-term project is estimated to be 27%/annum. The rate exceeds the social discount rate or opportunity cost of capital in the Philippine (15%/annum).

Accordingly, it can be concluded that the project is surely economically feasible. Moreover, even though the project cost were increased by 30% and at same time the benefits were decreased by 30% from the ones of the base case, the project continues to be almost economically feasible (14%/annum).

The situation is summarized in Tables 3.1.2-1 to 3.1.2-3.

Table 3.1.2-1 EIRRs of the New Cebu Port Project -Long-term Plan-

(unit: %/annum)

		Benefits			
		Base case	10% down	20% down	30% down
Project cost	Base case	27	24	22	19
	10% up	25	22	20	17
	20% up	23	20	18	15
	30% up	21	19	16	14

Table 3.1.2-2 Cost Benefit Ratios for the New Cebu Port -Long-term Plan-

-Discount rate : 15%/annum-

		Benefits			
		Base case	10% down	20% down	30% down
Project cost	Base case	1.75	1.57	1.40	1.22
	10% up	1.59	1.43	1.27	1.11
	20% up	1.46	1.31	1.17	1.02
	30% up	1.34	1.21	1.08	0.94

Table 3.1.2-3 Net Benefits for the New Cebu Port -Long-term Plan-

-Discount rate : 15%/annum-

(unit : million pesos on 2001 economic prices basis)

		Benefits			
		Base case	10% down	20% down	30% down
Project cost	Base case	8,116.0	6,219.8	4,323.6	2,427.4
	10% up	7,031.4	5,135.2	3,239.0	1,342.8
	20% up	5,946.8	4.050.6	2,154.4	258.2
	30% up	4,862.2	2,966.0	1,069.8	-826.4

2) Project Cash Flows of the Base Case

The project cash flows are tabulated in Table 3.1.2-4. The values are expressed on the Philippine domestic economic prices basis which is the numeraire adopted in this analysis.

Table 3.1.2-4 Cash Flows of the New Cebu Port Project ---Long-term Plan---

(unit : million Pesos at June 2001 prices on Economic price basis)

	Project cost					Benefit					Net Benefit
Year	Construc-tion cost	Replacem-emt cost	Maintena-nce cost	Operatio-n cost	Total	Benefit 1	Benefit 2	Benefit 3	Benefit 4	Total	
2003					0					0.0	0
2004	140.0				140					0.0	-140
2005	140.0				140					0.0	-140
2006	3,014.8				3014.8					0.0	-3014.8
2007	2,828.8				2828.8					0.0	-2828.8
2008	2,464.4				2464.4					0.0	-2464.4
2009	133.8		129.1	403.2	666.1	2,054.4	199.5	369.6	186.7	2,810.2	2144.1
2010	133.8		129.1	469.2	732.1	2,193.3	223.8	722.9	227.7	3,367.7	2635.6
2011	1601.8		129.1	530.7	2261.6	2,352.4	243.1	1,035.50	265.5	3,896.5	1634.9
2012	2,975.4		129.1	594.3	3698.8	2,519.4	263.7	1,366.60	306.4	4,456.1	757.3
2013	1,601.8		201.7	660.1	2463.6	2,668.1	285.4	1,699.60	345.4	4,998.5	2534.9
2014	1,763.0		201.7	728.3	2693	2,879.8	308.8	2,032.60	390.4	5,611.6	2918.6
2015			257.5	798.8	1056.3	3,074.5	333.6	2,365.60	436.6	6,210.3	5154
2016			257.5	871.9	1129.4	3,354.2	369.9	2,698.60	482.7	6,905.4	5776
2017		701.0	257.5	947.8	1906.3	3,496.8	387.9	3,029.60	534.6	7,448.9	5542.6
2018		701.0	257.5	1,026.70	1985.2	3,723.4	417.8	3,362.60	588.1	8,091.9	6106.7
2019			257.5	1,108.30	1365.8	3,961.5	449.5	3,695.60	641.1	8,747.7	7381.9
2020			257.5	1,193.70	1451.2	4,198.7	483.2	4,028.60	700.8	9,411.3	7960.1
2021		403.2	257.5	1,193.70	1854.4	4,198.7	483.2	4,028.60	700.8	9,411.3	7556.9
2022		403.2	257.5	1,193.70	1854.4	4,198.7	483.2	4,028.60	700.8	9,411.3	7556.9
2023		329.9	257.5	1,193.70	1781.1	4,198.7	483.2	4,028.60	700.8	9,411.3	7630.2
2024		329.9	257.5	1,193.70	1781.1	4,198.7	483.2	4,028.60	700.8	9,411.3	7630.2
2025			257.5	1,193.70	1451.2	4,198.7	483.2	4,028.60	700.8	9,411.3	7960.1
2026			257.5	1,193.70	1451.2	4,198.7	483.2	4,028.60	700.8	9,411.3	7960.1
2027		1,402.0	257.5	1,193.70	2853.2	4,198.7	483.2	4,028.60	700.8	9,411.3	6558.1
2028		1,402.0	257.5	1,193.70	2853.2	4,198.7	483.2	4,028.60	700.8	9,411.3	6558.1
2029			257.5	1,193.70	1451.2	4,198.7	483.2	4,028.60	700.8	9,411.3	7960.1
2030			257.5	1,193.70	1451.2	4,198.7	483.2	4,028.60	700.8	9,411.3	7960.1
2031		806.2	257.5	1,193.70	2257.4	4,198.7	483.2	4,028.60	700.8	9,411.3	7153.9
2032		806.2	257.5	1,193.70	2257.4	4,198.7	483.2	4,028.60	700.8	9,411.3	7153.9
2033		659.8	257.5	1,193.70	2111	4,198.7	483.2	4,028.60	700.8	9,411.3	7300.3
2034		659.8	257.5	1,193.70	2111	4,198.7	483.2	4,028.60	700.8	9,411.3	7300.3
2035			257.5	1,193.70	1451.2	4,198.7	483.2	4,028.60	700.8	9,411.3	7960.1
2036			257.5	1,193.70	1451.2	4,198.7	483.2	4,028.60	700.8	9,411.3	7960.1
2037		701.0	257.5	1,193.70	2152.2	4,198.7	483.2	4,028.60	700.8	9,411.3	7259.1
2038		701.0	257.5	1,193.70	2152.2	4,198.7	483.2	4,028.60	700.8	9,411.3	7259.1
Total	16,798	10,006	7,100	30,820	64,723	112,053	12,664	98,922	17,720	241,360	176,636
										EIRR =	**27%**

Legend :

Benefit 1 : Benefit brought about by treatment of transport demand of foreign trade cargoes which will exceed the treatment capacity of the existing Cebu Baseport at the new Cebu port planned to be constructed.

Benefit 2 : Reduction Benefit of transportation cost of foreign trade containerized cargoes which would be brought about by larger-sized vessels than the ones at present at the new Cebu port.

Benefit 3 : Reduction Benefit of navigation cost and handling cost of containerized cargoes which would be brought about by avoidance of transportation of the cargoes by transship vessels at the new Cebu port.

Benefit 4 : Reduction Benefit of handling cost of cargoes which would be brought about by installation of efficient cargo-handling equipment at the new Cebu port.

(2) Functions of the New Cebu Port

Expansion of the existing Cebu Baseport is limited; it will surely not be able to cope with the demand on the cargo and passenger transportation at Baseport in the very near future. Accordingly, the new Cebu port should be constructed as early as possible to supplement the shortage of the treatment capacity of the existing Cebu Baseport.
The new Cebu port is planned to be a unique government port which can deal with the foreign trade cargoes in the Cebu Island.
This is also the reason for the new construction of the port.

(3) (Summary) Situations of the "Without" and "With" Project Cases

The "Without" situation means a situation where the planned new Cebu port would not be constructed, while the "With" situation presents a situation where the port would be constructed. The treatment of cargoes at the two ports in two situations are as follows:

a) "Without" situation : All volumes of the foreign trade cargoes have to be treated at the existing Cebu Baseport, irrespective of the treatment capacity.
Accordingly, the Cebu Baseport will not be able to treat the potential traffic demand of Baseport.
b) "With" situation : In cooperation with the new Cebu port, Cebu Baseport would be able to treat the potential traffic demand after rehabilitation and expansion of Baseport. As a result, none of problems would occur.

(4) Construction Cost of the New Cebu Port

The construction cost by investment plan period, construction works, and financial and economic price bases is summarized in Table 3.1.2-5.
The long-term investment plan consists of two(2) sub-investment plans: The first sub-investment plan starts in 2004 and ends in 2008, and the second in 2009 and 2014.
The first sub-investment plan is called "Short-term investment plan" and evaluated independently of the "Long-term investment plan", whose result of the evaluation will be entered in the section 3, Report Volume 2.

Table 3.1.2-5 Construction Cost of the New Cebu Port Project

(unit : million pesos at 2001 financial and economic prices)

Construction Work	Long-term project				Short-term project				% of Short-term Project *3
	Financial cost			Economic	Financial cost			Economic	
	Local	Foreign	Total	Total	Local	Foreign	Total	Total	
Civil work	1927.8	4580.5	6508.4	6664.6	961.3	2309.6	3269.0	3347.6	50.2
Utilities	205,8	381.9	587.7	600.7	106.5	213.4	322.8	327.2	54.5
Building works	256.2	453.5	709.7	725.2	149.0	265.7	414.7	423.8	58.4
Access Roads	92.7	169.8	262.5	268.3	92.7	169.8	262.5	268.3	100.0
Vessel Support	1.0	119.0	120.0	124.1	1.0	119.0	120.0	124.1	100.0
Cargo Handling Equipment	556.6	5009.0	5565.5	5736.5	272.1	2448.5	2720.5	2804.2	48.9
Others*1	95.1	0	95.1	95.1	85.1	0	85.1	85.1	89.5
Engineering cost	317.7	645.1	962.8	984.8	164.2	333.4	497.7	509.0	51.7
Contingency	33.5.3	1145.8	1481.2	1520.2	178.3	590.9	769.2	789.4	51.9
VAT*2	1629.3	0	1629.3	0	846.1	0	846.1	0	n.a
Grand Total	5417.5	12504.5	17922.1	16719.5	2856.4	6451.2	9307.6	8678.7	51.9

Note *1: The sub-item cost consists of Land acquisition cost, Re-plantation cost of mangrove and Relocation cost of housings. The Land acquisition cost occupies a very large portion of the sub-item cost.
Note *2: VAT (Value Added Tax) is a financial cost, not an economic cost.
Note *3: "of the economic total cost".

The total construction cost of the new Cebu port long-term project is estimated to be 17,922 million pesos at 2001 financial prices or 16,720 million pesos at 2001 economic prices. Cost of the civil work accounts for 40% and installation cost of the cargo handling equipment, 34% of the total cost.

Cost of the short-term project accounts for 52% of the long-term project cost.

The economic costs of the construction works are larger than the ones of the financial costs due to conversion of the foreign portions which are parts of the financial cost by the construction works onto the Numeraire (the Philippine domestic economic prices).

However, as the VAT is not an economic cost, the economic total cost is smaller by 6.7 % than the financial total cost.

(5) Benefit Items to be expected

The New Cebu Port with facilities which the above-mentioned construction works will actualize would bring about the following benefits. The benefit items are derived through comparison of the above-mentioned "With" and "Without" project cases, and design of the facilities of the new Cebu port.

Table 3.1.2-6 Benefit Items relating to the New Cebu Port Project

Direct sources of creation of the benefits	Benefits items to be expected	
Expansion of the treatment capacity of foreign trade cargoes in the Region	Benefit 1:	Benefit brought about by treatment of transportation demand of foreign trade cargoes which will exceed the treatment capacity of the existing Cebu Baseport.
Reception of larger-sized container vessels	Benefit 2:	Reduction Benefit of transportation cost of foreign trade containerized cargoes which would be brought by the reception.
	Benefit 3:	Reduction Benefit of navigation cost and handling charge of containerized cargoes which would be brought about by avoidance of transshipment.
Improvement of cargo handling efficiency	Benefit 4:	Reduction Benefit of handling cost of cargoes.

Along with the four (4) benefit items, a benefit "Reduction Benefit of navigation cost of container vessels which would be brought about by the reception of larger-sized container vessels at the new Cebu port" can be supposed. However, the benefit is not counted in this analysis due to lack of appropriate basic data for the estimation.
The benefit items are common between the economic analyses on the "Long-term Plans" and "Short-term Plans". Only amounts of the benefits are different between the two analyses.

(6) Benefit 1: Benefit brought about by Treatment of Demand of Foreign Trade Cargoes which will exceed the Treatment Capacity of the Existing Cebu Baseport

1) Approach of Benefit 1
a. Approach of Benefit 1.
The Benefit 1 is one of the benefits of the project in the sense that the new Cebu port would reduce the following costs which are defined later, compared with the "Without" situation i.e. none of realization of the new Cebu port. As to concrete expression of amount of the Benefit 1, the following approaches can be supposed:

Approach 1: The excessive transportation demand of the foreign trade cargoes is supposed to be treated at the other government ports located in the Cebu Island. Additional project cost caused by the supposition is regarded as amount of the Benefit 1.
Approach 2: Custom clearance of the excessive cargoes is performed at the Manila International Seaport and then, the cargoes are transported as domestic cargoes to the other government ports. Additional project cost caused by the treatment is regarded as amount of the Benefit 1.
Approach 3: The excessive cargoes are supposed to be treated at the existing Cebu Baseport. Waiting time cost of vessels caused by the supposition is regarded as amount of the Benefit 1.

Approach 4: It is supposed that the excessive cargoes can not be treated at the other government ports located in the Cebu Island. Unfavorable effect of the non-treatment of the excessive cargoes to creation of the GRDP (Gross Regional Domestic Product) in the Region 7 is regarded as amount of the Benefit 1.

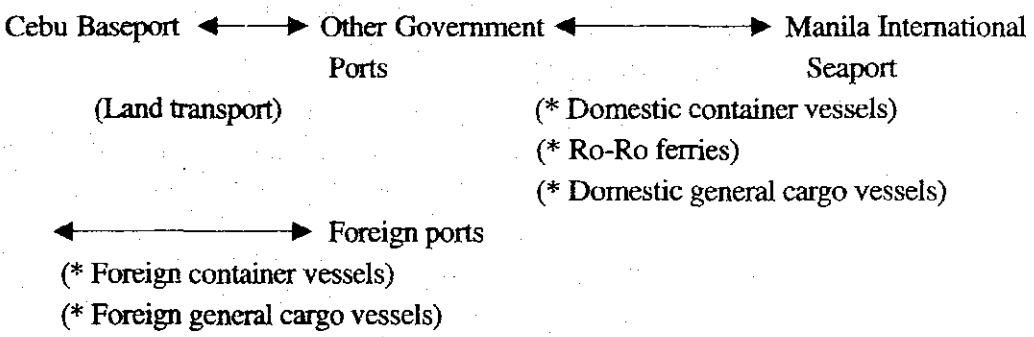
The Approach 2 is adopted in this analysis. It is selected after reviewing the four (4) Approaches from the following viewpoints:

* The Port Development Policy in the Region 7,
* Degree of acceptance of assumptions or suppositions introduced in the approaches, compared with the actual situations. The higher degree of the acceptance, the better, and
* The existing treatment capacities of handling cargoes in the other government ports.

