The five cargo handling enterprises offer many services as follows:

-Tug service
-Line handling
-Ship repair
-Freight forwarding
-Warehousing
-Inland transportation
-Water,Electricity,and Fuel service
-Cleaning

10-4-1 Assignment of Berths

The assignment of berths is planned to meet conditions specific to Hai Phong Port such as the need to await the turn of the tide and the difficulty of ships passing each other on a single channel. Facility operation meetings of interested parties are held regularly to discuss schedules of port entry/departure, anchoring and berth assignment.

For berth assignment, the ships included in the plan are given priority. There are cases in which a ship under contract for the use of a berth is given priority, but this is rare.

10-4-2 Stevedoring

(1) Cargo Handling Enterprises

As can be guessed from the English term, 'enterprise', harbor stevedoring was earlier carried out by independent companies; but at present it is almost directly operated by the Port Authority. Although various improvement plans have been introduced for raising the efficiency and modernizing the stevedoring work, there are still a number of problems to be solved.

(2) Working Hours

In the port of Haiphong, stevedoring work is carried out in four-shift on a 24-hour basis. When the interruptions from meals, breaks, and changing time are taken into account, the actual stevedoring time is between 16 and 18 hours.

(3) Stevedoring Hours and Maintenance System

The extent to which yard equipment is used at Haiphong port is shown in Table 10-4-1.

The Port Authority director operates a workshop for trouble shooting, minor repair and maintenance of these machines, but a lack of parts and deterioration of loading/unloading machines themselves is apparent.

These machines are not used very frequently, their operation rate reaching only 20-30%. Some pier cranes have capacities of 50-75 tons per actual operating hour. It seems possible to increase efficiency by using them in combination with yard machines. Nevertheless, there are some that have deteriorated considerably and spare parts cannot be easily provided. Remedial measures are urgently required.

Table10-4-1 Equipment and Boats

	Actual Operate (UNITS)	Rest Ratio (%)	Operating Ratio (%)	Actual Capacity (TON/Hour)
1. Crane				
Quay Crane	24	25.5	26.4	34.9
Mobile Crane	7	17.3	29.8	19.9
Yard Crane	10	30.1	22.2	28.1
Floating Crane	2	63.0	30.4	(75.5T)
2. Traffic				
Folk Lift	28	17.3	14.6	16.8
3. Tug Boat	17	5.5	43.2	(2x300HP)
4. Lighter	18	8.4	37.2	(250GRT)

Source: Hai Phong Port

One of the two floating cranes is a heavy duty type and the other is mounted on a dredger or used for the loading or unloading of clinkers, etc. The heavy duty crane is very old, having been built in 1944. Something should be done for the loading/unloading of heavy cargoes.

The majority of tugboats are small, ranging from 200 to 300 horse powers. Tugboats with about 1,000 horsepower are required to take care of large ships.

The lighters were built mostly in 1977 and 1987.

Table10-4-1-1 Actual Capacity of Crane

Kind of Equipment	Belong	Built	CARGO VAL TON	KIND OF CARGO	OPERATING DAYS	WAITING DAYS	REPAIR DAYS	NONOPERATE DAYS	OPERATING RATIO %	REST RATIO %	Condition	CAPACITY TON/HOUR
Quay crane 11 10t	m.p no.4	1972	39,016	steel	64	207	74	20	23.6	25.8	nouse good	33.9
12 10t	m.p no.2	1972	45,378	bulkcargo	57	228	60	20	20.0	21.9	in use	44.2
17 10t	m.p no.2	1974	55,171	steelbag	72	212	61	20	25.4	22.2		42.6
23 10t	m.p no2	1977	48,867	bulk	60	225	60	20	21.1	21.9		45.2
24 10t	m.p no2	1977	49,585	bulk	56	224	65	20	20.0	23.3		49.2
30 10t	m.p no.3	1979	58,120	steelbag	100	159	86	20	38.6	29.0		32.3
31 10t	m.p no.3	1979	48,056	bag	75	130	140	20	36.6	43.8		35.6
36 10t	yard no.4	1990	14,221	steel	38	234	73	20	14.0	25.5	nouse good	20.8
26 5t	m.p no.5	1978	37,198	g/cargo	58	209	78	20	21.7	26.9	in use	35.6
27 5t	m.p no.5	1978	54,071	g/cargo	73	202	70	20	26.5	24.7		41.1
28 5t	m.p no.4	1979	48,181	g/cargo	84	208	53	20	28.8	20.0		31.9
29 5t	yardno.2,3	1979	10,250	steel	19	255	71	20	6.9	24.9		30.0
32 5t	yardno.2,3	1979	-	-	-	-	-	-	-	-	nouse good	-
34 5t	m.p no.2	1980	34,811	steelbag	72	223	50	20	24.4	19.2	to Vtcach	26.9
2 10t	m.p no.10	1968	53,389	bag g/c	97	181	67	20	34.9	23.8	needrepair	30.6
3 10t	m.p no.9	1968	28,793	bag g/c	68	206	81	20	24.8	27.7	needrepair	23.5
4 10t	m.p no.11	1968	12,255	bag g/c	36	238	71	20	13.1	24.9	in use	18.9
13 10t	m.p no.8	1972	25,925	bag g/c	59	116	170	20	33.7	52.1		24.4
10 16t	m.p no7	1972	31,339	container	69	194	82	20	26.2	27.9		25.2
16 16t	m.p no.7	1974	46,244	container	97	196	52	20	33.1	19.7		26.5
35 16t	yard no.7	1985	39,335	container	29	266	50	20	9.8	19.2		75.4
37 10t	yard no.7	1990	9,317	container	21	274	50	20	7.1	19.2		24.6
18 10t	m.p no.6	1974	43,788	bag g/c	38	257	50	20	12.9	19.2	nouse good	64.0
25 10t	m.p no.6	1977	17,147	bag g/c	47	248	50	20	15.9	19.2	in use	20.3
9 5t	m.p no.11	1969	17,649	bag g/c	55	234	56	20	19.0	20.8		17.8
Q crane takraf 20/40	Chuave	1990	90,256	container	96	197	52	20	32.8	19.7		52.2
Q crane takraf 20/40	Chuave	1990	76,869	container	75	145	95	20	34.1	31.5		56.9
yard crane 21 5t	Chuave	1976	50,156	sand	79	176	90	20	31.0	30.1		35.3
yard crane 22 5t	Chuave	1976	40,150	sand	94	191	60	20	33.0	21.9		23.7
yard crane 07 5t	Vatcach	1969	51,686	bag	116	83	146	20	58.3	45.5	needrepair	24.8
yard crane 14 5t	Vatcach	1973	26,268	bag	67	225	53	20	22.9	20.0	in use	21.8
yard crane 15 5t	Vatcach	1973	15,417	bulk	33	167	145	20	16.5	45.2		26.0
yard crane 19 5t	Vatcach	1976	29,844	bag	71	112	162	20	38.8	49.9	nouse good	23.4
Crane kone1 5/10t	Vatcach	1988	68,599	g/cargo	110	181	54	20	37.8	20.3	needrepair	34.6
Crane kone2 5/10t	Vatcach	1991	49,074	g/cargo	102	164	79	20	38.3	27.1	in use	26.7
TOTAL QUAY			1,079,781		1,720	4,784	1,756	480	26.4	25.5		
YARD			286,644	1366425	567	1,983	900	200	22.2	30.1		

m.p: Main Port g/cargo: General Cargo

Table10-4-1-2 Actual Capacity of Crane (By Site, By Cargo)

Kind of Equipment	Belong	Built	CARGO VAL TON	OPERATING DAYS	CAPACITY TON/HOUR
Main port			868,106	1,444	33.4
g/cargo crane			257,123	427	33.5
Bag crane			162,380	257	35.1
Steel crane			118,658	193	34.2
Bulk crane			159,247	206	42.9
TOTAL QUAY CRANE			1,079,781	1,720	34.9
TOTAL YARD CRANE			286,644	567	28.1
CONTAINER CRANE			167,125	171	54.3