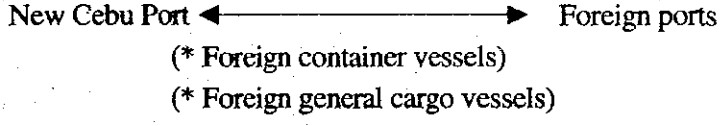
There exists almost none of treatment capacities of the foreign trade cargoes at the existing government ports except Cebu Baseport. Therefore, the assumption introduced in the Approach 1 is too unacceptable. The waiting time which would generate in case of the Approach 3 becomes soon infinitive, implying that the amount of the benefit become also infinitive. The assumption introduced in the Approach 4 is too strict, because the other government ports in the Cebu Island have surplus treatment capacities of the domestic trade cargoes.

b. Situations of the "Without" and "With" project cases of the Approach 2.
The situations of transportation processes of the excessive foreign trade cargoes in case of the Approach 2 are as follows:

a) Situation of the "Without"



b) Situation of the "With"



c. (Conclusion) Economic sub-items which constitute the Benefit 1

Based on the transportation processes of the excessive cargoes depicted above, the following economic sub-item costs which would generate in the "Without" situation can be enumerated as components of the Benefit 1, because the new Cebu port would reduce the additional sub-costs:

Additional cost 1: The land transportation cost between Cebu Baseport and the other government ports located in the Cebu Island.

Additional cost 2: Navigation cost of the domestic container vessels, RORO ferries and/or domestic general cargo vessels between the other government ports and the Manila International Seaport.

Additional cost 3: Handling cost of the excessive cargoes at the Manila Port.

2) Estimation Formulas of the Benefit 1

a. Estimation formulas.

$$(\text{Amount of the Benefit 1})_{tf} = (\text{Additional cost 1})_{td} + (\text{Additional cost 2})_{td} + (\text{Additional cost 3})_{tf}$$

"t" : The year 2009 (Commencement year of operation of the new Cebu port) -the year 2038 (Final year of evaluation period of this project).

"f" : Foreign trade cargoes.

"d" : Domestic trade cargoes.

$$(\text{Additional cost 1})_{td} = [(T^{fc}/UT^{fc}/UV) + (T^{fg}/UV^{fg})] \times C^{T}$$

T^{fc} : Excessive transportation demand of the foreign trade containerized cargoes at Cebu Baseport. The demand is equivalent to the whole potential transportation demand at Cebu Baseport after the year 2009. Therefore, transportation demand of the containerized cargoes transported by transship foreign container vessels is not included in the T^{fc}.

UT^{fc} : Foreign trade cargo volume in a container.

UV : Number of containers carried by a truck.

T^{fg} : Excessive transportation demand of the foreign trade general (conventional) cargoes at Cebu Baseport. The demand is equivalent to the whole potential transportation demand at Cebu Baseport after the year 2009. Therefore, transportation demand of the conventional cargoes transported by transship foreign general cargo vessels is not included in the T^{fg}.

UV^{fg} : Conventional cargo volume carried by a truck.

CT : Transportation cost of the cargoes carried by a truck.

$(\text{Additional cost 2})_{td} = T^{fc}/UT^{fc}/N^{c} \times V^{dc} \times D + T^{fg}/N^{fg} \times V^{dr} \times D$

N^{c} : Number of containers carried by a domestic container vessel.
V^{dc} : Navigation cost of domestic container vessel per day.
D : Sailing days of vessel between the Manila Port and the other government ports located in the Cebu Island.
N^{fg} : Conventional cargo volume carried by a RORO ferry in 2000.
V^{dr} : Navigation cost of RORO ferry per day.

$(\text{Additional cost 3})_{tf} = T^{fc}/UT^{fc} \times H^{cd} + T^{fg} \times H^{gd}$

H^{cd} : Handling charge of a domestic trade container at the Manila Port.
H^{gd} : Handling charge of domestic trade conventional cargo per ton at the Manila Port.

b. Background of the estimation formulas.

a) The amount of the Benefit 1 is estimated, based only on the transportation demand of foreign trade cargoes which does not include the one transported by transship foreign container and general cargo vessels. The benefits which would be brought about by the treatment of the latter will be discussed later as the "Benefit 3".

b) The amount of the Benefit 1 can be estimated independently of the phenomenon of the application of larger-sized foreign and domestic container vessels and domestic RORO ferries at the new Cebu port. It is because the total transportation volume is the main explanatory variable of the Benefit 1 and is independent of the ship sizes of the applied cargo vessels.

c) The domestic trade conventional cargoes could be transported between the other government ports and the Manila Port by both the RORO ferries and general cargo vessels. The navigation costs of the two vessels types are different. The navigation cost of the RORO ferry is adopted in this analysis due to lack of basic data on the navigation cost of the general cargo vessels.

d) It is supposed that the foreign trade cargoes after custom clearance are reloaded to the domestic vessels within 15 days at the Manila Port. Accordingly, charge on storage of cargoes is not imposed at the Manila Port (see "Port Tariff Rates in the Port of Manila").

3) Attribution of the Benefit 1

As pointed out in the previous sub-paragraphs (6)-1)-(c) and (6)-2)-(a), the three (3) categories of the additional costs are related to the domestic transportation of the cargoes. Accordingly, the whole amount of the Benefit 1 is attributed to the Philippine economics and society.

4) Values of the Variables in the Estimation Formulas

(a) Foreign trade cargo volume in a container (UT^{fc}):

10.2 tons/container

The volume is an weighted average of the following cases, applying the containerized cargo volumes by import and export in 2020:

Export cargoes: 5.6 tons/container
Import cargoes: 11.4 tons/container

(b) Number of container carried by a truck (UV) : One container per truck.

(c) Conventional cargo volume carried by a truck (UV^{fg}) : 8 tons per truck.

(d) Transportation cost of cargoes by a truck (C^{T}):

1,600 pesos per truck, applied for both cases of containers and conventional cargoes.

The cost is estimated based on the following situation:

- The cost for first 100 km transportation is estimated to be 1,600 pesos, including truck vehicle operating cost (8.8 pesos per km.) and loading and unloading costs of one container or conventional cargoes of 8 tons to / from the truck. Above 100 km, the cost increases by the vehicle operating cost.
- It is supposed that the other government ports are located within 100 km., pivoting on Cebu Baseport.

(e) Number of containers carried by a domestic container vessel (N^{C}):

(unit : containers/vessel)

2009	211	2015	254
2010	219	2016	260
2011	226	2017	267
2012	233	2018	274
2013	240	2019	281
2014	247	2020	288

Note : Case of RORO ferry and container cargo vessel.

(f) Navigation cost of domestic container vessel per day (V^{dc}) and of RORO ferry per day (V^{dr}):

Domestic container vessel : 236,250 pesos/day (4,500 US $ / day)
RORO ferry : 126,000 pesos/day (2,400 US $ / day)

(g) Sailing days of vessel between the Manila Port and the other government ports (D):

2 days.

(h) Conventional cargo volume carried by a RORO ferry in 2010 (N^{fg}):

490 tons per Middle RORO ferry.

The volume is expected to increase since 2001 but fixes in 2010.

(i) Handling charge of a domestic trade container (H^{cd}) and Handling charge of domestic trade conventional cargo per ton (H^{gd}) at the Manila Port:

H^{cd} : 4,008 pesos / container

H^{gd} : 294 pesos / ton

The charges are calculated, based on the following formula and basic data:

a) Calculation formula.

The charge = Wharfage + Cargo Handling Tariff

= Wharfage +Stevedoring charge +Cargo charge

Note 1: "Wharfage" is a charge which is imposed on cargo itself for usage of the whole related port facilities.

Note 2: "Cargo Handling Tariff" is a charge which is imposed on the cargo concerned for handling the cargo.

Note 3: In this analysis, "Charge on vessel" and "Storage charge" are not counted.

b) Basic data.

Table 3.1.2-7 Wharfage

		Unit	Cebu Port	Manila Port
General cargo:				
Domestic cargo	Import	peso/ton	4.00	4.00
	Export	peso/ton	4.00	4.00
Foreign cargo	Import	peso/ton	36.65	36.65
	Export	peso/ton	18.35	18.35
Transshipment		US$/ton	0.833	0.833
Containerized cargo:				
Domestic cargo	Import	peso/box	55*4	54*4
	Export	peso/box	55*4	54*4
Foreign cargo	Import	peso/box	520*4	520*4
	Export	peso/box	260*4	260*4
Transshipment		US$/box	12*4	12*4

Table 3.1.2-8 Cargo Handling Charge

		Unit	Cebu port	Manila Port
Stevedoring charge:				
General cargo	Domestic	peso/ton	63.65*6	290*5
	Foreign		91.87*7	
Containerized cargo	Domestic	peso/box	806.9*8	2,031
	Foreign		1,216.83*9	
Container Transshipment		peso/box		1,620*4
Cargo charge:				
FCL-Import		peso/box*10		2,117*4
FCL-Export		peso/box*10		1,729*4

Note 4: 20 ft box.

Note 5: 0-20 tons.

Note 6: Ro-Ro Palletized case ,including the "Cargo charge".

Note 7: Including the "Cargo charge".

Note 8: FCL Domestic Container case, 20-35 feet box, including the "Cargo charge"

Note 9: FCL (65%) and Empty Container (35%) case, 20 ft box, including the "Cargo charge".

Note 10: They are included in the "Stevedoring charge".

Source: Cebu Port: CPA Port Tariff

Manila Port: Port Tariff Rates in the Port of Manila.

(j) Excessive transportation demand of the foreign trade containerized cargoes (T^{fc}) and Excessive transportation demand of the foreign trade conventional cargoes (T^{fg}) at Cebu Baseport:

Table 3.1.2-9 Excessive Transportation Demand at Cebu Baseport

(unit: 1000 tons)

	Tfc	Tfg
2009	2,005.1	489.7
2010	2,249.2	477.0
2011	2,443.3	504.0
2012	2,649.8	531.3
2013	2,869.6	558.8
2014	3,103.4	586.7
2015	3,352.3	614.8
2016	3,717.0	643.0
2017	3,898.6	671.4
2018	4,198.1	699.8
2019	4,516.7	728.1
2020	4,855.5	756.4
2021	4.855.5	756.4
:	:	:
2038	4,855.5	756.4

The amounts of Benefit 1 by the sub-classified benefit items are presented in Appendix 3.1.2-1.

(7) Benefit 2: Reduction Benefit of Transportation Cost of Foreign Trade Containerized Cargoes

As pointed out in the Table 3.1.2-4, the reception of larger-sized container vessels at the new Cebu port would bring about two kinds of the Benefits (Benefit 2 and Benefit 3). The Benefit 2 relates to a benefit which is expected, based on the existing transportation routes of the foreign trade cargoes. The second Benefit(Benefit 3), i.e. "Reduction Benefit navigation cost and transportation cost of containerized cargoes which would be brought about by the reception of the existing transship vessels " will be discussed in the subsequent sub-paragraph. The Benefit 2 is one of the benefits of the project in the sense that the new Cebu port would reduce the following costs which are defined later, compared with the "Without" situation (i.e. none of realization of the new Cebu port).

1) Approach of the Benefit 2

(a) Situations of the "Without" and "With" project cases.

As to the foreign trade containerized cargoes which are now and will be transported between the port in the Cebu Island, emergence of the new Cebu port does not change the transportation route of the cargoes from the existing one, because Cebu Baseport has already treated the cargoes.

However, the new Cebu port would make possible the acceptance of larger-sized container vessels than the ones at the existing Cebu Baseport.

The situations are as follows:

a) Transportation process of the cargoes

* Situation of the "Without" : Cebu Baseport ◄——► Foreign ports
  (Foreign container vessel)
* Situation of the "With" : New Cebu Port ◄——► Foreign ports
  (Foreign container vessel)

b) Ship size.

* Situation of the "Without" : Less than 5,600 DWT
* Situation of the "With" : More than 5,600 DWT

(b) (Conclusion) Economic sub-items which constitute the Benefit 2. When the larger-sized container vessels are available for the transportation of the cargoes than vessels with ship sizes available in the Cebu Baseport, they can transport more volume of the cargoes than the one transported by smaller-sized vessels for one navigation. As a result, transportation cost of the cargoes per ton becomes cheaper than the present one.

Total transportation cost reduced by the difference in the transportation cost per ton is regarded as amount of Benefit 2.

2)Estimation Formula of the Benefit 2

(a) Estimation formula.

(Amount of the Benefit 2)$_{tf}$ = $T^{fc} \times [C^{cb} - C^{cn}] / UT^{fc} \times D^{f}$

T^{fc} : Excessive transportation demand of the foreign trade containerized cargoes. Transportation demand of the containerizes cargoes transported by transship foreign container vessels is not included in the T^{fc}.

C^{cb} : Average transportation cost of a container per day which corresponds to combination of the ship sizes of the container vessels available for Cebu Baseport.

C^{cn} : Average transportation cost of a container per day which corresponds to the combination of the ship sizes of the container vessels available for the new Cebu port.

Ut^{fc} : Foreign trade cargo volume in a container.

D^{f} : Sailing days of container vessel between Cebu Baseport and the foreign ports.

(b) Background of the estimation formula.

a) As being clear in the estimation formula, the amount of the Benefit 2 is estimated, based on the transportation demand of foreign trade containerized cargoes which does not include the one transported by transship foreign container vessels. This situation is the same as in the Benefit 1.

b) The foreign trade conventional cargoes would also generate a similar kind of the formularized Benefit 1. However, when the volume is relatively small compared with the containerized cargoes and basic data for estimating the amount of the benefit is lacking, the benefit is not counted in this analysis.

3) Attribution of the Benefit 2

In the case of export cargoes from the Philippine, it can be assumed that an improvement of international competition power of the cargoes which would be realized through lowering the export prices caused by adoption of the large-sized container vessels be reflected in the Benefit 2. Accordingly, the Benefit 2 brought about in the field of export cargoes attributes to the industry in Philippines.

On the other hand, in case the of the import cargoes, it can be assumed that the lowering of the import prices of the cargoes caused by the lowering of the transportation cost contribute to the lowering general prices in the Region 7.

In conclusion, whole amount of the Benefit 2 is attributed to the Philippine economy and society.

4) Values of the Variables in the Estimation Formula

a) The variable T^{fc}: see the previous sub-paragraph (6)-4)-j).

b) The variable C^{cb}:

617 pesos/container/day (11.75 US $/container/day).

The cost is estimated based on the following data:

- Basic data in 2010

Table 3.1.2-10 Sea Transportation Cost of Container (C^{cb})

Ship size (DWT)	No. of containers transported per week	%	Transportation cost of a container per day US $ / container / day
41,000	1,000	0.183	7.07
30,000	2,040	0.209	7.93
16,000	2,100	0.217	7.29
7,500	2,300	0.234	7.90
5,600	1,596	0.162	9.41

- Case of less than 5,600 DWT is not entered in the above table, therefore, it is estimated based on the data tabulated above, applying an extrapolation method.

c) The variable C^{cn}:

414 pesos/container/day (7.89 US $/container/day)

- It is calculated based on the basic data in the above table through a weighted mean calculation.

d) The variable UT^{fc}: see the previous sub-paragraph (6)-4)-a).

e) The variable D^{f}:

5 days.

(8) Benefit 3: Reduction Benefit of Navigation Cost and Handling Charge of Containerized Cargoes which would be brought about Avoidance of Transportation of the Cargoes transported by Transship Vessels

The containerized cargoes are now transported by larger-sized vessels than the ones available at the Cebu Baseport between ports in the Philippine and foreign ports.

Accordingly, the cargoes are transported through the other ports in the Philippine which have large facilities between Cebu Baseport and the foreign ports. This situation is called "Transshipment". The acceptance of the larger-sized vessels at the new Cebu port would make possible of reduction of costs related to the transshipment.

1) Approach of the Benefit 3

(a) Situations of the "Without" and "With" project cases.

The above -mentioned situations are depicted as follows:

a) Transportation processes of the containerized cargoes.

* Situation of the "Without".

Cebu Baseport ◄——► Manila Port ◄——► Foreign ports

Ports in Visaya

(Domestic container vessels) (Foreign container vessels)

* Situation of the "With".

New Cebu Port ◄——————————► Foreign ports

(Foreign container vessels)

b) Ship size available for the transportation.

* Situation of the "Without" : Less than 5,600 DWT
* Situation of the "With" : More than 5,600 DWT

(b) (Conclusion) Economic sub-items which constitute the Benefit 3

When larger-sized container vessels are received at the planned new Cebu port, large sized foreign container vessels do not need to drop at the Manila Port and ports in Visaya for reloading or unloading the containers to/from small-sized container vessels.

As a result, handling charge of the reloading or unloading at the Manila Port and ports in Visaya, and navigation cost of domestic container vessels would be reduced. Sum of the two sub-categories of the costs is regarded as amount of the Benefit 3.

2) Estimation Formulas of the Benefit 3

(a) Estimation formulas.

$(\text{Amount of the Benefit 3})_{tf} = X_{tf} + Y_{tf}$

X_{tf} : Total reduced handling charges of containers at the Manila Port and ports in Visaya which would be brought about by avoidance of the transshipment.

Y_{tf} : Total reduced navigation cost of domestic container vessels between the Manila Port / ports in Visaya and the new Cebu port which would be brought about by avoidance of the transshipment.

$X_{tf}=N^{tc}_{tf} \times H^{cd} \times 2$

N^{tc} : Number of containers transported by the transshipment at the Cebu Baseport.

H^{cd} : Handling charge of a domestic trade container at the Manila Port.

$Y_{tf}=N^{tc} / N^{fcb} \times V^{dcn} \times D$

N^{fcb} : Average number of containers carried by foreign trade container vessels whose average ship size is estimated, based on combination of the ship sizes available at Cebu Baseport.

V^{dcn} : Average navigation cost of domestic container vessel per day whose average ship size is estimated, based on combination of the ship sizes available at the new Cebu port.

D : Sailing days of vessel between the Manila Port and other government ports in the Cebu Island.

(b) Background of the estimation formulas.

a) It is assumed that only the containerized cargoes are transshipped.

b) It is supported that the sailing days between the Manila Port and ports in Visaya, and foreign ports be same as the one between the new Cebu port and the foreign ports.

3) Attribution of the Benefit 3

Definition of CIF (Cost, Insurance and Freight) and FOB (Freight on Board) leads a conclusion that whole amount of the Benefit 3 is attributed to the Philippine economy and society.

4) Values of the Variables in the Estimation Formulas

a) The variable H^{cd}:

4,008 pesos / container.

b) The variable N^{fcb}:

2008-2020 : 400 containers / vessel.

c) The variable V^{dcn}:

427,350 pesos / domestic container vessel / day (8,140 US$ / domestic container vessel / day).

d) The variable D:

2 days.

e) The variable N^{tc}:

(unit : 1000 containers)

2009	36.4
2010	71.2
2011	102.0
2012	134.6
2013	167.4
2014	200.2

2015	233.0
2016	265.8
2017	298.4
2018	331.2
2019	364.0
2020	396.8

Calculation results by the total reduced handling charges and total reduced navigation cost are presented in Appendix 3.1.2-2.

(9) Benefit 4: Reduction Benefit of Handling Cost of Cargoes

Cargo handling equipment for containerized and conventional cargoes with more efficient and larger handling capacity than the ones in the existing Cebu Baseport are planned to be installed at the new Cebu port. The equipment would save the handling cost of the cargoes.

1) Approach of the Benefit 4

(a) Approach of the Benefit 4.

a) *The Reduction Benefit can not be estimated by applying the maximum capacities of* cargo handling equipment planned to be installed. It is because amount of the Benefit estimated, based on the maximum capacities represents a "potential" amount, and does not reflect an amount "to be realized". In order to estimate the latter, the amount has to be calculated, based on magnitudes of effects on phases which can be observed in the "Without" project case.

b) Estimation of the latter encounters similar situations discussed in the case of the Benefit 1. As for estimation of the Benefit 4, the Approach 3 for the Benefit 1, with a little modified meaning, is adopted, taking into consideration existence of surplus treatment capacity cargo handling at Cebu Baseport during a few coming years. However, a lower cargo handling efficiency at Baseport than the expected one at the new Cebu port would force the cargo vessels to wait for handling of their cargoes.

(b) Situations of the "Without" and "With" project cases.

The above-mentioned situations are summarized as follows:

a) Treatment capacity of the related handling cargo facilities and equipment.

* Situation of the "Without" : The throughput capacity at Cebu Baseport in 2000.
* Situation of the "With" : The throughput capacity at the planned new Cebu port.

b) Effects from the situations.

* Situation of the "Without" : Vessels will wait for handling of their cargoes in or outside area of Cebu Baseport.
* Situation of the "With" : Situation of the wait would not occur.
  Reduction of total handling cost of the cargoes due to improvement of efficiency of the operation which would be brought about by a higher efficient equipment installed at the new Cebu port.

(c) (Conclusion) Economic sub-items which constitute the Benefit 4.

Amount of the Benefit 4 consists of the waiting time cost of cargo vessels which would occur in the "Without" project case, and cargo handling cost to be reduced from the one in the "Without".

2) Estimation Formulas of the Benefit 4

(a) Estimation formulas.

(Amount of the Benefit 4) $_{tf}$ =(Waiting time cost of the foreign trade cargo vessels) $_{tf}$
+ (Foreign trade cargo handling cost to be reduced) $_{tf}$

(Waiting time cost of the foreign trade cargo vessels) $_{tf}$
= (Waiting time cost of foreign trade container vessels) $_{tf}$
+ (Waiting time cost of foreign trade conventional cargo vessels) $_{tf}$

(Waiting time cost of foreign trade container vessels) $_{tf}$

$$= X^{fc}{}_{tf} \times UN^{fcb} / US^{fcb} \times UB^{fcb} \times W^{fc} / 18 \times R$$

X^{fc} : Annual waiting time of the foreign trade container vessels to be reduced.

$$X^{tc}{}_{tf} = N^{fc}{}_{tf} \times [\ 1/UN^{fcb} - 1/UN^{fcn}]$$

$N^{f}c$: Annual number of foreign trade containers treated at the new Cebu port.

UN^{fcb} : Number of foreign trade containers per hour treated at Cebu Baseport.

UN^{fcn} : Number of foreign trade containers per hour treated at the new Cebu port.

US^{cb} : Average number of containers carried by a foreign container vessel at Cebu Baseport.

UB^{fcb} : Average berthing time of foreign container vessel for loading and unloading the containers at Cebu Baseport.

W^{fc} : Waiting time cost of foreign trade container vessel per day.

R : Ratio of volume of the containerized cargoes transported by the Philippine maritime industry to the total volume of the cargoes.

(Waiting time cost of foreign trade conventional vessels) $_{tf}$

$$= X^{fg} \times UN^{fgb} / US^{fgb} \times UB^{fgb} \times W^{fc} / 18 \times R$$

X^{fg} : Annual number of the foreign trade conventional cargo vessels to be reduced.

$$X^{fg}{}_{tf} = T^{fg} \times [\ 1/UN^{fgb} - 1/UN^{fgn}]$$

T^{fg} : Annual volume of foreign trade conventional cargoes treated at the new Cebu port.

UN^{fgb} : Volume of foreign trade conventional cargoes per hour treated at Cebu Baseport.

UN^{fgn} : Volume of foreign trade conventional cargoes per hour treated at the new Cebu port.

US^{fgb} : Average volume of foreign trade conventional cargoes carried by a foreign trade conventional cargo vessel at Cebu Baseport.

UB^{fgb} : Average berthing time of foreign conventional cargo vessel for loading and unloading the containers at Cebu Baseport.

(Foreign trade cargo handling cost to be reduced) $_{tf}$

=(The cost to be reduced relating to foreign container vessel) $_{tf}$

+ (The cost to be reduced relating to foreign conventional cargo vessels) $_{tf}$

(The cost to be reduced relating to foreign container vessels) $_{tf} = X^{fc}_{tf} \times C^{fcb}$

C^{fcb} : Handling cost of foreign trade containers per hour at Cebu Baseport.

(The cost to be reduced relating to foreign conventional cargo vessels)$_{tf} = X^{fg}_{tf} \times C^{fgb}$

C^{fgb} : Handling cost of foreign trade conventional cargoes per hour at Cebu Baseport.

(b) Background of the estimation formulas.

a) The main explanatory variable of the amount of the Benefit 3 discussed before is cargo handling "charge" which generates now at other ports in the country, but not cargo handling "cost" which would generate at Cebu Baseport. Accordingly, all volume of cargoes including those transported by the transship foreign cargo vessels becomes the subject to be considered in the Benefit 4.

b) It is assumed that the Cebu Baseport be able to treat the cargoes which will exceed the treatment capacity of the Cebu Baseport for a limited period, utilizing the existing surplus treatment capacity. However, the treatment forces the foreign trade vessels to wait in or outside of the port. This situation is adopted as situation of the effect in the "Without" project case.

3) Attribution of the Benefit 4

A partial amount of the benefit of the waiting time cost of foreign trade cargo vessels is attributed to the Philippine economy and society. Basis of the judgment is as follows:

Whole volume of the foreign trade cargoes are originally transported by foreign cargo vessels. However, whole volume of the domestic cargoes are to be transported by the Philippine maritime industry. This is regulated by the Philippine Law. In most cases of the transportation of the foreign trade cargoes, final destination or origin ports of the cargoes are local ports in the Cebu Island. Accordingly, it is convenient for the foreign maritime industry to employ the Philippine cargo vessels for the transportation, depending on the OD ports of the cargoes. Therefore, a part of the Benefit 4 is attributed to the Philippine economy and society.

4) Values of the Variables in Estimation Formulas

a) Waiting time cost of a foreign container vessel and foreign conventional cargo vessel per day (W^{fc}):

160,000 pesos/vessel/day.

* Average waiting time of 18 hours is supposed to estimate the cost.

b) The variable R:

5%.

Referring to the cases in Japan.

c) Cargo handling cost per hour of foreign trade containers (C^{fcb}_{2000}) and foreign conventional cargo (C^{fgb}_{2000}) at Cebu Baseport in 2000:

Foreign container cargo: 42,589 pesos / hour

Foreign conventional cargo :3,032 pesos / hour

The costs are estimated based on the following basic data:

* Cargo handling cost, including "Cargo charge" at Cebu Baseport in 2000:

Foreign container cargo: 1,216.83 pesos / box

Foreign conventional cargo : 91.87 pesos /ton

* Cargo handling volume per hour at Cebu Baseport in 2000:

Foreign container cargo : 35 boxes / hour

Foreign conventional cargo : 33 tons / hour

d) The variables N^{fc}, UN^{fcn}, UN^{fcb}, US^{fcb} and UB^{fcb}:

Table 3.1.2-11 N^{fc}, UN^{fcn}, UN^{fcb}, US^{fcb} and UB^{fcb}

	Nf^{c} (1000 containers)	Un^{fcn} (containers / hour)	Un^{fcb} (containers / hour)	Us^{fcb} (containers / vessel)	Ub^{fcb} (hours / vessel)
2008			44	400	11.1
2009	369.4	91	44	400	11.1
2010	445.0	92	44	400	11.1
2011	509.8	94	44	400	11.1
2012	576.7	96	44	400	11.1
2013	645.6	97	44	400	11.1
2014	716.7	97	44	400	11.1
2015	790.2	101	44	400	11.1
2016	866.2	102	44	400	11.1
2017	944.9	104	44	400	11.1
2018	1,026.4	106	44	400	11.1
2019	1,110.9	107	44	400	11.1
2020	1,198.5	109	44	400	11.1

e) The variables T^{fg}, UN^{fgn}, UN^{fgb}, US^{fgb} and UB^{fgb}:

Table 3.1.2-12 T^{fg}, UN^{fgn}, UN^{fgb}, US^{fgb} and UB^{fgb}

	T^{fg} (1000 tons)	Un^{fgn} (tons / hour)	Un^{fgb} (tons / hour)	Us^{fgb} (tons / vessel)	Ub^{fgb} (hours / vessel)
2008			105	7,000	67.0
2009	498.7	105	105	7,000	67.0
2010	477.0	105	105	7,000	67.0
2011	504.0	105	105	7,000	67.0
2012	531.3	105	105	7,000	67.0
2013	558.8	105	105	7,000	67.0
2014	586.7	105	105	7,000	67.0
2015	614.8	105	105	7,000	67.0
2016	643.0	105	105	7,000	67.0
2017	671.4	105	105	7,000	67.0
2018	699.8	105	105	7,000	67.0
2019	728.4	105	105	7,000	67.0
2020	756.4	105	105	7,000	67.0

The sub-classified benefits by the ship types ,and containerized and conventional cargoes are presented in Appendix 3.1.2-3.

3.1.3 Economic Analysis on the Cebu Baseport Project

(1) Conclusion and Summary of the Analysis

1) Conclusion on the Investment Efficiency of the Project

EIRR of base case of the Long-term project is estimated to be 20% / annum. The rate exceeds the social discount rate or opportunity cost of capital of the Philippine, but is fairly below of the new Cebu port project(27%/annum). Accordingly, it can be concluded that the project is economically feasible. However, as shown in Table 3.1.3-1, the efficiency is considerably affected by changes in the project cost or amount of the benefits, compared with the stability of the efficiency in the new Cebu port case. This implies that attention should be paid for unexpected changes in the value of the two items from the planned or estimated ones.

Table 3.1.3-1 EIRRs of the Cebu Baseport Project -Long-term Plan-

(unit: %/annum)

		Benefits			
		20% down	10% down	Base case	10% up
Project cost	20% up	n.a	n.a	8	15
	10% up	n.a	5	15	20
	Base case	n.a	14	20	25
	10% down	13	20	26	30

Note : n.a: It is impossible to calculate the EIRR due to time-series of the minus net benefits.