Table 10-4-1-3 Actual Capacity of Vehicle

Kind of Equipment		Belong - CAPACITY		Cargo Vol TON	Working Hours	Operating Ratio %	LOAD-Ratio T/HOUR
Mob-clane	kc5363 k24	Ent-1	25T	6,386	525	10.9	12.2
	kc5363	Ent-2	25T	9,825	650	13.5	15.1
	k25 o15			5,375	325	6.7	16.5
	4561a 00	Chuave	16T	28,245	2,380	49.3	11.9
	4561a 03		16T	16,907	1,662	34.4	10.2
	kc5363 k26		25T	99,518	3,013	62.4	33.0
	rdk 28t		28T	34,542	1,536	31.8	22.5
TOTAL				200,798	10,091	29.8	19.9
Forklift	USSRB60	Ent-1	5T	590	30	0.6	19.7
	B49			887	235	4.9	3.8
	B66			1,843	265	5.5	7.0
	B68			2,637	345	7.1	7.6
	B69			489	75	1.6	6.5
	B75			1,883	220	4.6	8.6
	B76			3,403	370	7.7	9.2
	B77			2,159	425	8.8	5.1
	4014m C3			5,434	505	10.5	10.8
	C4			3,608	440	9.1	8.2
	C5			4,878	485	10.0	10.1
	C10			7,331	740	15.3	9.9
	TOYOTA E21			11,855	765	15.8	15.5
	E22			14,401	1,020	21.1	14.1
	HYSTER E27			1,467	195	4.0	7.5
	E28			5,860	470	9.7	12.5
	E29			34,949	1,145	23.7	30.5
	E31			72,399	2,270	47.0	31.9
	KAIMAR E30			65,311	1,840	38.1	35.5
	4045 B50	ENT-2		23,127	1,245	25.8	18.6
	B70			23,819	1,135	23.5	21.0
	B71			10,618	690	14.3	15.4
	B73			942	30	0.6	31.4
	TOYOTA E23			13,231	670	13.9	19.7
	E24			7,416	540	11.2	13.7
	4014 C6	CHUAVE	5T	6,771	2,054	42.5	3.3
	C7		5T	2,673	1,191	24.6	2.2
	- E26		3T	2,157	388	8.0	5.6
TOTAL				332,138	19,783	14.6	16.8

Table10-4-1-4 Floating Crane and Lighter

Kind of Equipment		Belong	Built	CARGO VAL TON	KIND OF CARGO	OPERATING DAYS	WAITING DAYS	REPAIR DAYS	NONOPERATE DAYS	OPERATING RATIO %
FLOATING CRANE	P10	31.9M 75T	1954	3,772	HEAVY	104	238	23		30.4
	P11	10T	1977	212,634	M3 CREDGE	233	58	74		80.1
LIGHTER	NO3 93		1972	4,684	UREA	171	194	-		46.8
	NO4 94		1977	1,700	PELLET	63	302	-		17.3
	NO5 95		1977	1988	CEMENT	72	293	-		19.7
	NO6 96		1977	1224	STEEL	54	131	-		29.2
	NO7 97		1977	1999	RICE	81	284	180		22.2
	NO8 98		1977	1000		36	149	-		19.5
	NO9 99		1977	1223		45	320	180		12.3
	NO10 102		1977	1671		63	302			17.3
	NO11 104		1987	2991		117	183			39.0
	NO12 105		1987	5300		298	67	65		81.6
	NO13 106		1987	3880		135	165	0		45.0
	NO14 107		1987	2940		108	257	65		29.6
	NO15 108		1987	4460		169	196			46.3
	NO16 109		1987	4387		165	200			45.2
	NO17 110		1987	5119		207	158			56.7
	NO18 111		1988	4656		179	194			48.0
	NO19 112		1988	4751		189	176			51.8
	NO20 114		1988	4946		180	185			49.3
	NO21 D25		-	3728		45	260	60		14.8
TOTAL				62647		2377	4016	550	0	37.2

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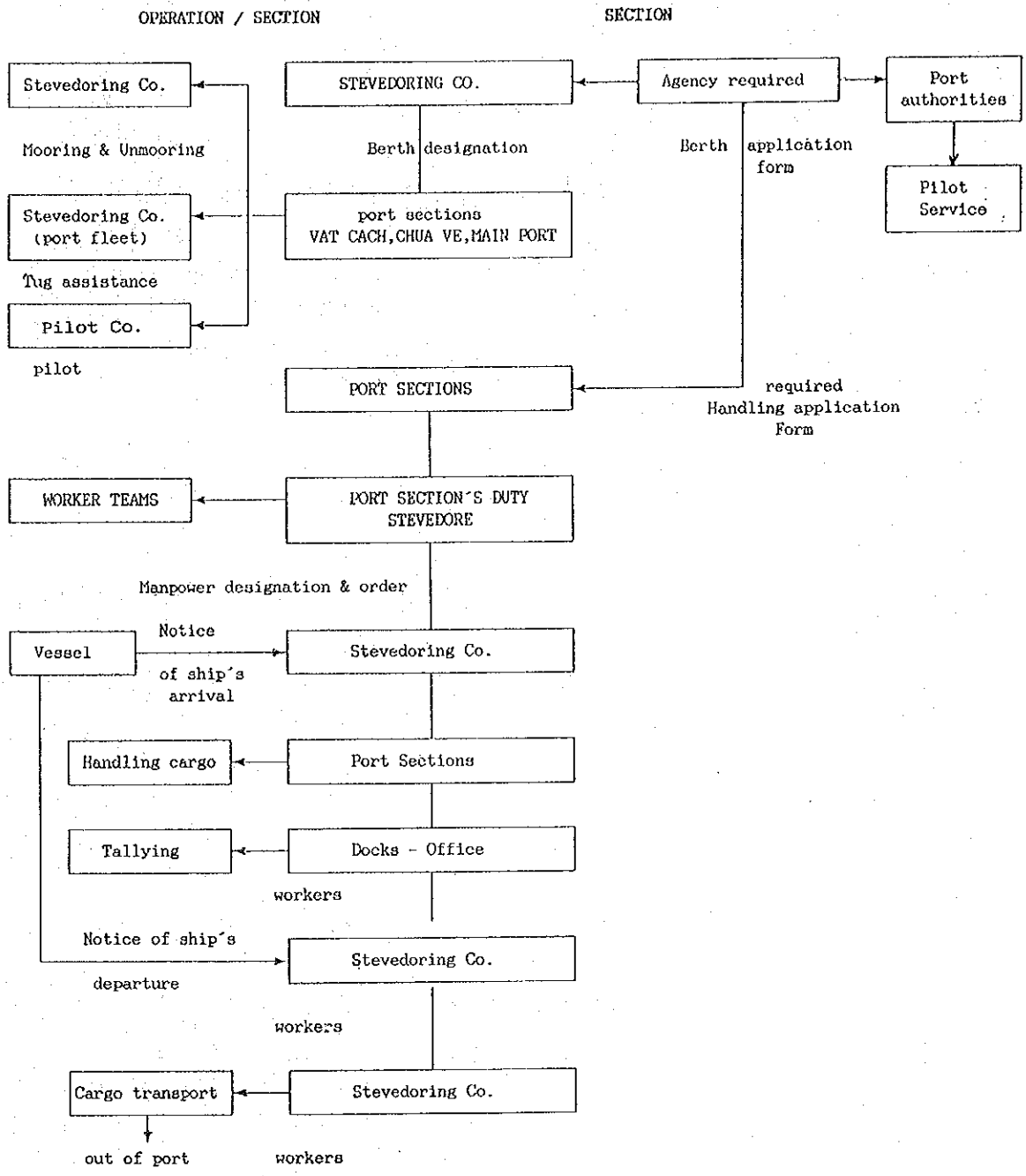
Port : Hai phong

PORT OPERATION CYCLE



(4) Cargo Handling Situation

Data on the cargo handling of major ships at the Hai Phong Port are shown in Table 10-4-2.

Table10-4-2 Operating Hours

	3,000DWT Type	5,000DWT Type	7,000DWT Over Type
Handling Cargo	Rice Cement	Fertilizer Bulk,Steel	Bulk,Steel General
Waiting Time for Pilot,Tugs	2.0 hours	2.0 hours	2.0 hours
Time for Entry	2.5-3 hours	2.5-3 hours	2.5-3 hours
Berthing Mooring	1.2 hours	1.3 hours	1.3 hours
Customs Quarantine	2.0 hours	2.0 hours	2.0 hours
Cargo Handling	79.0 hours	110.4 hours	155.1 hours
Waiting for Departure	1.0 hour	1.0 hour	1.0 hour
Total stay Time(ship)	88.2 hours	119.7 hours	164.4 hours
Vessels (1992)	357	242	104
Total Stay Time	28,203 hours	26,717 hours	16,130 hours

Source:Hai Phong Port

Stevedoring restricts the movement of ships for most of their days in port. The total number of restricted hours is 71,050, or a total of 3,000 days, according to the above table.

The berth occupancy rate is estimated to be about 60% (for 13 berths in the main port area and in the Chua Ve area). An increase in freight can be dealt with, to some extent, by raising the efficiency of stevedoring.

10-4-3 Storage System

Table 10-4-3 shows the quay sheds and open storage yards in Haiphong Port.

Table10-4-3 Storage Facilities in Main Port

Ware House:	13 houses,	total 49,525 m2
Yards	: 47,942 m2	
Yards	: 19,300 m2,	for container

Cargo is stored at Haiphong Port for only a brief period of time. The major portion of it is for direct shipment.