Table 3.1.3-2 Cost Benefit Ratios of Cebu Baseport -Long-term Plan-

-Discount rate : 15%/annum-

		Benefits			
		20% down	10% down	Base case	10% up
Project cost	20% up	0.73	0.82	0.92	1.01
	10% up	0.80	0.90	1.00	1.10
	Base case	0.88	0.99	1.10	1.21
	10% down	0.98	1.10	1.22	1.34

Table 3.1.3-3 Net Benefits of Cebu Baseport -Long-term Plan-

-Discount rate : 15%/annum-

(unit : million pesos on 2001 economic prices basis)

		Benefits			
		20% down	10% down	Base case	10% up
Project cost	20% up	-322.0	-212.0	-101.9	8.1
	10% up	-221.8	-111.8	-1.7	108.2
	Base case	-121.6	-11.6	98.4	208.5
	10% down	-21.4	88.6	198.6	308.7

2) Project Cash Flows of the Base Case

The project cash flows are tabulated in Table 3.1.3-4. The values are expressed on the Philippine domestic economic prices basis which is the figure adopted in this analysis.

Table 3.1.3-4 Cash Flows of the Cebu Baseport Project ---Long-term Plan---

(unit : million Pesos at June 2001 prices on Economic price basis)

	Project cost					Benefit				Net
Year	Construc-tion cost	Replacem-ent cost	Maintena-nce cost	Operatio-n cost	Total	Benefit 1	Benefit 2	Benefit 3	Total	Benefit
2003		0.0	0.0	0.0	0				0.0	0
2004		0.0	0.0	0.0	0				0.0	0
2005	8.4	0.0	0.0	0.0	8.4				0.0	-8.4
2006	135.4	0.0	0.0	0.0	135.4				0.0	-135.4
2007	233.3	0.0	0.3	0.0	233.6				0.0	-233.6
2008	144.0	0.0	0.9	0.0	144.9				0.0	-144.9
2009	136.1	0.0	1.3	22.9	160.3	172.2	35	74.9	282.1	121.8
2010	98.1	0.0	1.6	47.4	147.1	166.6	67.9	78.6	313.1	166
2011	0.0	0.0	1.9	68.0	69.9	169.8	69.7	80.6	320.1	250.2
2012	8.7	0.0	1.9	89.6	100.2	172.9	71.5	82.6	327.0	226.8
2013	140.7	0.0	1.9	112.4	255	175.7	73.3	84.8	333.8	78.8
2014	243.0	0.0	2.4	136.4	381.8	178.6	75	87	340.6	-41.2
2015	111.0	0.0	2.9	161.6	275.5	181.3	76.6	89.2	347.1	71.6
2016		0.0	3.2	188.0	191.2	183.8	78.2	91.6	353.6	162.4
2017		0.0	3.2	215.8	219	186.1	79.8	94	359.9	140.9
2018		0.0	3.2	244.8	248	188.0	81.2	96.4	365.6	117.6
2019		0.0	3.2	286.9	290.1	189.8	82.6	99	371.4	81.3
2020		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
2021		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
2022		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
2023		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
2024		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
2025		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
2026		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
2027		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
2028		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
2029		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
2030		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
2031		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
2032		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
2033		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
2034		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
2035		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
2036		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
2037		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
2038		0.0	3.2	306.1	309.3	191.3	83.8	101.6	376.7	67.4
Total	1258.7	0	88.7	7389.7	8737.1	5,599.5	2383	2889.1	10,871.6	2134.5
									EIRR =	**20%**

Legend :

Benefit 1:Recovery Benefit of treatment capacity of domastic trade cargoes

Benefit 2:Improvement Benefit of treatment efficiency of domastic trade cargoes

Benefit 3:Reduction Benefit of embarkation-disembarkation time cost of passengers

(2) Final Functions of the Rehabilitated and Expanded Cebu Baseport

Functions of the treatment of all volume of the foreign trade cargoes and 10% of domestic containerized cargoes, which have to be performed at Cebu Baseport in the "Without" project case of the new Cebu port, are planned to be transferred to the new Cebu port in 2009. After the year 2009, Baseport will work as a main seaport in Region 7 which will handle domestic trade cargoes and passengers.

(3) Construction Cost of the Cebu Baseport Project

The construction cost by investment plan periods, construction works, and financial and economic price bases is summarized in Table 3.1.3-5.
As pointed out in the previous chapter, projects for Cebu Baseport development comprise the on-going projects, projects planned by private sector and projects proposed by the Study Team. *Only the construction cost of the projects proposed by the Study Team is adopted and* tabulated in the Table. The on-going projects and projects planned by private sector are regarded as "given" projects and evaluation of the projects are not carried out in this analysis.
The long-term investment plan consists of two(2) sub-investment plans: The first sub-plan starts in 2005 and ends in 2010 and the second sub-plan in 2012 and 2015.
The first sub-plan is called "Short-term investment plan" and evaluated independently of the "Long-term investment plan".

Table 3.1.3-5 Construction Cost of Cebu Baseport Project

(unit : million pesos at 2001 financial and economic prices)

Construction Work	Long-term project				Short-term project				% of Short-term Project *3
	Financial cost			Economic	Financial cost			Economic	
	Local	Foreign	Total	Total	Local	Foreign	Total	Total	
Civil work	308.2	719.2	1027.4	1051.9	182.9	426.8	609.7	624.3	59.3
Utilities									
Building works									
Access Roads									
Vessel Support	0.9	16.1	17.0	17.5	0.9	16.1	17.0	17.5	100.0
Cargo Handling Equipment									
Others*1									
Engineering cost	21.6	51.5	73.1	74.9	12.9	31.0	43.9	45.0	60.0
Contingency	33.1	78.7	111.8	114.5	19.7	47.4	67.1	68.7	60.0
VAT*2	122.9	0	122.9	0	73.8	0	73.8	0	n.a
Grand Total	486.7	865.5	1352.2	1258.8	290.0	521.3	811.3	755.5	60.0

Note *1: The sub-item cost consists of Land acquisition cost, Re-plantation cost of mangrove and Relocation cost of housings. The Land acquisition cost occupies a very large portion of the sub-item cost.
Note *2: VAT (Value Added Tax) is a financial cost, not an economic cost.
Note *3: "of the economic total cost".

The total construction cost of Cebu Baseport long-term project is estimated to be 1,352 million pesos at 2001 financial prices or 1,259 million pesos at 2001 economic prices. Cost of the civil work occupies 84% of the total construction cost. Cost of the short-term project occupies 60% of the long-term project cost. The economic costs by the construction works are larger than the financial costs due to conversion of the foreign portions which are parts of the financial cost by the construction works onto the Numeraire (the Philippine domestic economic prices). However, as the VAT is not an economic cost, the economic total cost is smaller by 6.9% than the financial total cost.

(4) Benefit Items to be expected

1) Main Rehabilitation and Expansion Works

The main works for rehabilitating and expanding the throughput capacity of Baseport are as follows:

1. Repair and expansion of the existing piers, and
2. Rearrangement of the related passenger's facilities.

It is assumed that damage of the existing piers proceed and the piers will not function without being repaired in the near future.

2) Benefit Items to be expected

Based on the rehabilitation and expansion works, the following benefit items can be enumerated:

Table 3.1.3-6 Benefit Items relating to the Cebu Baseport Rehabilitation and Expansion Project

Main expansion works	Direct sources of creation of the benefits	Benefit items to be expected
* Repair and expansion of the existing piers.	* Recovery of treatment capacity of cargoes	Benefit 1: Recovery benefit of treatment capacity of domestic trade cargoes
	* Reception of larger-sized domestic cargo vessels	Benefit 2: Improvement benefit of treatment efficiency of domestic trade cargoes.
	* Shortening of embarkation / disembarkation time of passengers	Benefit 3: Reduction benefit of time cost of passengers

The benefit items are common between the economic analyses on the "Long-term Plans" and "Short-term Plans". Only amounts of the benefits are different between the two analyses.

(5) Benefit 1: Recovery Benefit of Treatment Capacity of Domestic Trade Cargoes

Piers and a part of berths of the existing Cebu Baseport have been so damaged, and they are in situations of nonuse or inefficient utilization. Accordingly, it can be assumed that waiting time of domestic cargo vessels for handling of their cargoes will generate and increase transportation demand of the cargoes in future. The Baseport would be able to recover the throughput capacity to the originally designed level and increase the capacity through the rehabilitation and expansion works.

1) Approach of the Benefit 1

(a) Situations of the "Without" and "with" project cases.

The above-mentioned situations are summarized as follows:

a) Situations of the usage of the piers.

* Situation of the "Without" : The piers will not be able to be utilized.
* Situation of the "With" : The piers will receive domestic trade cargo vessels with ship sizes available for the piers.

b) Effects of the situations.

* Situation of the "Without" : Waiting time of the vessels will occur due to the treatment of the cargoes at other part of berths.
* Situation of the "With" : The waiting time would not occur.

(b) (Conclusion) Economic sub-item which constitutes the Benefit 1.

The waiting time cost of domestic trade cargo vessels which would occur in the "Without" project case is counted as amount of the Benefit 1.

2) Estimation Formula of the Benefit 1

(a) Estimation formula.

$$(\text{Amount of the Benefit 1})_{td} = [T^{dg}_{td} \times (1.0 - R^b)] / UT^{dg} \times UB^{dg} / 18 \times W^{dg}$$

T^{dg} : Volume of domestic trade conventional cargoes treated at Cebu Baseport.
R^b : Utilization ratio of the berths in the "Without" project case.
UT^{dg} : Average cargo volume per domestic trade conventional cargo vessel.
W^{dg} : Waiting time cost of the domestic trade conventional cargo vessel per day.
UB^{dg} : Average berthing time of the domestic trade conventional cargo vessel for loading and unloading the cargoes at berth of Cebu Baseport.

(b) Background of the estimation formula.

a) Estimation of this Benefit encounters the similar situation discussed in the Benefit 1 of the new Cebu port. The Approach 3 for the Benefit 1, but with a little modified meaning, is adopted for this Benefit 1, taking into account existence of surplus treatment

capacity of cargo handling at Cebu Baseport during a few coming years.

b) It is supposed that cargoes which are not efficiently treated at the piers concerned due to the damage of the piers be treated at other part of berths in Baseport.
However, the extraordinary treatment of the cargoes at the other working berths forces the vessels to wait in or outside the Baseport.

3) Attribution of the Benefit 1

Activities concerning to the treatment of the domestic cargoes are made by the Philippine maritime industry. Therefore, whole amount of the Benefit 1 is attributed to the Philippine economy and society.

4) Values of the Variables in the Estimation Formula

a) Utilization ratio of the berths in the "Without" project case (R^b):

76.4%

It is calculated on the following basic data:

* Whole length of berth of Baseport : 3,958m
* Length of the berth to be repaired : 936m

b) Waiting time cost of the domestic trade conventional cargo vessel per day (W^{dg}):

170,630 pesos/vessel/day (3,250 US$/vessel/day).

* 2000 DWT vessel is supposed.

c) The variables T^{dg}, UT^{dg} and UB^{dg}:

Table 3.1.3-7 T^{dg}, UT^{dg} and UB^{dg}

	T^{dg} (1000 tons)	UT^{dg} *1 (tons /vessel)	UB^{dg} *1 (hours / vessel)
2000	2,941.3	632	
2008	5,037.9	669	10.3
2009	5,310.1	683	9.9
2010	5,597.2	699	9.3
2011	5,746.3	704	9.3
2012	5,893.7	709	9.3
2013	6,038.5	715	9.3
2014	6,580.0	720	9.3
2015	6,317.4	725	9.3
2016	6,449.8	730	9.3
2017	6,575.9	735	9.3
2018	6,694.8	741	9.3
2019	6,805.1	746	9.3
2020	6,905.4	751	9.3

Note *1: The values are estimated, based on Table 3.1.3-8.

Table 3.1.3-8 Vessel and Cargo Data (1)

	Cargo volume per vessel (tons/vessel)		Berthing time of vessel (hours/vessel)		% of cargo volume	
	RORO	Conventional	RORO	Conventional	RORO	Conventional
2008	448	844	3.8	16	44.2	55.8
2009	469	754	3.6	15	44.3	55.7
2010	490	765	3.5	14	44.4	55.6
|	|	|	|	|	|	|
2020	490	960	3.5	14	44.4	55.6

(6) Benefit 2: Improvement Benefit of Treatment Efficiency of Domestic Trade Cargoes

The rehabilitated and expanded piers would make possible of acceptance of larger-sized conventional cargo vessels than at present. This implies that handling of greater volume of the cargoes per hour than the one at present becomes possible, and finally the handling efficiency of the cargoes would be improved.

1) Approach of the Benefit 2

(a) Situations of the "Without" and "With" project cases.

The above-mentioned situations are summarized as follows:

a) Available ship size.

* Situation of the "Without" : Ship sizes at present.
* Situation of the "With" : Larger-sized than the ones at present.

b) Effects from the situations.

* Situation of the "Without" : Occurrences of handling cost of domestic trade conventional cargoes carried by vessels with the ship sizes at present.
* Situation of the "With" : Same as the ones in the "Without", but with the larger ship sizes than ones at present.

(b) (Conclusion) Economic sub-item which constitutes the Benefit 2

It would become possible for larger-sized conventional cargo vessels to be received at the expanded piers. As a result, volume of cargoes per hour to be treated would be improved, supposing that there exists a sufficient handling capacity of the handling cargo equipment. Handling cost of the conventional cargoes which would be reduced through the improvement of handling cargo efficiency is counted as amount of the Benefit 2.

2) Estimation Formula of the Benefit 2

(a) Estimation formula.

$$(\text{Amount of the Benefit 2})_{td} = T^{dg}_{td} \times [1/UT^{dgh}_{2008} - 1/UT^{dgh}_{td}] \times C^{dg}_{td}$$

T^{dg} : Volume of domestic trade conventional cargoes treated at Cebu Baseport.
UT^{dgh} : Domestic conventional cargo volume treated per hour.
C^{dg} : Handling cost of the conventional cargo per hour.

(b) Background of the estimation formula.

a) It is supposed that there exist a sufficient capacity of handling cargo equipment which can cope with the increase of the cargoes to be treated at Baseport.

b) As presented in the above formula, the deference in the cargo volumes per hour between in 2008 and in future is regarded as the fundamental factor of the Benefit 2. This implicitly supposes that phenomenon of the larger-sized can be observed in the field of the domestic conventional cargo vessels. However, effect of the phenomenon is not taken into consideration in the Benefit 2.

3) Attribution of the Benefit 2

Because of the same reason as the one of the Benefit 1, whole amount of the Benefit 2 is judged to attribute to the Philippine economy and society.

4) Values of the Variables in the Estimation Formula

a) The variable T^{dg}: see the paragraph (5)-4)-c).

b) Handling cost of the domestic conventional cargoes per hour (C^{dg}):

6,815 pesos / hour in 2000.

The cost is estimated, based on the following basic data:

* General cargo handling cost, including "Cargo charge" at Cebu Baseport in 2000:
290 pesos /ton.
* Average general cargo handling volume per hour at Cebu Baseport in 2000:
23.5 tons / hour.

The volume per hour is estimated, based on the following data:

* Handling volume per hour (tons/hour):
RORO ferry: 35
Conventional cargo vessel: 14.9
* % of the transportation volumes by ship type:
RORO ferry: 42.8
Conventional cargo vessel: 57.2

c) Handling volume of domestic conventional cargoes per hour (UT^{dgh}):

2008	:	105.9
2009	:	118.0
2010-2020	:	130.5

The average handling volume is estimated, based on Table 3.1.3-9.

Table 3.1.3-9 Vessel and Cargo Data (2)

	Handling volume per hour (tons/hour)		% of conventional cargo to be transported	
	RORO	Conventional	RORO	Conventional
2008	161.7	61.7	44.2	55.8
2009	180.6	68.3	44.3	55.7
2010-2020	200.0	75.0	44.4	55.6

(7) Benefit 3: Reduction Benefit of Embarkation and Disembarkation Time Cost of Passengers

1) Approach of the Benefit 3

(a) Situations of the "Without" and "With" project cases.

Situations of time consumed for embarkation-disembarkation of passengers:

* Situation of the "Without" : Time required at present.
* Situation of the "With" : Less than the time required at present.

(b) (Conclusion) Economic sub-item which constitutes the Benefit 3.

The passengers could spend a less time for these embarkation-disembarkation because the passengers-related facilities at Baseport are planned to be improved. Total time cost of the passengers which would be reduced is regarded as amount of the Benefit 3.

2) Estimation Formula of the Benefit 3

(a) Estimation formula.

$(\text{Amount of the Benefit 3})_{td} = P_{td} \times ET \times UC^p$

P : Number of passengers at Cebu Baseport.
ET : Net saved time spent for their embarkation and disembarkation.
UCp : Time cost of a passenger.

(b) Background of the estimation formula.

It is supposed that the saved time of the passengers who are engaged in production activities be used to the production activities.

3) Attribution of the Benefit 3

The UC^p corresponds to only the one of the passengers who are engaged in their production activities. The time cost of passengers with other traveling objectives are not counted. Therefore, whole amount of the Benefit 3 is attributed to the Philippine economy and society.

4) Values of the Variables in the Estimation Formula

a) Net saved time spent for the embarkation-disembarkation (ET):

20 minutes/passengers/embarkation-disembarkation.

* Source: RORO Ferry Terminal Development Project 2000.

b) Time cost of a passenger in 2000 (UC^P):

14.9 pesos/hour.

The cost is estimated, applying the following formula and the basic data:

$$UC^P = GDP_{1999} / E_{1999} \times (1.0 + R^P) / H^W \times S^A_{2000}$$

GDP : Philippine GDP in 1999: 2,996,371 million pesos at current prices.

E : Total numbers of working and employed persons in 1999: 29,003 thousand persons.

R^P : Inflation rate from 1999 to 2000 : 8%(estimated).

H^W : Annual working hours: 2,400 hours.

S^A : Share of passengers who are engaged in production activities in the whole passengers: 32%.

Source : JICA OD Survey in 1992.

c) Number of passengers at Cebu Baseport (P):

(unit : 1000 passengers)

2009	15,087.8	2015	17,967.0
2010	15,820.9	2016	18,436.5
2011	16,224.7	2017	18,920.3
2012	16,640.8	2018	19,418.9
2013	17,069.6	2019	19,932.7
2014	17,511.6	2020	20,462.4

3.1.4 Economic Analysis on the Toledo Port Project

(1) Conclusion and Summary of the Analysis

1) Conclusion on Investment Efficiency of the Project

EIRR of the base case of the long-tern project is estimated to be 25%/annum. The rate exceeds the social discount rate or opportunity cost of capital in the Philippine..

Accordingly, it can be concluded that the project is economically feasible. Moreover, even though the project cost were increased by 20% and at same time ,the benefits were decreased by 20% from the ones of the base case (15%/annum), the project continues to be economically feasible.

The situation is summarized in the Table 3.1.4-1.

Table 3.1.4-1 EIRRs of the Toledo Port Project -Long-term Plan-

(unit: %/annum)

		Benefits			
		Base case	10% down	20% down	30% down
Project cost	Base case	25	22	19	16
	10% up	22	20	17	14
	20% up	20	18	15	12
	30% up	18	16	13	11

Table 3.1.4-2 Cost Benefit Ratios of Toledo Port Project -Long-term Plan-

-Discount rate :15%/annum-

		Benefits			
		Base case	10% down	20% down	30% down
Project cost	Base case	1.51	1.36	1.21	1.06
	10% up	1.37	1.24	1.10	0.96
	20% up	1.26	1.13	1.01	0.88
	30% up	1.16	1.05	0.93	0.81

Table 3.1.4-3 Net Benefits of Toledo Port Project -Long-term Plan-

-Discount rate :15%/annum-

(unit : million pesos on 2001 economic prices basis)

		Benefits			
		Base case	10% down	20% down	30% down
Project cost	Base case	338.5	238.5	138.4	38.3
	10% up	272.3	172.2	72.2	-27.9
	20% up	206.1	106.0	6.0	-94.1
	30% up	139.9	39.8	-60.2	-160.3

2) Project Cash Flows of the Base Case

The project cash flows are tabulated in Table 3.1.4-4. The values are expressed on the Philippine domestic economic prices basis which is the figure adopted in this analysis.

Table 3.1.4-4 Cash Flows of the Toledo Port Project ---Long-term Plan---

(unit : million Pesos at June 2001 prices on Economic price basis)

Year	Project cost					Benefit				Net Benefit
	Construc-tion cost	Replacem-ent cost	Maintena-nce cost	Operatio-n cost	Total	Benefit 1	Benefit 2	Benefit 3	Total	
2003	0.0				0				0.0	0
2004	6.9				6.9				0.0	-6.9
2005	6.9				6.9				0.0	-6.9
2006	188.6				188.6				0.0	-188.6
2007	188.6				188.6				0.0	-188.6
2008	0.0		4.3		4.3				0.0	-4.3
2009	0.0		4.3	54.2	58.5	18.4	112.1	5.2	135.7	77.2
2010	0.0		4.3	59.3	63.6	38.5	140.6	5.4	184.5	120.9
2011	7.8		4.3	63.2	75.3	54.0	149	5.5	208.5	133.2
2012	7.8		4.3	67.4	79.5	70.4	158.1	5.7	234.2	154.7
2013	254.2		4.3	71.9	330.4	88.0	167.7	5.8	261.5	-68.9
2014	254.2		4.3	76.5	335	106.6	177.8	6	290.4	-44.6
2015			10.2	81.4	91.6	126.4	188.7	6.1	321.2	229.6
2016			10.2	86.8	97	147.5	200.3	6.3	354.1	257.1
2017		25.5	10.2	92.5	128.2	169.9	212.5	6.4	388.8	260.6
2018		25.5	10.2	98.6	134.3	193.8	225.6	6.6	426.0	291.7
2019			10.2	105.0	115.2	219.1	239.5	6.7	465.3	350.1
2020			10.2	111.7	121.9	246.3	254.4	6.9	507.6	385.7
2021			10.2	111.7	121.9	246.3	254.4	6.9	507.6	385.7
2022			10.2	111.7	121.9	246.3	254.4	6.9	507.6	385.7
2023			10.2	111.7	121.9	246.3	254.4	6.9	507.6	385.7
2024		33.9	10.2	111.7	155.8	246.3	254.4	6.9	507.6	351.8
2025		33.9	10.2	111.7	155.8	246.3	254.4	6.9	507.6	351.8
2026			10.2	111.7	121.9	246.3	254.4	6.9	507.6	385.7
2027		25.5	10.2	111.7	147.4	246.3	254.4	6.9	507.6	360.2
2028		25.5	10.2	111.7	147.4	246.3	254.4	6.9	507.6	360.2
2029			10.2	111.7	121.9	246.3	254.4	6.9	507.6	385.7
2030			10.2	111.7	121.9	246.3	254.4	6.9	507.6	385.7
2031			10.2	111.7	121.9	246.3	254.4	6.9	507.6	385.7
2032			10.2	111.7	121.9	246.3	254.4	6.9	507.6	385.7
2033			10.2	111.7	121.9	246.3	254.4	6.9	507.6	385.7
2034		33.9	10.2	111.7	155.8	246.3	254.4	6.9	507.6	351.8
2035		33.9	10.2	111.7	155.8	246.3	254.4	6.9	507.6	351.8
2036			10.2	111.7	121.9	246.3	254.4	6.9	507.6	385.7
2037		25.5	10.2	111.7	147.4	246.3	254.4	6.9	507.6	360.2
2038		25.5	10.2	111.7	147.4	246.3	254.4	6.9	507.6	360.2
Total	915	288.6	274.9	2979.1	4457.6	5,912.3	6805.5	196.8	12,914.6	8457
									EIRR =	**25%**

Legend :

Benefit 1:Treatment Benefit of the cargoes which exceed the existing cargo treatment capacity of the Toledo port.

Benefit 2:Reduction Benefit of transportation cost of the cargoes and navigation cost of RoRo ferries which would be brought about by reception of larger-sized domastic cargo vessels at the expanded Toledo port.

Benefit 3:Reduction Benefit of embarkation-disembarkation time cost of passengers which would be brought about by rehabilition and construction of passenger terminals.

(2) Final Functions of the Expanded Toledo Port

The functions of the port are as follows:

1. Treatment of domestic trade cargoes, and
2. Treatment of passengers.

There would be basically no change in the functions between now and in future. However, the port is planned to be positioned as a main intermediate government port located at the west side of the Cebu Island. It would be able to handle cargoes and passengers whose OD ports of not only the Toledo area and the Negros Island but also the Cebu urban area and the Negros Island.. As a result, volume of the cargoes and number of the passengers to be handled at the port are supposed to increase at a high pace in future.

(3) Construction Cost of the Toledo Port Project

The construction cost by construction works, and financial and economic price basis is summarized in Table 3.1.4-5.

Table 3.1.4-5 Construction Cost of the Toledo Port Project

(unit : million pesos at 2001 financial and economic prices)

Construction Work	Long-term project			
	Financial cost			Economic
	Local	Foreign	Total	Total
Civil work	164.2	371.1	535.3	548.0
Utilities	6.4	9.6	16.0	16.3
Building works	31.9	49.0	80.9	82.6
Access Roads				
Vessel Support				
Cargo Handling Equipment	11.5	103.5	115.0	118.5
Others*1				
Engineering cost	17.3	35.0	52.3	53.5
Contingency	23.1	56.8	79.9	81.8
VAT*2	87.9	0	87.9	0
Grand Total	342.3	625.1	967.3	900.7

Note *1: The sub-item cost consists of Land acquisition cost, Re-plantation cost of mangrove and Relocation cost of housings. The Land acquisition cost occupies a very large portion of the sub-item cost.
Note *2: VAT (Value Added Tax) is a financial cost, not an economic cost.

The total construction cost of the project is estimated to be 967 million pesos at 2001 financial prices or 901 million pesos at 2001 economic prices.

The economic costs by the construction works are larger than the ones of the financial costs due to conversion of the foreign portions which are parts of the financial cost by the construction works onto the Numeraire (the Philippine domestic economic prices).
However, as the VAT is not an economic cost, the economic total cost is smaller by 6.9 % than the financial total cost.

(4) Benefit Items to be expected

1) Main Expansion Works
The main works for expanding the throughput capacity of Toledo port are as follows:
1. Expansion of the existing berths and construction of new berths.
2. Rehabilitation and expansion of the passenger terminal, and
3. Construction of road traffic-related facilities.

2) Benefit items to be expected
Based on the above-mentioned functions of the expanded port, the following benefit items can be enumerated:

Table 3.1.4-6 Benefit Items relating to the Toledo Port Expansion Project

Main expansion works	Direct sources of creation of the benefits	Benefit items to be expected
* Expansion and construction of the berths.	* Expansion of treatment capacity of the cargo handling.	Benefit 1: Treatment Benefit of cargoes exceeding the existing cargo treatment capacity.
	* Reception of large-sized domestic cargo vessels.	Benefit 2: Reduction Benefit of transportation cost of the cargoes and navigation cost of RORO ferries.
* Rehabilitation and construction of passenger terminals.	* Smooth treatment of passengers.	Benefit 3: Reduction Benefit of embarkation and disembarkation time cost of passengers.

"Construction of road traffic-related facilities", one of the main expansion works, is not enumerated in the Table 3.1.4-6. Because the facilities are supporting facilities for improving treatment efficiency of the cargoes and passengers, and are not source from which tangible benefits can be created. However, the facilities will definitely contribute to improvement of safety and smoothness of the traffic and finally to stability of mentality of the truck drivers. These contributions are not taken into consideration in this analysis.

(5) Benefit 1: Treatment Benefit of Domestic Trade Cargoes exceeding the Existing

Cargo Treatment Capacity
The existing Toledo port will not be able to treat the potential transportation demand of the domestic cargoes in the near future and therefore only the expanded port could cope with the

demand. Accordingly, the expanded port would bring about benefit through treatment of the excessive cargoes.

1) Approach of the Benefit 1

(a) Situations of the "Without" and "With" project cases.

a) Transportation processes of the excessive cargoes.

* Situation of the "Without".

Toledo port ◄——► Government ports near the Toledo port ◄——► Negros

(Land transport) (Ferry)

* Situation of the "With".

Toledo port ◄——————————► Negros

(RORO ferry)

b) Effects of the Situations.

* Situation of the "Without" : Occurrence of additional transportation cost imposed on the excessive cargoes between the Toledo port and the near government ports.
* Situation of the "With" : No occurrence of the additional transportation cost.

(b) (Conclusion) Economic sub-item which constitutes the Benefit 1.

The additional transportation cost which would occur in the "Without" project case is regarded as amount of the Benefit 1.

2) Estimation Formula of the Benefit 1

(a) Estimation formula.

$$(\text{Amount of the Benefit 1})_{td} = [T^{Tc}_{td} - T^{Tc}_{2008}] / UV^{fg} \times C^{T}$$

T^{Tc} : Volume of cargoes to be treated at the Toledo port.
UV^{fg} : Conventional cargo volume carried by a truck.
C^{T} : Transportation cost of cargoes carried by a truck.

(b) Background of the estimation formula.

a) Estimation of this Benefit encounters the similar situation discussed in the case of the Benefit 1 of the new Cebu port. The approach 3 for the Benefit 1, but with a little modified meaning, is adopted for this Benefit, taking into consideration existence of surplus treatment capacities of cargo handling at the government ports located near the Toledo port.

b) It is assumed that for example, the Tabuelan port could treat the excessive cargoes which is located near Toledo port. And it is neglected whether or not the alternative ports can treat the excessive cargoes.

c) There are some differences in the following points from the ones in the case of Cebu Baseport, when the alternative ports are used:

* Carrying capacities by vessel types, and
* Navigation cost by vessel types.

Those differences are not reflected in the above formula.

3) Attribution of the Benefit 1

Activities concerning to the treatment of domestic cargoes are made by the Philippine transportation industries. Therefore, whole amount of the Benefit 1 is attributed to the Philippine economy and society.