10-4-4 Inland Transport

Cargo is transported between the port and hinter-land via road, rail, and inland waterways. Roads are the primary means of transport.

10-4-5 Data Processing

Haiphong Port has just begun processing data on ships and the loading/unloading of cargoes.

There are several activities requiring data processing, such as stevedoring at the container terminal, planning for the use of berths, calculation of employees' salaries, etc. Timely investigations, study and introduction of data processing are necessary.

The process begins with the establishment of a policy toward the introduction. Then, the types of service that need data processing should be identified, followed by analyses of the contents of the service and clerical procedures. Only after this should the advantages and disadvantages of the introduction be discussed.

Once it has been judged as effective in solving a problem, a new EDP system should be designed.

A system is put in operation after introduction, education and training periods. For this port, the automation of clerical processes related to the loading/unloading of containers seems indispensable.

10-5 Management and Operation System

10-5-1 Basic Concept of Management and Operation

There is no generalized form of port management; ports are managed in a variety of ways depending on the histories of their development, state system, local characteristics, economic conditions, etc.

Nevertheless, the securing of autonomy, unitary management, financial independence and the introduction of the principle of competition are the minimum requirements.

(1) Autonomy

In view of the importance of the port to the national economy, it is desirable that proper relations be established with the central government while maintaining the independence of the port management entity.

(2) Unitary management

It is vital for the management system to have the necessary and sufficient authority over the port area and main functions.

(3) Financial independence

The management system is required to have its own budget, maintain a reasonable level of port charges, and be able to further depreciate and renew facilities besides repaying debts.

(4) Principle of competition

For port management, it is essential to have a clear definition of responsibilities and a rational organization based on it, so that an adequate profit level can be maintained without disregarding competition with the outside world.

10-5-2 Speculation of Hai Phong Port

(1) Low efficiency of cargo handling

Between enterprises, there is a good cooperation during busy times. Enterprises can send workers and equipments from one to the other. There will be enough personnel to handle the increasing cargo when enterprises introduce the mechanical handling system.

Four shifts per day is good for container ships but three shifts per day is suggested for conventional ships.

(2) Customs Operation

There must be customs everywhere but a good way to reduce checking time and prevent waste time will be suggested.

(3) New Machine

Each enterprise should pay a depreciation of the new machine by their own.

(4) Maintenance

For the repair of new machines ,it is better to have training courses. In Hai Phong Port, preliminary exercise was taken for two years by port authority.

(5) Business of New Service

Transport forwarding on cargoes for all the customers should be introduced especially for container.

Substantial maritime service should be developed and supplied for all the ships coming into or out of port.

Repair services for all ships and facilities within the port will be conducted, later, this service can expand beyond the port.

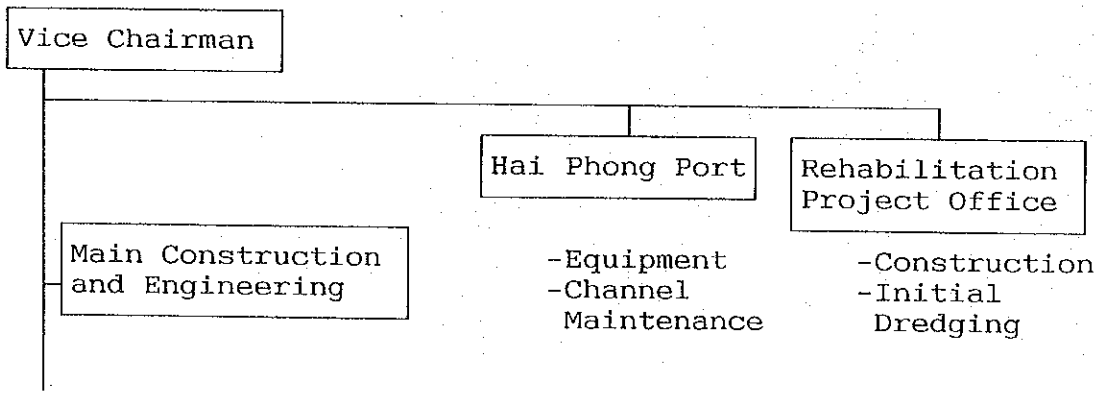
10-5-3 Recommendation on Management and Operation System

The Executive Agency

The Urgent Rehabilitation Project of Hai Phong Port consists of many kinds of works and quick decisions for implementation are required. The executive agency should have strong function for carrying out the project smoothly.

The establishing new organization is as follows:

Upper organization	:	Coordination Committee consists of relative organization concerned (SPC, MOTAC, VINAMARINE)
Executive Agency	:	VINAMARINE
practical executive organization	:	To establish New Rehabilitation Project Office parallel with Haiphong Port Authority
Maintenance dredging executive organization	:	Dredging Department under Haiphong Port Authority



Management and Operation

(1) The cargo handling operations should be carried out under three shift system.

(2) For the time being quay side operation at Main Port Container Terminal will use ship's gear. In the future, when new equipment is procured, the same number of workers will be used terminal operation but efficiency should increase.

(3) It is recommendable to keep the same number of shifts and workers after The Rehabilitation Project is implemented as at present. But some reorganization and repositioning of officers should be made by the Port Management in order to be in line with than port facilities.

(4) Mass handling method is recommended for quay side cargo handling operation instead of the existing handling system which produces very low efficiency by directly loading (or unloading) cargo from to or trucks or wagons.

(5) The cargo volume through the port is expected to increase, therefore new, good equipment will be procured.
Port efficiency depends very much on equipment availability. So, suitable training should be given to the future managers as well as equipment operators and the maintenance workers.

(6) A computer management network is recommended at container terminals to enhance delivery.

(7) The existing port working offices are scattered throughout the Port area. The offices that are able to be moved should be gathered in one quarter for a better communication and integrated management.

Chapter 11 Economic Analysis

Chapter 11 Economic Analysis

11-1 Economic Analysis

This chapter evaluates the feasibility of implementing the urgent rehabilitation project of Hai Phong Port from the viewpoint of economy. The rate of return was roughly estimate at 13.3%.

11-2 Method of Economic Analysis

By using the cost-benefit analysis, the economic internal rate of return is calculated to assess economic effectiveness. Figure 11-2-1 is a flowchart showing the method of economic analysis.

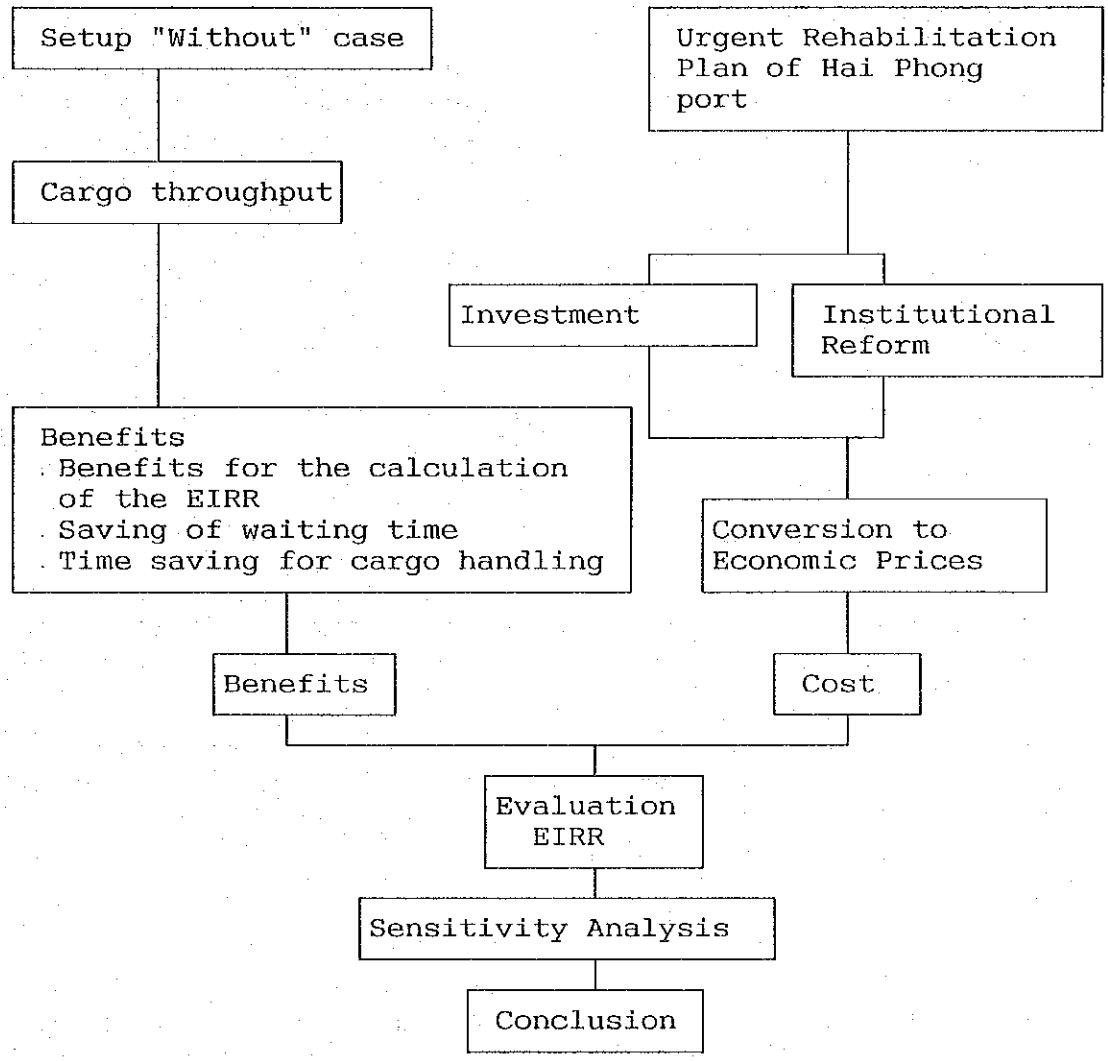


Fig.11-2-1 Flow Charts of Economic Analysis

For evaluation, the expected costs and benefits are measured and economic prices are amended according to the concept of the removal of transfer items and economic price (border prices); EIRR is then calculated.

To find out the degree of influence of uncertain elements, sensitivity analysis is also performed.

11-3 Premises of Economic Analysis

11-3-1 Schedule of start of use

As provided in the implementation plan, the Hai Phong port channel is expected to be opened for general use in the beginning of 1997, while in the Chua Ve and main port areas step-by-step improvement is expected to be completed in 1998.

11-3-2 Project life

The project life is set at 34 years, including the working period, while in Viet Nam the depreciation period of civil engineering structures is 20 - 30 years; the working period of this project is four years.

This means the evaluation of economic analysis covers the 34 years from 1994 to 2027.

11-3-3 Foreign exchange rate

The exchange rate used is US$1 = VND 10,680 (calculated from the average rate in the first half of 1993).

11-3-4 'Without' case

In the economic analysis, the case of not implementing the urgent rehabilitation project of Hai Phong port ('without' case) is assumed, and the difference in cost and benefit is assessed to determine the feasibility of the project.

Setting the 'without' case is one of the most important factors in the economic analysis. In this study, the 'with' and 'without' cases are conceived as follows.

11-3-5 Concept

(1) 'With' case

As the volume of cargo to be handled in 1995, when the port of Hai Phong is opened for use with its channel depth increased, the forecast demand in Chapter 4 is used. For the cargo volume from 1996 through 1998, the values of estimated cargo shown in 4-2-2 are used.

It is assumed that container berths and general cargo use berths in the Vat Cach section, excluding those on the wharf, at that time will show an occupancy rate of 90% or more, and the rate is believed to reach almost a limit of a handling capacity . Accordingly, the volume of cargo is kept at that fixed level in and after 1998. An increase in cargo thereafter will be taken care of in an another future project.

The basic concept is as follows.

1) The channel depth is -6.0m.

2) Funds are invested for raising the loading/unloading capacity.

3) Maintenance dredging is carried out to maintain the water depth.

(2) 'Without' case

If the volume of cargo increases without improving the present water depth, 1998's occupancy rate of general use berths for freight will exceed 90% and ships will have to wait for a longer time. Without cargo going to an other mode of transport or other ports, the estimated volume of cargo is the same as in the
'with' case.

Other basic concepts are:

1) The channel depth of Hai Phong port remains unchanged (- 4.1m).

2) No investment is made to step up the capacity of existing berths.

3) Maintenance dredging for maintaining the present capacity is carried out.

Maintenance of dredging volume in future is an important factor in the economic analysis. In the study, the maintenance volume of 4 million m3 per year is adopted. This value is maximum capacity for Dredging Company in Viet Nam.

11-4 Benefit

11-4-1 Points of benefit

Following are the measurable benefits expected from the implementation of this project:

1) Saving of waiting cost (decrease in time spent waiting for turn of the tide)

2) Saving of cost incurred for large ships entering the port

3) Saving of time for cargo transportation owing to reduced time for stevedoring

4) Saving of time for cargo transportation owing to increased speed of navigation.

A rough calculation is made for 1), 2) and 3).

11-4-2 Saving of demurrage

When the Haiphong port urgent rehabilitation project is executed, the waiting hours of ships are reduced and ships can save on waiting cost. This is a benefit of this project, and it is calculated by estimating the difference in waiting hours between the 'without' case (without investment) and the 'with' case (with investment) and converting the produce into amount of money using the following formula for evaluation.

Saving in ships' staying cost	=	Difference of ships' staying time "Without" and "with" cases	
		x	ships' staying cost
		x	Percentage accruing to Viet Nam

(1) Difference in waiting hours

The depth -6m which is concepted, the volume of cargo handled at the port was stated in the preceding paragraph, which is summarized as follows.

Table11-4-1 Waiting Hours

	"with" case	"without" cas
Average hours of tidal waiting per a ship	7.02	38.4
Total hours by year	8,780	47,188

(2) Difference in waiting cost

Waiting cost is the expense incurred by a ship on waiting, assessed by economic price. To estimate this, the ship cost,

composed of ship price, crew cost, insurance, repair charge, etc., was accumulated item by item.

The main general cargo ships' staying cost for representative type is shown in table 11-4-2 which is based on data provided by a Japanese shipping company.

Table11-4-2 Ships' staying cost by type

(UNIT;US$/ship day)

Ship Type (DWT.TON)	3,000	5,000	7,000	10,000	15,000	20,000
Staying Cost	4,000	5,080	6,200	7,800	10,500	12,300
Container Ship	5,000	6,500	8,100	10,500	12,700	14,900

(3) Accruing of benefit

100% of the benefit from savings in ship cost accrue to Viet Nam in the case of Vietnamese ships. If it is a foreign ship, 50% accrue to Vietnam. The ratio between the Vietnamese and foreign ships is:

The former represents 100% in the case of domestic trade and 40% in the case of foreign trade, according to the present ratio.

Based on the above assumption, the ratio of benefit accruing to Vietnam is computed as follows:

Foreign trade $0.4 \times 1.0 + 0.6 \times 0.5 = 0.7$

Domestic trade $1.0 \times 1.0 = 1.0$

(4) Results of calculation

The calculated saving benefit of waiting cost for each ship type is shown in Table 11-4-3 and that for each year is shown in Table 11-4-4.

Table 11-4-3 Ship's Waiting Cost Saving Benefit

TYPE OF VESSELS	SHIP SIZE (DWT)	STAYING COST ($/DAY) (A)	WAITING TIME WITHOUT (HOURS) (B)	WITH (HOURS) (C)	(B)-(C) (HOURS)	(B)-(C) = (D) (DAYS)	BENEFIT (A)X(D) 1,000$	BENEFIT TO VIETNAM 1,000$
G-CARGO (F)	20,000	12,300	3,600	2,610	990	41	507	355
G-CARGO (F)	15,000	11,600	21,750	18,000	3,750	156	1,813	1,269
G-CARGO (F)	10,000	9,150	16,200	5,400	10,800	450	4,118	2,882
G-CARGO (F)	7,000	6,200	1,122	234	888	37	229	161
FERTILIZER(F)	7,000	6,200	1,122	234	888	37	229	161
ORE (F)	7,000	6,200	1,122	234	888	37	229	161
GRAIN (F)	7,000	6,200	1,122	234	888	37	229	161
WOOD (F)	5,000	5,080	230	0	230	10	49	34
STEEL (F)	5,000	5,080	230	0	230	10	49	34
CEMENT (F)	5,000	5,080	230	0	230	10	49	34
G-CARGO (D)	5,000	5,080	230	0	230	10	49	49
CEMENT (D)	5,000	5,080	230	0	230	10	49	49
TOTAL			47,188	26,945	20,243	843	7,599	5,348

F:Foreign D:Domestic G-CARGO:General Cargo

Table11-4-4 Total Ships' Waiting Benefit

Year	Benefit
1998 - 2027	11,227 x $1,000 / year

11-4-3 Time Cost Savings

When the project is executed, loading/unloading time is shortened and time required for import and export is reduced.