4) Values of the Variables in the Estimation Formula

a) The variable UV^{fg}:

8 tons per truck.

b) The variable C^{T}:

1,600 pesos per truck.

c) Volume of cargoes to be treated at Toledo port (T^{tc}):

(unit: 1000 tons)

2008	1,089.8
2009	1,181.9
2010	1,282.4
2011	1,359.8
2012	1,442.0
2013	1,529.6
2014	1,622.7

2015	1,721.7
2016	1,827.2
2017	1,939.3
2018	2,058.8
2019	2,185.5
2020	2,321.3

(6) Benefit 2: Reduction Benefit of Transportation Cost of the Cargoes and Navigation Cost of RORO Ferries

The expanded port could accept large-sized RORO ferries than the present ones. As a result, the expanded port could reduce the transportation cost of the domestic cargoes and navigation cost the RORO ferries than the ones in the "Without" project case.

1) Approach of the Benefit 2

(a) Situations of the "Without" and "With" project cases.

The above-mentioned situations are summarized as follows:

a) Ship size.

* Situation of the "Without" : 1000 grt RORO ferry.
* Situation of the "With" : 4000 grt RORO ferry.

b) Navigation cost of a RORO ferry.

* Situation of the "Without" : Navigation cost of the 1000 grt RORO ferry.
* Situation of the "With" : Navigation cost of the 4000 grt RORO ferry.

c) Transportation cost of cargoes per ton.

* Situation of "Without" : Transportation cost per ton at present.
* Situation of "With" : Cheaper transportation cost per ton than the one in the "Without" case.

(b) (Conclusion) Economic sub-items which constitute the Benefit 2.

As clarified in the above-mentioned situations, introduction of the larger-sized RORO ferries between Toledo port and the Negros Island would bring about lowering of transportation cost of cargoes and finally reduce the total transportation cost, while would increase the navigation per RORO ferries.

As a result, the saved total transportation cost of the cargoes and difference in the navigation costs between the small ship-sized and the larger-sized RORO ferries are regarded as amount of the Benefit 2.

2) Estimation Formulas of the Benefit 2

(a) Estimation formulas

$$(\text{Amount of the Benefit 2})_{td} = (\text{Transportation cost of the cargoes to be reduced})_{td} + (\text{Difference in the navigation cost of RORO ferries})_{td}$$

$$(\text{Transportation cost of cargoes to be reduced})_{td} = T^{tcR}{}_{td}/UT^{tcR}{}_{2007} \times [UT^{tcR}{}_{td} - UT^{tcR}{}_{2008}] / UV^{fg} \times UC^{cR}$$

T^{tcR} : Volume of cargo to be transported by middle RORO ferries at Toledo port.
UT^{tcR} : Volume of cargo to be transported per a RORO ferry available at Toledo port.
UV^{fg} : Conventional cargo volume carried by a truck.
UC^{cR} : Transportation charge of a truck by the RORO ferry.

The portion "T^{tcR}/UT^{tcR} means number of RORO ferries necessary for transporting the cargo volume and the remaining portion means transportation cost measured at truck basis per a RORO ferry, which would be saved by introduction of larger-sized RORO ferries than the ones in the "Without" project case.

(Difference in the navigation cost of RORO ferries)$_{td}$

$$= T^{tcR}_{td} \times [\ 1/UT^{tcR}_{2008} - 1/UT^{tcR}_{td}] \times UN^{R} \times D^{T}$$

UN^{R} : Average navigation cost of a RORO ferry per day.

DT : Sailing days of a RORO ferry between Toledo port and the Negros Island.

(b) Background of the estimation formulas.

Due to lack of data on the transportation cost of cargoes per ton km, the transportation charge of a truck by RORO ferry (UC^{cR}) is adopted as a proxy of the cost.

3) Attribution of the Benefit 2

The same reason as the one of the Benefit 1 is valid in the Benefit 2. Accordingly, whole amount of the Benefit 2 is judged to attribute to the Philippine economy and society.

4) Values of the Variables in the Estimation Formulas

a) Transportation charge of a truck by a RORO ferry (UC^{cR}):

2,000 pesos/truck.

b) The variable UT^{fg}:

see the previous sub-paragraph (5)-4)-a).

c) Average navigation cost of a RORO ferry per day (UN^{R}):

153,560 pesos/RORO ferry/day (4,500 US$/large RORO ferry/day x 65%).

d) Sailing days of RORO ferry between Toledo port and the Negros Island (D^{T}):

0.5 days.

e) The variable T^{tcR}:

(1000 tons)

2007	527.9	2014	851.9
2008	572.1	2015	903.9
2009	620.5	2016	959.2
2010	673.2	2017	1,018.1
2011	713.9	2018	1,080.8
2012	757.0	2019	1,147.4
2013	803.0	2020	1,218.6

The variable is estimated as follows:

$T^{tcR}_{td} = T^{tc} \times 52.5\%$

T^{tc} : Volume of cargoes to be treated at Toledo port.

52.5% : Share of the volume of conventional cargoes transported by middle RORO

ferries in the total volume in 2000 at Cebu Baseport.

f) The variable UT^{tcR}:

(unit : tons / ferry)

2007	:	170
2008	:	180
2009	:	235
2010-2020	:	245

The variable is estimated based on the following basic data:

* RORO ferry with ship size of 2000 grt is planned to dock at the expanded Toledo port, while those of 4000 grt at the Cebu Baseport.
* Cargo volume to be transported per a RORO ferry with 4000 grt is forecasted as follows:

2007	:	427 tons
2008	:	448 tons
2009	:	469 tons
2010-2020	:	490 tons

The costs by the sub-items are presented in Appendix 3.1.4-1.

5) Benefit 3: Reduction Benefit of Embarkation and Disembarkation Time Cost of Passengers

Estimation formula and values of the variables in the estimation formula of the Benefit 3 are same as the ones of the Benefit 3 of Cebu Baseport. Only number of the passengers are deferent:

a) Number of passengers at Toledo port:

(unit: 1000 passengers)

2009	1,050.7
2010	1,088.8
2011	1,116.6
2012	1,144.8
2013	1,173.3
2014	12,02.2

2015	1,231.4
2016	1,261.0
2017	1,291.0
2018	1,324.3
2019	1,352.0
2020	1,383.2

3.1.5 Economic Analysis on the New San Remigio Port Project

(1) Conclusion and Summary of the Analysis

1) Conclusion on the Investment Efficiency of the Project

EIRR of the base case of the long-term project is estimated to be 27%/annum. The rate exceeds the social discount rate or opportunity cost of capital in the Philippines. Accordingly, it can be concluded that the project is economically feasible. Moreover, even though the project cost were increased by 30% and at the same time the benefits were decreased by 30% from the ones of the base case (15%/annum), the project continues to be economically feasible.

The situation is summarized in the Table 3.1.5-1.

Table 3.1.5-1 EIRRs of the New San Remigio Port Project -Long-term Plan-

(unit: %/annum)

		Benefits			
		Base case	10% down	20% down	30% down
Project cost	Base case	27	25	23	20
	10% up	25	23	21	18
	20% up	23	21	19	17
	30% up	22	20	18	15

Table 3.1.5-2 Cost Benefit Ratios of the New San Remigio Port Project –Long-term Plan-

-Discount rate : 15%/annum-

		Benefits			
		Base case	10% down	20% down	30% down
Project cost	Base case	1.90	1.71	1.51	1.33
	10% up	1.73	1.55	1.38	1.21
	20% up	1.58	1.42	1.27	1.11
	30% up	1.46	1.31	1.17	1.02

Table 3.1.5-3 Net Benefits of the New San Remigio Port Project –Long-term Plan-

-Discount rate : 15%/annum-

(unit : million pesos on 2001 economic prices basis)

		Benefits			
		Base case	10% down	20% down	30% down
Project cost	Base case	297.1	234.3	171.5	108.8
	10% up	264.1	201.3	138.5	75.7
	20% up	231.0	168.2	105.4	42.6
	30% up	197.9	135.1	72.3	9.5

2) Project Cash Flows of the Base Case

The project cash flows are tabulated in Table 3.1.5-4. The values are expressed on the Philippine domestic economic prices basis which is the figure adopted in this analysis.

Table 3.1.5-4 Cash Flows of the San Remigio Port Project ---Long-term Plan---

(unit : million Pesos at June 2001 prices on Economic price basis)

	Project cost					Benefit					Net
Year	Construc-tion cost	Replacem-emt cost	Maintena-nce cost	Operatio-n cost	Total	Benefit 1	Benefit 2	Benefit 3	Benefit 4	Total	Benefit
2003					0					0.0	0
2004	3.5				3.5					0.0	-3.5
2005	3.5				3.5					0.0	-3.5
2006	136.0				136					0.0	-136
2007	136.0				136					0.0	-136
2008			2.7	15.8	18.5					0.0	-18.5
2009			2.7	17.4	20.1	93.2	2.3	3.1	3.2	101.8	81.7
2010			2.7	19.3	22	103.5	4.8	6.3	3.3	117.9	95.9
2011	4.0		2.7	20.8	27.5	111.2	6.8	8.7	3.4	130.1	102.6
2012	4.0		2.7	22.3	29	119.6	8.9	11.1	3.5	143.1	114.1
2013	89.4		2.7	23.9	116	128.6	11.1	13.6	3.7	157.0	41
2014	89.4		2.7	25.9	118	138.2	13.5	16.1	3.8	171.6	53.6
2015			4.9	27.7	32.6	148.6	32.2	18.6	3.9	203.3	170.7
2016			4.9	29.9	34.8	159.8	37.8	21.2	4	222.8	188
2017		6.5	4.9	32.0	43.4	171.8	43.8	23.9	4.1	243.6	200.2
2018		6.5	4.9	34.4	45.8	184.7	50.2	26.5	4.2	265.6	219.8
2019			4.9	37.1	42	198.7	57.2	29.3	4.4	289.6	247.6
2020			4.9	39.8	44.7	213.6	64.6	32	4.5	314.7	270
2021			4.9	39.8	44.7	213.6	64.6	32	4.5	314.7	270
2022			4.9	39.8	44.7	213.6	64.6	32	4.5	314.7	270
2023			4.9	39.8	44.7	213.6	64.6	32	4.5	314.7	270
2024		18.9	4.9	39.8	63.6	213.6	64.6	32	4.5	314.7	251.1
2025		18.9	4.9	39.8	63.6	213.6	64.6	32	4.5	314.7	251.1
2026			4.9	39.8	44.7	213.6	64.6	32	4.5	314.7	270
2027		6.5	4.9	39.8	51.2	213.6	64.6	32	4.5	314.7	263.5
2028		6.5	4.9	39.8	51.2	213.6	64.6	32	4.5	314.7	263.5
2029			4.9	39.8	44.7	213.6	64.6	32	4.5	314.7	270
2030			4.9	39.8	44.7	213.6	64.6	32	4.5	314.7	270
2031			4.9	39.8	44.7	213.6	64.6	32	4.5	314.7	270
2032			4.9	39.8	44.7	213.6	64.6	32	4.5	314.7	270
2033			4.9	39.8	44.7	213.6	64.6	32	4.5	314.7	270
2034		18.9	4.9	39.8	63.6	213.6	64.6	32	4.5	314.7	251.1
2035		18.9	4.9	39.8	63.6	213.6	64.6	32	4.5	314.7	251.1
2036			4.9	39.8	44.7	213.6	64.6	32	4.5	314.7	270
2037		6.5	4.9	39.8	51.2	213.6	64.6	32	4.5	314.7	263.5
2038		6.5	4.9	39.8	51.2	213.6	64.6	32	4.5	314.7	263.5
Total	465.8	114.6	136.5	1062.7	1779.6	5,616.3	1496	786.4	127	8,025.7	6246.1
										EIRR =	27%

Legend :

Benefit 1:Reduction Benefit of cargo damage cost which would be brought about by reception of RoRo ferries at the San Remigio port.

Benefit 2:Reduction Benefit of cargo handling cost which would be brought about by installation of efficient cargo handling equipments at the new San Remigio port.

Benefit 3:Treatment Benefit of passengers who will not be treated due to the treatment capacity at the existing Hagnaya port.

Benefit 4:Reduction Benefit of embarkation-disembarkation time cost which would be brought about at the new San Remigio port.

(2) Final Functions of the New San Remigio Port

Functions of the new port as follows:

1. Treatment of domestic trade cargoes, and
2. Treatment of passengers.

At present, the existing Hagnaya port performs the above-mentioned functions. However, the port will definitely not be able to cope with the future traffic demand, because of financial problem for the port to be expanded from the topographical viewpoint of the port. Accordingly, it is efficient to transfer the functions of the port to a newly-planned port to cope with the future traffic demand on the existing Hagnaya port.
As a result, the newly planned port would function as a main intermediate government port located at the north end of the Cebu Island. It would be able to treat cargoes and passengers whose OD ports of not only the Hagnaya area and Bantayan Island, but also the Cebu urban area and the Bantayan Island.

(3) Construction Cost of the New San Remigio Port Project

The construction cost by construction works, and financial and economic price basis is summarized in Table 3.1.5-5.

Table 3.1.5-5 Construction Cost of the New San Remigio Port Project

(unit : million pesos at 2001 financial and economic prices)

Construction Work	Long-term project			
	Financial cost			Economic
	Local	Foreign	Total	Total
Civil work	91.0	186.5	277.5	283.9
Utilities	2.4	3.5	5.9	6.0
Building works	14.8	22.1	36.9	37.7
Access Roads				
Vessel Support	0.4	8.0	8.4	8.7
Cargo Handling Equipment	4.9	44.3	49.3	50.7
Others*1	9.4	0	9.4	9.4
Engineering cost	8.7	17.7	26.5	27.0
Contingency	13.2	28.2	41.4	42.4
VAT*2	45.5	0	45.5	0
Grand Total	190.2	310.4	500.6	465.8

Note *1: The sub-item cost consists of Land acquisition cost, Re-plantation cost of mangrove and Relocation cost of housings.
The Land acquisition cost occupies a very large portion of the sub-item cost.
Note *2: VAT (Value Added Tax) is a financial cost, not an economic cost.

The total construction cost of the project is estimated to be 501 million pesos at 2001 financial prices or 466 million pesos at 2001 economic prices.
The economic costs by the construction works are larger than the ones of the financial costs due to conversion of the foreign portions which are parts of the financial cost by the construction works onto the Numeraire (the Philippine domestic economic prices). However, as the VAT is not an economic cost, the economic total cost is smaller by 7.0 % than the financial total cost.

(4) Characteristics of the New Port and Benefits to be expected

1) Main Construction Works
The main construction works of the new San Remigio port are as follows:

1. Construction of new berths.
2. Construction of new passenger terminal, and
3. Construction of road traffic-related facilities.

2) Characteristics of the New San Remigio Port
The above-mentioned main construction works would bring about not only enlargement of handling capacities of domestic cargoes and passengers but also a change in the transportation structure of the cargoes, compared with the "Without" situation. The treatment capacities are planned to be expanded with a big jump from the one in the "Without" case. The newly constructed port would make possible of "Truck with RORO transportation" of the cargoes between the origins and destinations. In the "Without" case, i.e. the present situation of transportation of the cargoes, it is "Truck-conventional cargo vessel-truck".
The two categories of the characteristics make types of estimation formulas of the Benefits different from the ones adopted in the cases of evaluation of the other projects.

3) Benefit items to be expected
Based on the above-mentioned functions of the newly constructed port, the following benefit items can be enumerated:

Table 3.1.5-6 Benefit Items relating to the New San Remigio Port Project.