On the part of the shipper, time savings mean shorter time of recovery of invested money, increased opportunities for investing in other production activities, and more earnings from funding. In terms of money, benefit from saved time is expressed as follows:

$$STC = Q \times D \times V \times I / 365$$

Q = Average loadage/ship (ton/ship)

D = Reduction in number of days required for loading/ unloading (day/ship)

V = Average unit price of goods ($/ton)

I = Interest on working funds (%/year)

The average unit price of goods is estimated as shown in Table 11-4-5, on the basis of unit price of cargo by item as

obtained from existing material.

Table11-4-5 Unit Price of Cargo

(UNIT;$/TON)

Cargo	Steel	Wood	Ferti lizer	Ore	Cement	Rice	Others
Price	600	86	84	33	70	107	1,500

Interest on working funds is assumed to be 20% considering the short term lending rate of interest on working funds in effect in Viet Nam.

Table 11-4-7 shows the benefit from time cost saving by ship type, based on the above conditions. The benefit from time cost saving for each year, calculated on the basis of Table 11-4-7, is shown in Table 11-4-6.

Table11-4-6 Total Benefit of Time Cost Saving

Year	Benefit
1998 - 2027	10,515 x $1,000 / year

Table11-4-7 Benefit of Time Cost Saving

TYPE OF VESSELS		SHIP SIZE (DWT)	AVERAGE LOAD (TON)	UNIT PRICE ($/T)	INTEREST WORKING FUNDS (%/YEAR)	SAVING DAYS OF WAITING (DAYS)	SAVING DAYS (DAY) (A)-(B)	HANDLING HOURS (WITHOUT) (A)	HANDLING HOURS (WITH) (B)	BENEFIT 1,000$
G-CARGO	(F)	20,000	8,000	1,500	20	41	80	5,760	3,840	797
G-CARGO	(F)	15,000	6,000	1,500	20	156	500	36,000	24,000	3,236
G-CARGO	(F)	10,000	4,000	1,500	20	450	300	21,600	14,400	2,466
G-CARGO	(F)	7,000	4,200	1,500	20	37	15	5,600	5,236	180
FERTILIZER	(F)	7,000	4,200	84	20	37	15	5,600	5,236	10
ORE	(F)	7,000	4,200	33	20	37	15	5,600	5,236	4
GRAIN	(F)	7,000	4,200	107	20	37	15	5,600	5,236	13
WOOD	(F)	5,000	3,000	86	20	10	50	5,095	3,896	8
STEEL	(F)	5,000	3,000	600	20	10	50	5,095	3,896	59
CEMENT	(F)	5,000	3,000	70	20	10	50	5,095	3,896	7
G-CARGO	(D)	5,000	3,000	1,500	20	10	50	5,095	3,896	147
CEMENT	(D)	5,000	3,000	70	20	10	50	5,095	3,896	7
CEMENT	(D)	3,000	1,800	70	20	0	57	7,266	5,904	4
GRAIN	(D)	3,000	1,800	107	20	0	57	7,266	5,904	6
ORE	(D)	3,000	1,800	33	20	0	57	7,266	5,904	2
TOTAL						843	1,361	133,036	100,378	6,946

G-CARGO:General Cargo F:Foreign D:Domestic

11-4-4 Saving of Cost Incurred for Large Ships

Large ships save cost by scale merit. Benefits accrue to foreign shipowners and to Vietnamese ships. However ,it is now standard practice to include some of the benefits accruing to foreign shipowners in the appraisal on the understanding that in the long run this benefit will filter through to the national economy. It is assumed that 70% of the total benefit described in 11-4-2 (3) will eventually accrue to the port.

"without" case; Traffic by 7,000DWT class vessels

"with" case; Traffic by 10,000DWT class vessels

(unit;$1,000)

	"without" case	"with" case
Total cost	174,900	156,650

Difference of total cost in each year is calculated as follows.

(without case - with case) x 0.7 = $12,780x1,000/year

11-4-5 Other benefits

If the project is not implemented, several ships will have to wait for the turn of the tide and vacant berths in Hai Phong port, and economic activities in the background zone of the port and in the metropolitan area will be substantially impaired.

The implementation of this plan will enable the background zone in general to develop industries, distribution business, etc., and contribute to the promotion of economic development in the background zone by upgrading income and living standards.

From the viewpoint of national economic development, it will offer great benefits.

11-5 Cost

Construction cost, management operation cost(maintenance dredging cost, maintenance repair cost and other operating costs) and replacement investment are included in the cost-benefit analysis.

11-5-1 Construction Cost

The annual investment figures (market price) estimated in Chapter 9 'Cost Estimation' are assumed.

Table 11-5-1 Annual Investment

UNIT:$1,000

ITEMS	1994	1995	1996	1997	1998	TOTAL
DREDGING-H	0	26,640	2,720	0	0	29,360
DREDGING-G	0	16,822	5,390	0	0	22,212
STRUCTURE	0	10,900	0	0	0	10,900
BUILDING	0	1,200	600	0	0	1,800
EQUIPMENT	0	11,639	20,960	0	0	32,599
BOAT	1,500	0	4,000	15,000	0	20,500
OTHERS	0	2,003	0	0	0	2,003
CONTINGENCY	0	2,949	436	0	0	3,385
E-FEE	5,471	2,155	2,155	0	0	9,781
TOTAL	6,971	74,308	36,261	15,000	0	132,540

DREDGING-H: Use Hopper Dredger DREDGING-G: Use Grab Ship E-FEE : Engineering Fee

11-5-2 Management/operation Costs

(1) Maintenance Dredging Cost

Maintenance dredging volume is 2.3 million m^3 each year.

In the "with" case, channel depth will be -6 m, and sedimentation volume is considered about 6.3 million m^3 per year. Maintenance dredging for keeping present condition is carried out by The Dredging Company in "without" case. The volume is 4.0 million m^3 each year.

Then, difference between "with" and "without" cases is 2.3 million m^3.

(2) Maintenance and Repair Cost

Maintenance costs for the new yard and the installed handling machinery are considered at economic prices. 5% of the total construction cost, excluding dredging cost, is assumed to be maintenance cost.

(3) Other Operating Cost

Fuel, power, lighting and other expenses are summed up.

11-5-3 Replacement Investment

After the depreciation of loading/unloading machines, etc., the amount of initial investment is taken as cost. Replacement investment plans for the various years are shown in Table 11-5-2.

Table 11-5-2 Annual Replacement Investment

(UNIT;$1,000)

Year	Item	Cost
2018	Vehicles,Equipment	11,352
2019	Vehicles,Equipment	20,443
2020	Ships	18,531

11-6 Economic Price

11-6-1 Conversion of economic price

The economic analysis is meant to review the effectiveness of the project; that is whether effective redistribution is made from the standpoint of national economy. For the analysis, economic price (border price) rather than market price is used.

There are several ways of converting market price to economic price. In this report, benefit and cost are divided into five items of tradable goods, non-tradable goods, skilled labor power, unskilled labor power, and transfer item; various transportation variables are applied to each of them for conversion.

11-6-2 Elimination of transfer items

Taxes, construction interest, subsidies, etc., are not direct cost (consumption of resources) originated from investment when viewed from the standpoint of state finance; they are simply transfer of money and so these are eliminated from cost and benefit.

Taxes levied in this country include Turnover Tax Import/Export Tax Natural Resource Tax and others, comprising several tax rates with differ depending on construction material and construction-related transactions.

In this chapter, 10% is withdrawn from material and service

excluding personnel cost in the domestic currency part of construction cost, and 4% transaction tax is withdrawn from maintenance/repair cost and operating costs in management/operation cost as transfer items respectively.

11-6-3 Application of Conversion Facter

The prices of tradable goods are expressed in CIF and FOB value for import goods and export goods respectively.

These values show the actual border prices. However, as the border price of non-tradable goods cannot be converted directly,the border price of the inputs needed to produce the non tradable goods is considered.

In this study non-tradable goods are considered that labor power and transfer items are substracted from local currency.

After that, market price is multiplied the standard conversion factor directly.

As for skilled labor, the economic price is determind by multiplying the market wage by the conversion factor for consumption.

On the other hand ,the economic price of unskilled labor is determind by multiplying the nominal wage by the shadow wage rate and the conversion fator for consumption.

(1)Standard Conversion Factor(SCF)

The standard conversionn factor is used to determine the economic prices of certain goods which cannot be directly revalued at border prices.

These goods include most non tradable goods and services.

The standard conversion factor is expressed by the following equation:

$$SCF = \frac{I + E}{(I + Di) + (E - De)}$$

where, I : Value of exports (CIF)
E : Value of imports (FOB)
Di : Value of taxes on exports
De : Value of taxes on imports

The standard conversion factors for the last two years for which data is available (1991, 1992), which is estimated by Statistics of Import/Export and Duties of Foreign Trades, are

shown in Table 11-6-1. In this study , standard conversion factor of 0.993 is adopted.

Table 11-6-1 Standard Conversion Factor

UNIT:MILLION $

YEAR	TOTAL IMPORT VALUE(CIF)	TOTAL EXPORT VALUE(FOB)	TOTAL IMPORT TAX	TOTAL EXPORT TAX	SCF IN EACEYEAR
1989	2,565.8	1,946.0	68.1	24.7	0.990
1990	2,752.4	2,404.0	81.8	39.7	0.992
1991	2,338.1	2,087.1	67.3	48.3	0.996
Average					0.993

(2)Conversion Factor for Consumption Goods (CFC)

This conversion factor is used to convert the market prices of consumption goods into border prices. The conversion factor for consumption goods is usually calculated in the same manner as the SCF, replacing total imports and exports by those of consumption goods only.

However in this case, it is difficult to directly calculate the CFC due to the shortage of necessary data such as import/export value and taxes on the consumption goods.

Therefore in this study the conversion factor for consumption goody is estimated by using Statistics of Foreign Trades and Duties of Foreign Trades.

CFC of 0.986 is adopted.

Reference Table for CFC

UNIT:MILLION $

ITEM	1989	1990	1991
EXPORT			
GOODS	571.3	635.8	300.1
AGRICULTURE	742.4	783.2	628.0
FOREST	86.7	126.5	175.5
AQUA	188.2	239.1	285.4
TOTAL TAX	10.6	15.0	20.4
TOTALVOL	1,588.6	1,784.6	1,389.0
IMPORT			
MACHINE	172.5	179.4	119.6
INSTRUMENT	178.3	134.5	71.0
MATERIAL	1,377.2	1,589.6	1,530.7
GOODS	328.4	409.8	325.2
TOTAL TAX	63.0	77.4	64.1
TOTALVOL	2056.4	2313.3	2046.5
C.F.C	0.9858	0.9850	0.9874

(3)Conversion Factor for Labor

For the economic analysis, labor costs are usually measured in terms of their opportunity costs, that is, the value of the foregone marginal product from other alternate employment due to the employment of laborers for the project.

The cost of skilled labor is calculated based on actual market wages, assuming that the market mechanism is functioning properly. As these are domestic costs or market costs, they are converted into border prices by multiplying the market wages by the conversion factor for consumption goods.

Thus, border price of labor cost can be expressed as the border price of purchasing power, that is, market wage multiplied by the conversion factor for consumption goods is obtained in accordance with the above premises:

$$\text{Conversion Factor for Skilled Labor} = \frac{\text{Skilled Labor Opportunity Cost}}{\text{Skilled Labor Wages}} \times \text{CFC}$$

$$= 1.0 \times 0.986$$

$$= 0.986$$

The cost of unskilled labor is calculated based on the foregone marginal product of labor. Where it is assumed that the marginal product of unskilled labor in market prices is equal to the nominal wage which is the wage for temporary workers, the economic wage rate is calculated by the following equation:

$$m = \Sigma \left(Di / Si \right) \times Wi$$

where, m : Marginal product of temporary workers in market prices
Wi : Wage rate for temporary workers
Di : Demand for temporary workers
Si : Supply for temporary workers

This equation means that the marginal product is based on the demand supply condition in the labor market considering the degree of underemployment. Considering the labor market, the labor is usually provided from the agriculture sector.

Therefore, in this study , the marginal wage rate is calculated based on the labor market in the agriculture sector.

According to 1992 statistics, national income in the agricultural sector per capital in Viet Nam was $75/year. The

average wage of an unskilled laborer was $300/year. Thus, the conversion factor for unskilled labor obtained from these is:

$$\text{Conversion factor of unskilled labor} = \frac{\text{Unskilled labor opportunity cost}}{\text{Unskilled labor wages}} \times \text{CFC}$$

$$= \frac{\text{Per capita of agricultural sector}}{\text{Unskilled labor wages}} \times \text{CFC}$$

$$= 0.247$$

11-6-4 Economic Price of Cost and Benefit

The following economic prices of cost and benefit were obtained by applying the above estimation method and various conversion factors.

(1) Construction Cost

As the CIF price is used for the foreign currency part, the same is adopted here. As for the domestic currency part, the amount from which labor power and 10% transaction tax, which is a transfer item, are deducted is regarded as non-traded goods and multiplied by the standard conversion factor.

Labor power is divided into skilled and unskilled labor power and multiplied by the conversion factor for skilled labor and the conversion factor for unskilled labor respectively.

Conversion factors and economic prices by types of work and for overall construction cost are shown in Table 11-6-2.

(2) Management/operation cost

1) Maintenance dredging cost: The maintenance dredging volume to maintain a water depth of -6.0m amounts to 6.3 million m3/year, and amounts to 4 million m3 on the present channel if usual maintenance dredging is done.

Then the difference comes to 2.3 million m3/year-$9,200 transaction tax (10%) as transfer item to be withdrawn.

Table 11-6-2 Conversion Factor and Economic Cost for Construction

ITEMS	COSTRUCT MARKET PRICE	FOREIGN PORTION (%)	LOCAL PORTION (%) TRADABLE	NON-TRADE	SKILLED LABOR	UNSKILLED LABOR	TRANSFER ITEM	CONVERSION FACTOR	CONSTRUCTION ECONOMIC PRICE
	1,000$	1.00	1.00	0.993	0.986	0.247	0		1,000$
DREDGING-H	29,360	90.0	3.7	5.3			1.0	0.98963	29,055
DREDGING-G	22,212	96.6	2.4	0.6			0.3	0.99657	22,136
STRUCTURE	10,900	56.3	9.4	15.0	3.4	13.4	2.7	0.87088	9,493
BUILDING	1,800	70.5	3.8	3.8	9.0	12.0	0.8	0.89961	1,619
EQUIPMENT	32,599	95.0	0.9	0.9	0.0	3.0	0.2	0.97535	31,795
BOAT	20,500	95.0	0.9	0.9	0.0	3.0	0.2	0.97535	19,995
OTHERS	2,003	21.4	6.4	32.1	28.6	7.1	4.3	0.89711	1,797
CONTINGENCY	3,385	88.9	2.8	3.8	0.9	2.9	0.7	0.97082	3,286
E-FEE	9,781	100.0	0.0	0.0	0.0	0.0	0.0	1.00000	9,781
TOTAL	132,540	118,945	3,413	4,651	1,131	3,504	896		128,957

Table 11-6-3 Annual Improvement

UNIT:$1,000

ITEMS	1994	1995	1996	1997	1998	TOTAL
DREDGING-H	0	26,364	2,692	0	0	29,055
DREDGING-G	0	16,764	5,372	0	0	22,136
STRUCTURE	0	9,493	0	0	0	9,493
BUILDING	0	1,080	540	0	0	1,619
EQUIPMENT	0	11,352	20,443	0	0	31,795
BOAT	1,463	0	3,901	14,630	0	19,995
OTHERS	0	1,797	0	0	0	1,797
CONTINGENCY	0	2,863	423	0	0	3,286
E-FEE	5,471	2,155	2,155	0	0	9,781
TOTAL	6,934	71,867	35,526	14,630	0	128,957

2) Maintenance/repair cost: Since a detailed cost structure is unknown, the amount of transaction tax is deducted as a transfer item and multiplied by the standard coefficient of transformation.

3) Other operating costs: These are calculated in the same manner as maintenance/repair cost.

(3) Replacement investment

When replacement investment is made, the comprehensive conversion factor corresponding to the amounts of replacement investment for the various items is multiplied.

(4) Demurrage saving benefit

This is computed at international prices to be recognized as economic price as it is.

(5) Time cost saving benefit

Unit prices of goods are expressed on a CIF basis (import) and FOB basis (export) to be recognized as economic price as they are.

11-6-5 Computed results of cost benefit (economic price)

'Annual investment amounts (economic price)' and 'cost benefit' are shown in Table 11-6-3 and Table 11-6-4 respectively.

11-7 Evaluation

11-7-1 Method of evaluation

As stated in 11-2, the economic feasibility of the project is assessed by the economic internal rate of return(EIRR). The internal rate of return is calculated as a discount rate to satisfy the following equation:

$$\sum_{n=i}^{n} \frac{Bi - Ci}{(1 + r)^{i-1}} = 0$$

where, Bi: Benefit in the i-th year ($)
Ci: Cost in the i-th year ($)
n : Period of the project life
r : Discount rate (EIRR)

On the above premises, EIRR computed by the above equation = 13.34 %.