Direct sources of creation of the benefits	Benefits items to be expected
* Reception of larger-sized domestic cargo vessels.	Benefit 1: Reduction Benefit of cargo damage cost which would be brought about by reception of RORO ferries.
* Installation of efficient cargo handling equipment.	Benefit 2: Reduction Benefit of cargo handling cost
* Construction of passenger-related facilities.	Benefit 3: Treatment Benefit of passengers who will not be treated due to the treatment capacity at the existing Hagnaya port.
	Benefit 4: Reduction Benefit of embarkation / disembarkation cost of passengers.

"Construction of road traffic-related facilities", one of the main expansion works, is not enumerated in the Table 3.1.5-4. Because the facilities are supporting facilities for improving treatment efficiency of the cargoes and passengers, and are not source from which tangible benefits can be created. However, the facilities will definitely contribute to improvement of safety and smoothness of the traffic and finally to stability of mentality of the truck drivers. These contributions are not taken into consideration in this analysis.

Along with the above-numerated kinds of the Benefits, a benefit "Treatment Benefit of the cargoes which will exceed the existing treatment capacity of the Hagnaya port" can be easily supposed. Concept of the benefit is same as the one of the Benefit 1 of the new Cebu port project. However, as mentioned above, the amount of the benefit is expected to be so big and by itself make this project economically feasible. Therefore, the benefit is not counted in this analysis.

(5) Benefit 1: Reduction Benefit of Cargo Damage Cost which would be brought about by Reception of RORO Ferry

At present, the cargoes are transported by very small conventional cargo vessels between the Hagnaya port and the ports in the Bantayan Island. The cargoes loaded or unloaded to/from the vessels are transported by trucks from/to the origins or final destinations. During the transportation, the cargoes are damaged. Service of the RORO ferries which the new port would make possible of would mitigate the damage, because the loading and unloading the cargoes to and from the trucks and vessels are not needed any more.

1) Approach of the Benefit 1

(a) Situations of the "Without" and "With" project cases.

The above -mentioned situations are summarized as follows:

a) Vessel type to be used for transportation of cargoes:

* Situation of the "Without":

Hagnaya Port ◄——————————► Ports in the Bantayan Island

(Very small conventional cargo vessels)

* Situation of the "With":

San Remigio Port ◄——————————► Ports in the Bantayan Island

(RORO ferries)

(Conventional cargo vessels)

b) Effects of the situations:

* Situation of the "Without" : occurrence of cargo damage at loading / unloading of the cargoes from the very small conventional cargo vessels.
* Situation of the "With" : The above-mentioned two problems would be solved.

(b) (Conclusion) Economic sub-item which constitutes the Benefit 1.
The cargo damage cost to be reduced through the application of the continuous truck transportation is regarded as amount of the Benefit 1.

2) Estimation Formula of the Benefit 1
(a) Estimation formula.

$$(\text{Amount of the Benefit 1})_{td} = T^{tcs}_{td} \times R^{st} \times CV \times RD$$

T^{tcs} : Volume of cargoes to be treated at the new San Remigio port.
R^{st} : Ratio of volume of cargoes which are transported by trucks and RORO ferries in the Ttcs.
CV : Value of the cargoes per ton.
RD : Net percentage of damage ratio of the cargoes which would be reduced through the truck and RORO ferry transportation.

(b) Background of the estimation formula.
As implied above, the new San Remigio port would not only expand collection area of cargoes from the Hagnaya area to the Cebu urban area, but also change transportation method of the cargoes between the origin and destination from the existing "Truck-conventional vessel-truck transportation " to "Truck with RORO ferry transportation", i.e. generation of a transportation structural change. Amount of benefit which can be estimated on the structural change in the transportation demand and method would become large so much that only the amount make this project economically feasible. Accordingly, amount of the Benefit 1 has to be estimated in another way, but it has to reflect roughly the effects which would be brought about by the structural change. As a result, amount of "cargo damage cost" to be reduced is adopted as a proxy of reflection of the structural change and in order to avoid the problem mentioned above.

3) Attribution of the Benefit 1
Activities concerning to the treatment of the domestic cargoes are made by the Philippine transportation industry. Therefore, whole amount of the Benefit 1 is attributed to the Philippine economy and society.

4) Values of the Variables in the Estimation Formula
a) The variable R^{st}:
96.7%.

The value is set based on the following data:
Percent of the cargo volume diverted from the Hagnaya port to the new San Remigio port in the total cargo volume which is to be handled at the new San Remigio port:

2000 : 3.3%
2020 : 3.4%

b) Value of the cargoes per ton (CV):

14,000 pesos per ton.

Source : "RORO Ferry Terminal Development in the Philippines 2000".

c) Net percentage of damage ratio of the cargoes (RD) :

2% of the value of cargo per ton.

Source: "RORO Ferry Terminal Development in the Philippines 2000".

d) Volume of cargoes to be treated at the San Remigio port (T^{tcs}):

(unit: 1000 tons)

2009	344.2	2015	548.8
2010	382.1	2016	590.1
2011	410.8	2017	634.5
2012	441.6	2018	682.3
2013	474.8	2019	733.7
2014	510.5	2020	789.0

(6) Benefit 2: Reduction Benefit of Cargo Handling Cost

At the new port, not only berths are planned to be newly constructed but also more efficient cargo handling equipment will be installed. They would be expected to improve the cargo handling cost, compared with the one in the "Without" project case.

1) Approach of the Benefit 2

(a) Situations of the "Without" and "With" project cases.

The above-mentioned situations are summarized as follows:

a) Treatment capacity of the handling cargo facilities and equipment:

* Situation of the "Without" : The treatment capacity in 2000.
* Situation of the "With" : The enhanced capacity.

b) Effect from the situations:

* Situation of the "Without" : Total time of handling the cargoes will be prolonged and finally, it will become infinitive due to the small handling capacity of the Hagnaya port.
* Situation of the "With" : There would be none of the problem which would occur in the "Without" project case.

(b) (Conclusion) Economic sub-item which constitutes the Benefit 2.

The cargo handling cost which would be reduced through the improvement in the cargo handling efficiency is regarded as amount of the Benefit 2.

2) Estimation Formula of the Benefit 2

(a) Estimation formula.

(Amount of the Benefit 2)td = $[T^{tcs}_{td} - T^{tcs}_{2008}] / UT^{tcs} \times C^{dg} \times M^{h}$

T^{tcs} : Cargo volume to be treated at the new San Remigio port.

UT^{tcs} : Cargo volume to be treated per hour at the new San Remigio port.

Cdg : Handling cost of domestic conventional cargoes per hour.

M^{h} : Scale of treatment-cargo efficiency.

(b) Background of the estimation formula.

a) As pointed out in the sub-paragraph (9)-1)-(a)-a) of the new Cebu port project, the amount of the Benefit 2 can also be estimated , based on the maximum handling capacities of cargo handling equipment planned to be installed. However, the amount represents a "potential" amount and does not reflect an amount "to be realized".

b) As mentioned above, another type of estimation formula for estimating the amount to be realized can be devised, based on the plausible improvement in the cargo handling efficiency which would be able to be observed at the new port. However, the improvement ratio of the efficiency which is calculated, based on the "Without" and "With" situations becomes very high. It is because characteristics of the situations between the "Without" and "With" are very different, as mentioned above (see item 3)-b) entered below). When applying the improvement in the planned efficiency, the amount of the Benefit 2 becomes too large. The above-shown estimation formula is a modified one due to avoidance of the problem.

3) Attribution of the Benefit 2.

Based on the same reason as the one of the Benefit 1, whole amount of the Benefit 2 is judged to attribute to the Philippine economy and society.

4) Values of the Variables in the Estimation Formula

a) The variable T^{tcs} :

see the previous sub-paragraph (5)-4)-d).

b) Cargo volume to be treated per hour at the new San Remigio port (UT^{tcs}):

101 tons per hour for the period 2000 - 2010.

The volume is set, referring the following data:

UT^{tcs} : 2000 : 3 tons / hour at the Hagnaya port.

2020 : 202 tons / hour at the new San Remigio port.

c) The variable C^{dg}:

6,815 pesos / hour in 2000.

d) Scale of cargo handling efficiency (M^h):

2008 - 2014 : 1.0

2015 - 2020 : 2.0

The scale is set, referring the basic data for the UT^{tcs}.

(7) Benefit 3: Treatment Benefit of Passengers who will not be treated due to Limit of the Treatment Capacity of the Existing Hagnaya Port

The existing Hagnaya port will not surely treat the potential demand of the passenger transportation in the near future due to its small throughput capacity. The excessive passengers will have to use other ports located near the ports for the traffic between the area and ports in the Bantayan Island. The new port could avoid such situation, because the new port is planned to cope with the potential demand.

1) Approach of the Benefit 3

Situations of the "Without" and "With" on this Benefit is almost same as the ones of the Benefit 1 of the Toledo port expansion project "Treatment Benefit of Cargoes exceeding the Existing Cargo Treatment Capacity", except the subjects are different: "Passengers" in this case, while "Cargoes" in the latter case. Therefore, none of description will be added on this issue.

2) Estimation Formula of the Benefit 3

(a) Estimation formula.

$$(\text{Amount of the Benefit 3})_{td} = [P^s_{td} - P^s_{2008}] \times [F + UC^p \times H^{pt} + 1/UP^D \times V^p \times H^{pv}/24]$$

P^s : Number of passengers to be treated at the new San Remigio port.

F : Land transportation cost of passengers between the Hagnaya area and the nearest government ports.

UC^p : Time cost of the passengers (see the Benefit 3 of the Cebu Baseport rehabilitation and expansion project).

H^{pt} : Land transportation time of the passengers between the OD pair.

UP^D : unıber of passengers per a passenger vessel which navigates between the nearest government ports and the Bantayan Island.

V^p : Navigation cost of passenger vessel per day.

H^{PV} : ailing hours of the passenger vessels between the above-mentioned OD pair.

The first portion in the second parentheses of the above formula "$F + UC^{pt} \times H^{pt}$" means direct and indirect costs which would generate on the passengers and the remaining portion in the parentheses, navigation cost of the passenger vessels generated additionally.

(b) Background of the estimation formula.
It is almost same as the Benefit 1 of the Toledo port expansion project.

3) Attribution of the Benefit 3
Based on the same reason of the Benefit 1, the whole amount of the Benefit 3 is judged to attribute to the Philippine economy and society.

4) Values of the Variables in the Estimation Formula
a) The variable F:
60 pesos per person within distance of 30 km.

b) Land transportation time of the passengers between the OD pair (H^{pt}):
1 hour.
c) The variable UP^{D}:
108 passengers per the passenger vessel.
It is estimated based on the following basic data:

	Carrying capacity (No. of passengers)	Actual number of passengers
Passenger vessel (large)	173	139
Passenger vessel (small)	95	76

d) Navigation cost of the passenger vessel per day (V^{P}):
94,500 pesos/passenger vessel/day (4,500 US$/vessel/day x 40%).
e) The variable H^{pv}:
1 hour.
f) Number of passengers to be treated at the new San Remigio port (P^{S}):

(unit : 1000 passengers)

2009	641.2	2015	780.7
2010	669.8	2016	804.0
2011	691.3	2017	827.6
2012	713.1	2018	851.6
2013	735.3	2019	876.0
2014	757.8	2020	900.8

(8) Benefit 4: Reduction Benefit of Embarkation and Disembarkation Time Cost of Passengers

The estimation formula and the values of the variables are same as the ones adopted in the Benefit 3 of the Toledo port expansion project, except the number of passengers of the new San Remigio port tabulated above.
Therefore, description on this Benefit 4 is omitted here.

3.2 Preliminary Financial Analysis

3.2.1 Methodology

(1) Viability of the project

The viability of the project is evaluated using the Financial Internal Rate of Return (FIRR) The FIRR is a discount rate which makes the cost and revenue during the project life equal. The FIRR is calculated by the following formula.

$$\sum_{i=1}^{n} \frac{R_i - C_i}{(1+r)^{i-1}} \simeq 0$$

n : Project life
R_i : Revenue in the i-th year: the first year is the base year
C_i : Cost in the i-th year
r : Discount rate

3.2.2 Prerequisites of Financial Analysis

(1) Scope of the Financial Analysis

Scope of this financial analysis is each project in the Master Plan.

(2) "With" case and "Without" case

The viability of the project, namely FIRR, is analyzed based on the difference of the revenues and cost between the "With" case and "Without" case. With" case is the case which the Master Plan is executed while Without" case represents the existing situation.

(3) Base Year

All costs and revenues are indicated in prices as of 2001,when the price survey was conducted. We call this year the "Base Year" .All cost and revenues are indicated in prices as of June 2001 (US $ 1.00=125yen=52.5 Peso). Neither price inflation nor increases in nominal wage are considered in the project life.

(4) Project Life

Considering the long-term loans and the service lives of the port facilities, the project life in the financial analysis is determined to be 35 years from the beginning of the project including

five years for detailed design and construction of port facilities and 30 years of operation.

(5) Cost

The items of cost shouldered by CPA are as follows :

- Project Costs
- Administration cost
- Maintenance cost

(6) Revenue

The CPA has announced that it will revise its port tariff. The financial analysis employs the revised tariff, and all the revenues are calculated on the basis of the revised tariff in January 2001.

The items of revenue shouldered by CPA are as follows :

- Harbor Fees
- Berthing Fees
- Anchorage Fees
- Port Usage Fees
- Storage Charges
- Arrastre / Steve. Share (foreign 20%, domestic 10%)
- Leasing Fees (from 2009 to 2014 is 250 million pesos and from 2015 is 500million pesos at the New Cebu Port)

3.2.3 Evaluation

(1) The New Cebu Port and Cebu Baseport

1) Fund Raising

Seventy-five percent of the initial investment by CPA is assumed to be raised by foreign funds. The remaining 25% is assumed to be raised by domestic funds.

The following conditions are employed for the foreign funds.

Loan period	30 years, including a grace period of 10 years
Interest rate	2.0%
Repayment	Fixed amount repayment of principal
Ratio of investment	Less than 75% of the project cost

The following conditions are employed for the domestic fund

Loan period	10years
Interest rate	15.0% (the real interest rate excluding inflation rate)
Repayment	Fixed amount repayment of principal

The weighted average interest rate of funds for investment by CPA is 5.25% under the conditions stated above.

2) Viability of the Project

Result of the FIRR of the New Cebu Port 8.4 %

Result of the FIRR of Cebu Baseport 5.4 %

Result of the FIRR of the New Cebu Port and Cebu Baseport add to : 8.2 %

In the New Cebu Port Case and Cebu Baseport Cases, FIRR exceeds the weighted average interesting rate. Judging from this analysis, this project is assessed to be financially viable. Naturally the case of the New Cebu Port and Cebu Baseport adding to is assessed to be financially viable.

Results of the FIRR are shown in Table 3.2.3-1 and Table 3.2.3-2 and Table 3.2.3-3.

(2) Toledo Port and the New San Remigio port

1) Viability of the Project

In both ports, CPA can cover operating costs (personnel, administration, and maintenance cost) using its own revenues, but investment cost.

Therefore, construction cost must also be subsidized by the government or municipality, or CPA's assets.