Table 11-6-4 Cost Benefit (Economic Price)

YEAR	COST ($1,000)							BENEFIT ($1,000)				(9)-(5)
	INVEST-MENT (1)	OPERATING COST (2) DREDGING	MAINTE-NANCE	MANAGE-MENT	REPLACE-MENT (3)	RESIDUAL VALUE (4)	TOTAL (5)	SAVING OF WAITIN	SAVING HANDLING	CHANGE TO LARGE	TOTAL (9)	= (10)
1994	6,934						6,934				0	-6,934
1995	71,867						71,867				0	-71,867
1996	35,526						35,526				0	-35,526
1997	14,630						14,630				0	-14,630
1998	0	8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
1999		8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
2000		8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
2001		8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
2002		8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
2003		8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
2004		8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
2005		8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
2007		8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
2008		8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
2009		8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
2010		8,251	3,390	255	0		11,896	11,227	10,515	12,780	34,522	22,626
2011		8,251	3,390	255	11,352		23,248	11,227	10,515	12,780	34,522	11,274
2012		8,251	3,390	255	20,443		32,339	11,227	10,515	12,780	34,522	2,183
2013		8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
2014		8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
2015		8,251	3,390	255	0		11,896	11,227	10,515	12,780	34,522	22,626
2016		8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
2017		8,251	3,390	255	18,531		30,427	11,227	10,515	12,780	34,522	4,095
2018		8,251	3,390	255	0		11,896	11,227	10,515	12,780	34,522	22,626
2019		8,251	3,390	255	0		11,896	11,227	10,515	12,780	34,522	22,626
2020		8,251	3,390	255	0		11,896	11,227	10,515	12,780	34,522	22,626
2021		8,251	3,390	255	0		11,896	11,227	10,515	12,780	34,522	22,626
2022		8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
2023		8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
2024		8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
2025		8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
2026		8,251	3,390	255			11,896	11,227	10,515	12,780	34,522	22,626
2027		8,251	3,390	255		-11,119	778	11,227	10,515	12,780	34,522	33,744
TOTAL	128,957	239,293	98,310	7,395	50,326	-11,119	513,162	325,583	304,935	370,620	1,001,138	487,976

EIRR 0.133

(1)+(2)+(3)+(4)=(5)

(6)+(7)+(8)=(9)

11-7-2 Evaluation

Although there are different ways to evaluate the feasibility of the project, the most common way is to determine if the above EIRR exceeds the nation's opportunity cost of capital(OCC) or not. Since OCC in developing countries is said to be about 10%, the EIRR of this project, above 10%, shows that the project is feasible.

11-8 Sensitivity Analysis

11-8-1 Analysis Cases

Regardless of the type of project to be assessed, estimated values should be used without exception to allow uncertain elements to be included. To know the feasibility of the execution of this project, even if such uncertain elements change, sensitivity analysis is conducted after changing the above conditions.

1) Case A: 10% increase in cost

2) Case B: 10% decrease in benefit

3) Case C: 10% increase in cost and 10% decrease in benefit

11-8-2 Result

The result of sensitivity analysis are shown in Table 11-8-1.

Table11-8-1 Results of Sensitivity Analysis

CASE:	Case A	; EIRR =	11.4 %
	Case B	; EIRR =	11.2 %
	Case C	; EIRR =	9.3 %

11-8-3 Conclusion

The EIRR of this project reaches levels about 10% both in the basic case and in the sensitivity analysis cases.

Further, in a comprehensive assessment in which uncountable benefits in are included, the urgent rehabilitation project of Haiphong port is found to be fully worthwhile from the viewpoint of the national economy.

Chapter 12 Rough Financial Analysis

Chapter 12 Rough Financial Analysis

12-1 Object and Procedure of Financial Analysis

Economic analysis is carried out to assess project feasibility from the viewpoint of national economy, while financial analysis does so from the financial point of view.

For this purpose, the profitability of the project is reviewed by the discount cash flow method, one of the assessment methods of profitability of investment. In addition, the business performance of the Haiphong Port Authority as the execution body is analyzed based on its financial statements.

The procedure of financial analysis is as follows.

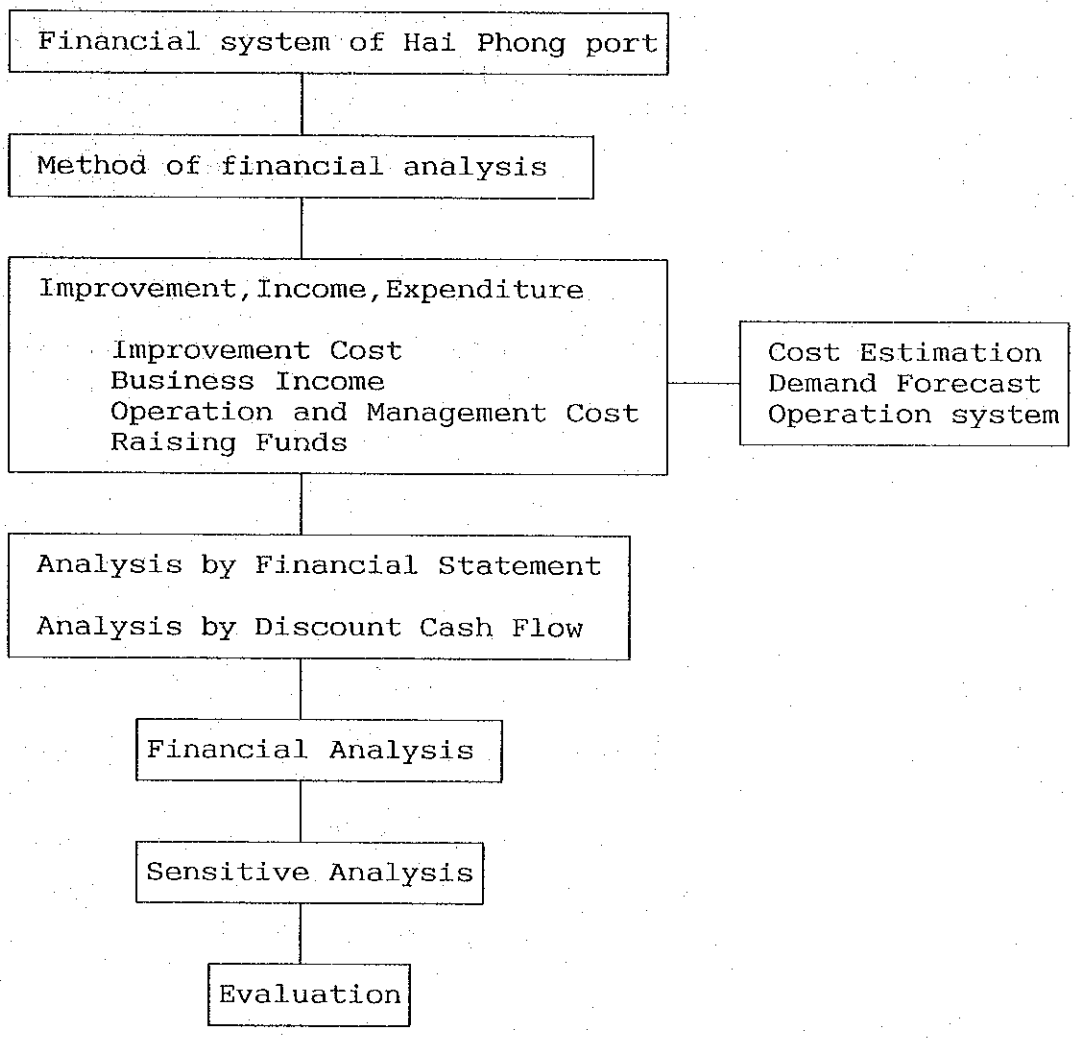


Figure 12-1-1 Flow Chart of Financial Analysis

12-2 Accounting System of Port Authority

12-2-1 Accounting System

The Port Authority's accounting is taken care of mainly by two sectors: the Port sector and Other Business sector.

The port sector is divided into the management section and production section. The port management section produces no profit; income comes from the Cargo Handling Division, etc., of the production section.

Investment and repayment of loans is taken care of by this department.

Dredging belongs to a separate accounting system and part of the state budget is distributed to a state-managed corporation specializing in dredging. Major investment is a separate budget, supplemented separately by the nation and the Vietnam National Maritime Bureau (VINAMARINE).

Decisions on other investment and business are taken by the Director of the Port Bureau.

All financial conditions are reported to the central government through VINAMARINE every three months. Accordingly, the fan of financial statements is unified for all ports of the nation. Expenses are divided into 12 items and work is divided into 10 types.

12-2-2 Distribution of Profit

Profits made by the production sector are distributed as follows:

1) 50% of profit is submitted to the state.

2) 33% of profit is appropriated as fund for port construction and other investment.

3) 17% of profit is accumulated as staff's welfare and bonus.

As expense forecasting is done constantly and rates are revised as often as possible, there is no major borrowing.

(For major profit distribution, see Figure 12-2-1.)