Results of the FIRR are shown in Table 3.2.3-4 and Table 3.2.3-5.

Table 3.2.3-1The New Cebu Port

(Unit:1000Pesos)

	Year	Revenue (1)	Cost(2)			Difference (1)-(2)	Net Present Value		
			Investment	Expenses	Total		Revenue	Cost	Difference
1	2,004		124,700		124,700	-124,700	0	124,700	-124,700
2	2,005		124,700		124,700	-124,700	0	115,039	-115,039
3	2,006		2,809,800		2,809,800	-2,809,800	0	2,391,301	-2,391,301
4	2,007		2,449,800		2,449,800	-2,449,800	0	1,923,397	-1,923,397
5	2,008		2,218,400		2,218,400	-2,218,400	0	1,606,784	-1,606,784
6	2,009	746,900	115,400	122,021	237,421	509,479	499,068	158,641	340,427
7	2,010	846,564	115,400	122,021	237,421	609,144	521,839	146,351	375,488
8	2,011	923,653	1,379,200	122,021	1,501,221	-577,568	525,248	853,691	-328,442
9	2,012	1,002,732	2,610,000	122,021	2,732,021	-1,729,289	526,042	1,433,241	-907,200
10	2,013	1,083,980	1,379,200	122,021	1,501,221	-417,241	524,609	726,540	-201,930
11	2,014	1,167,579	1,470,000	122,021	1,592,021	-424,442	521,291	710,793	-189,501
12	2,015	1,503,722		236,628	236,628	1,267,094	619,357	97,463	521,894
13	2,016	1,592,607		236,628	236,628	1,355,979	605,148	89,912	515,236
14	2,017	1,684,434		236,628	236,628	1,447,806	590,455	82,947	507,508
15	2,018	1,779,417		236,628	236,628	1,542,789	575,426	76,521	498,906
16	2,019	1,877,773		236,628	236,628	1,641,145	560,189	70,592	489,596
17	2,020	1,992,326		236,628	236,628	1,755,698	548,316	65,123	483,193
18	2,021	1,992,326		236,628	236,628	1,755,698	505,837	60,078	445,759
19	2,022	1,992,326		236,628	236,628	1,755,698	466,649	55,424	411,225
20	2,023	1,992,326		236,628	236,628	1,755,698	430,496	51,130	379,366
21	2,024	1,992,326		236,628	236,628	1,755,698	397,145	47,169	349,976
22	2,025	1,992,326		236,628	236,628	1,755,698	366,377	43,515	322,862
23	2,026	1,992,326		236,628	236,628	1,755,698	337,993	40,143	297,850
24	2,027	1,992,326		236,628	236,628	1,755,698	311,808	37,033	274,774
25	2,028	1,992,326		1,736,628	1,736,628	255,698	287,651	250,734	36,918
26	2,029	1,992,326		236,628	236,628	1,755,698	265,366	31,518	233,849
27	2,030	1,992,326		236,628	236,628	1,755,698	244,808	29,076	215,732
28	2,031	1,992,326		236,628	236,628	1,755,698	225,842	26,823	199,019
29	2,032	1,992,326		236,628	236,628	1,755,698	208,345	24,745	183,600
30	2,033	1,992,326		236,628	236,628	1,755,698	192,204	22,828	169,376
31	2,034	1,992,326		1,736,628	1,736,628	255,698	177,314	154,557	22,757
32	2,035	1,992,326		236,628	236,628	1,755,698	163,577	19,428	144,149
33	2,036	1,992,326		236,628	236,628	1,755,698	150,904	17,923	132,981
34	2,037	1,992,326		236,628	236,628	1,755,698	139,213	16,534	122,679
35	2,038	1,992,326		236,628	236,628	1,755,698	128,428	15,253	113,175
	Total	52,063,547	14,796,600	9,411,198	24,207,798	27,855,749	11,616,947	11,616,947	0

FIRR= 8.40%

Table 3.2.3-2 Cebu Baseport

(Unit:1000Pesos)

	Year	Revenue (1)	Cost(2)			Difference (1)-(2)	Net Present Value		
			Investment	Expenses	Total		Revenue	Cost	Difference
1	2,004	0	0	0	0	0	0	0	0
2	2,005	0	9,000	0	9,000	-9,000	0	8,543	-8,543
3	2,006	0	145,600	0	145,600	-145,600	0	131,179	-131,179
4	2,007	0	250,500	0	250,500	-250,500	0	214,222	-214,222
5	2,008	0	154,700	0	154,700	-154,700	0	125,574	-125,574
6	2,009	18,846	146,200	7,188	153,388	-134,541	14,521	118,182	-103,661
7	2,010	38,846	105,400	9,391	114,791	-75,945	28,409	83,950	-55,540
8	2,011	49,058	0	12,534	12,534	36,524	34,054	8,701	25,353
9	2,012	59,147	9,400	12,534	21,934	37,213	38,972	14,452	24,519
10	2,013	69,072	151,200	12,534	163,734	-94,662	43,199	102,402	-59,203
11	2,014	78,772	261,100	12,534	273,634	-194,862	46,762	162,439	-115,677
12	2,015	88,188	119,200	14,118	133,318	-45,130	49,692	75,121	-25,429
13	2,016	97,256		15,929	15,929	81,327	52,016	8,519	43,497
14	2,017	105,897		15,929	15,929	89,968	53,760	8,087	45,674
15	2,018	114,036		15,929	15,929	98,107	54,950	7,676	47,275
16	2,019	121,581		15,929	15,929	105,652	55,609	7,286	48,323
17	2,020	128,438		15,929	15,929	112,509	55,761	6,915	48,845
18	2,021	128,438		15,929	15,929	112,509	52,927	6,564	46,363
19	2,022	128,438		15,929	15,929	112,509	50,238	6,231	44,007
20	2,023	128,438		15,929	15,929	112,509	47,685	5,914	41,771
21	2,024	128,438		15,929	15,929	112,509	45,262	5,613	39,649
22	2,025	128,438		15,929	15,929	112,509	42,962	5,328	37,634
23	2,026	128,438		15,929	15,929	112,509	40,779	5,057	35,722
24	2,027	128,438		15,929	15,929	112,509	38,707	4,800	33,907
25	2,028	128,438		15,929	15,929	112,509	36,740	4,557	32,184
26	2,029	128,438		15,929	15,929	112,509	34,873	4,325	30,548
27	2,030	128,438		15,929	15,929	112,509	33,101	4,105	28,996
28	2,031	128,438		15,929	15,929	112,509	31,419	3,897	27,523
29	2,032	128,438		15,929	15,929	112,509	29,823	3,699	26,124
30	2,033	128,438		15,929	15,929	112,509	28,308	3,511	24,797
31	2,034	128,438		15,929	15,929	112,509	26,869	3,332	23,537
32	2,035	128,438		15,929	15,929	112,509	25,504	3,163	22,341
33	2,036	128,438		15,929	15,929	112,509	24,208	3,002	21,206
34	2,037	128,438		15,929	15,929	112,509	22,978	2,850	20,128
35	2,038	128,438		15,929	15,929	112,509	21,810	2,705	19,105
	Total	3,281,025	1,352,300	447,200	1,799,500	1,481,526	1,161,900	1,161,900	0

FIRR= 5.4%

Table 3.2.3-3 The New Cebu Port and Cebu Baseport add to

(Unit:1000Pesos)

	Year	Revenue (1)	Cost(2)			Difference (1)-(2)	Net Present Value		
			Investment	Expenses	Total		Revenue	Cost	Difference
1	2,004	0	124,700	0	124,700	-124,700	0	124,700	-124,700
2	2,005	0	133,700	0	133,700	-133,700	0	123,606	-123,606
3	2,006	0	2,955,400	0	2,955,400	-2,955,400	0	2,525,996	-2,525,996
4	2,007	0	2,700,300	0	2,700,300	-2,700,300	0	2,133,716	-2,133,716
5	2,008	0	2,373,100	0	2,373,100	-2,373,100	0	1,733,600	-1,733,600
6	2,009	765,747	261,600	129,209	390,809	374,938	517,161	263,940	253,221
7	2,010	885,411	220,800	131,412	352,212	533,199	552,833	219,914	332,919
8	2,011	972,711	1,379,200	134,555	1,513,755	-541,044	561,489	873,802	-312,313
9	2,012	1,061,879	2,619,400	134,555	2,753,955	-1,692,076	566,683	1,469,679	-902,995
10	2,013	1,153,052	1,530,400	134,555	1,664,955	-511,903	568,883	821,441	-252,558
11	2,014	1,246,351	1,731,100	134,555	1,865,655	-619,304	568,489	850,968	-282,479
12	2,015	1,591,910	119,200	250,746	369,946	1,221,964	671,288	156,001	515,286
13	2,016	1,689,863		252,557	252,557	1,437,306	658,794	98,460	560,335
14	2,017	1,790,331		252,557	252,557	1,537,774	645,268	91,026	554,242
15	2,018	1,893,453		252,557	252,557	1,640,896	630,913	84,154	546,759
16	2,019	1,999,354		252,557	252,557	1,746,797	615,903	77,801	538,103
17	2,020	2,120,764		252,557	252,557	1,868,207	603,981	71,927	532,055
18	2,021	2,120,764		252,557	252,557	1,868,207	558,382	66,497	491,886
19	2,022	2,120,764		252,557	252,557	1,868,207	516,226	61,476	454,750
20	2,023	2,120,764		252,557	252,557	1,868,207	477,252	56,835	420,417
21	2,024	2,120,764		252,557	252,557	1,868,207	441,221	52,544	388,677
22	2,025	2,120,764		252,557	252,557	1,868,207	407,910	48,577	359,333
23	2,026	2,120,764		252,557	252,557	1,868,207	377,114	44,910	332,204
24	2,027	2,120,764		252,557	252,557	1,868,207	348,643	41,519	307,124
25	2,028	2,120,764		1,752,557	1,752,557	368,207	322,321	266,360	55,961
26	2,029	2,120,764		252,557	252,557	1,868,207	297,987	35,487	262,500
27	2,030	2,120,764		252,557	252,557	1,868,207	275,490	32,807	242,682
28	2,031	2,120,764		252,557	252,557	1,868,207	254,691	30,331	224,360
29	2,032	2,120,764		252,557	252,557	1,868,207	235,463	28,041	207,422
30	2,033	2,120,764		252,557	252,557	1,868,207	217,686	25,924	191,762
31	2,034	2,120,764		1,752,557	1,752,557	368,207	201,251	166,310	34,941
32	2,035	2,120,764		252,557	252,557	1,868,207	186,057	22,157	163,900
33	2,036	2,120,764		252,557	252,557	1,868,207	172,010	20,484	151,526
34	2,037	2,120,764		252,557	252,557	1,868,207	159,024	18,938	140,086
35	2,038	2,120,764		252,557	252,557	1,868,207	147,018	17,508	129,510
	Total	55,344,573	16,148,900	9,858,398	26,007,298	29,337,275	12,757,433	12,757,433	0

FIRR= 8.17%

Table 3.2.3-4 The New San Remigio Port

	Year	Revenue (1)	Cost(2)			Difference (1)-(2)
			Investment	Expenses	Total	
1	2,004		3,300		3,300	-3,300
2	2,005		3,300		3,300	-3,300
3	2,006		138,200		138,200	-138,200
4	2,007		138,200		138,200	-138,200
5	2,008	3,339		4,963	4,963	-1,625
6	2,009	3,697		4,963	4,963	-1,266
7	2,010	4,089		4,963	4,963	-875
8	2,011	4,400	3,600	4,963	8,563	-4,163
9	2,012	4,730	3,600	4,963	8,563	-3,833
10	2,013	5,080	73,400	4,963	78,363	-73,283
11	2,014	5,452	73,400	4,963	78,363	-72,911
12	2,015	5,848		7,087	7,087	-1,239
13	2,016	6,269		7,087	7,087	-818
14	2,017	6,717		7,087	7,087	-370
15	2,018	7,195		7,087	7,087	107
16	2,019	7,704		7,087	7,087	616
17	2,020	8,247		7,087	7,087	1,159
18	2,021	8,247		7,087	7,087	1,159
19	2,022	8,247		7,087	7,087	1,159
20	2,023	8,247		7,087	7,087	1,159
21	2,024	8,247		7,087	7,087	1,159
22	2,025	8,247		7,087	7,087	1,159
23	2,026	8,247		7,087	7,087	1,159
24	2,027	8,247		7,087	7,087	1,159
25	2,028	8,247		7,087	7,087	1,159
26	2,029	8,247		7,087	7,087	1,159
27	2,030	8,247		7,087	7,087	1,159
28	2,031	8,247		7,087	7,087	1,159
29	2,032	8,247		7,087	7,087	1,159
30	2,033	8,247		7,087	7,087	1,159
31	2,034	8,247		7,087	7,087	1,159
32	2,035	8,247		7,087	7,087	1,159
33	2,036	8,247		7,087	7,087	1,159
34	2,037	8,247		7,087	7,087	1,159
35	2,038	8,247		7,087	7,087	1,159
	Total	221,205	437,000	204,843	641,843	-420,639

Table 3.2.3-5 Toledo Port

	Year	Revenue (1)	Cost(2)			Difference (1)-(2)
			Investment	Expenses	Total	
1	2,004		6,300		6,300	-6,300
2	2,005		6,300		6,300	-6,300
3	2,006		171,700		171,700	-171,700
4	2,007		171,700		171,700	-171,700
5	2,008	846		4,419	4,419	-3,573
6	2,009	1,680		4,419	4,419	-2,739
7	2,010	2,588		4,419	4,419	-1,832
8	2,011	3,295	7,000	4,419	11,419	-8,125
9	2,012	4,044	7,000	4,419	11,419	-7,375
10	2,013	4,839	231,900	4,419	236,319	-231,480
11	2,014	5,683	231,900	4,419	236,319	-230,637
12	2,015	6,578		9,129	9,129	-2,552
13	2,016	7,528		9,129	9,129	-1,601
14	2,017	8,538		9,129	9,129	-592
15	2,018	9,610		9,129	9,129	481
16	2,019	10,750		9,129	9,129	1,620
17	2,020	11,961		9,129	9,129	2,832
18	2,021	11,961		9,129	9,129	2,832
19	2,022	11,961		9,129	9,129	2,832
20	2,023	11,961		9,129	9,129	2,832
21	2,024	11,961		9,129	9,129	2,832
22	2,025	11,961		9,129	9,129	2,832
23	2,026	11,961		9,129	9,129	2,832
24	2,027	11,961		9,129	9,129	2,832
25	2,028	11,961		9,129	9,129	2,832
26	2,029	11,961		9,129	9,129	2,832
27	2,030	11,961		9,129	9,129	2,832
28	2,031	11,961		9,129	9,129	2,832
29	2,032	11,961		9,129	9,129	2,832
30	2,033	11,961		9,129	9,129	2,832
31	2,034	11,961		9,129	9,129	2,832
32	2,035	11,961		9,129	9,129	2,832
33	2,036	11,961		9,129	9,129	2,832
34	2,037	11,961		9,129	9,129	2,832
35	2,038	11,961		9,129	9,129	2,832
	Total	293,239	833,800	250,043	1,083,843	-790,604