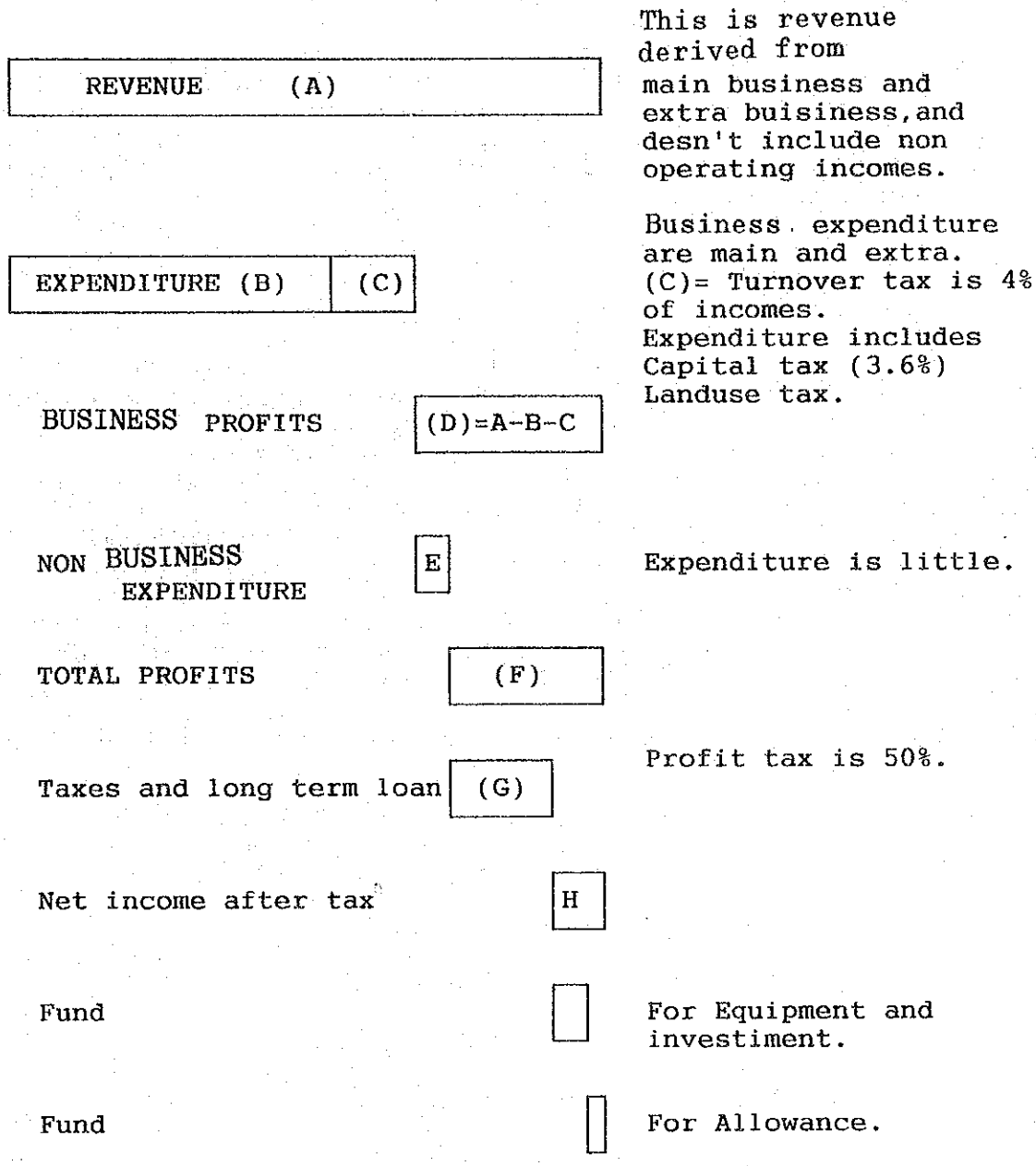


Figure 12-2-1 Distribution of Profit

12-2-3 Procurement of Funds and Reimbursement

As stated earlier, the cost needed to build new facilities and major facilities is appropriated by the nation and VINAMARINE. Any shortage is the responsibility of the Port Authority. So far, however, money has been invested only within the limit of the budget.

12-2-4 Port charges

In Viet Nam, port tariffs are unified throughout the country by 'THE PORT DUES AND CHARGES TARIFF (divided into two categories; one for foreign ships and the other for domestic ships). While revisions had been made by the National Economic Committees, etc., in the past, it has become possible to revise the rates simply by reporting thanks to VINAMARINE's new policy of responding promptly to changes in economic conditions. In fact, revisions have been effected every two or three months.

First, the Port Authority calculates the necessary expenses and the rates are reviewed so as to meet the expenses. When a ship enters the port, $0.3/GRT is collected as channel charge.

Recently, the port tariff, per tonnage, has changed as follows.

1989	2,800	VND/TON
Feburary,1990	5,992	VND/TON
September,1990	8,400	VND/TON
November,1990	9,800	VND/TON
November,1990	11,270	VND/TON
June,1991	14,028	VND/TON
February,1992	16,884	VND/TON
March,1992	19,416	VND/TON
June,1993	21,352	VND/TON

12-2-5 Financial Statement of Hai Phong port

In Table 12-2-1, we can see the financial condition of Hai Phong Port Authority over a three year period.

Financial income statement, Financial balance sheet, and financial cash flow show a good financial condition for the most part.

Table 12-2-1 Financial of Income Statement

10*6 VND	Actual		
	1990	1991	1992
A. REVENUE			
1. Main Buisiness	23,412	34,935	49,277
2. Extra Buisiness	3,092	3,130	10,402
Total Operating Revenue	26,504	38,064	59,679
B. EXPENSES			
1. Personal Cost	5,382	7,561	12,660
2. Social Welfare	0	0	0
3. Equipment Repairs	4,279	6,257	7,005
4. Management Expenditure	3,154	4,234	9,475
5. Fuel	1,149	2,200	2,291
6. Materials	708	1,033	1,471
7. Maintenance	1,722	2,871	5,384
8. Electricity etc.	655	843	1,151
9. Others	2,746	3,015	9,654
10. Dues Insurance etc.	1,705	3,749	2,950
Sub Total	21,500	31,762	52,042
Depreciation	2,820	5,839	7,758
Total Operating Expenses	24,320	37,601	59,800
Net Operating Revenue	2,184	463	-121
C. Other Income			
1. Found Mnagement	2,185	464	0
2. Other Interests	1,618	63	0
3. Interest on loan	141	120	225
Sub Total	3,944	647	225
D. Interest Paid			
Profit/(Loss)	6,128	1,110	104
Tax	3,064	555	52
Net Profit/(Loss) after tax	3,064	555	52
Working Ratio	81	83	87
Operating Ratio	92	99	100

Fixed assets are reappraised annually due to inflation so accumulated depreciation becomes large.

12-3 New Large-scale Investment

As stated earlier, another national corporation takes charge of dredging. Some drawbacks are seen in this system: limited budget, unsuitable period of project execution, incomplete supervision of execution, etc.

The situation supports the argument that the Port Authority's responsibility for maintaining channel depth should be defined for appropriate sharing of responsibilities.

12-4 Method of Financial Analysis

12-4-1 Method of Analysis

As for the profitability of the project, a financial internal rate of return (FIRR) is calculated on all expenses and income related to the improvement of the channel and loading is calculated and assessed. From the standpoint of checking financial soundness of the management/operating entity, the Port Authority also becomes an object of the study.

12-4-2 Period of Project

As in the case of economic analysis, the period of study extends to 30 years after the commencement of general use and for a 4-year working period.

12-4-3 Premises of Calculation

Prior to the financial analysis, the following premises for calculation are set.

(1) Amount of Investment

The amount of investment is determined as shown in Table 12-4-1 on the basis of the integration of construction cost.

The government's aid to large-scale investment is a problematical point, for which the following assumption is made:

1) So far, the Hai Phong Port Authority has received subsidies of VND100 - 150 million from the government and about VND100 million from VINAMARINE each year.
When these are combined with the investment in this

project for 30 years, about VND6 - 7.5 billion is expected to be received as subsidies.

2) In this case, the government, VINAMARINE and the port of Hai Phong bear VND100 million, or 1/3 each, in most of the sharing forms. If 2/3 of the total investment amount of just below VND13 billion can be received as subsidies, the amount will be VND8.7 billion.

3) In terms of this project, the port of Haiphong is the primary beneficiary of loading/unloading machines, and many will receive the benefit of dredging. When the cost of channel dredging and maintenance that has a large number of beneficiaries is excluded, the amount will be a little less than 660 million (cost of new dredger excluded).

4) To take these into account, the principal and interest of dredging and maintenance are subsidized by the government and VINAMARINE are assumed to be the fundamental case.

Table 12-4-1 Investment

Subsidies from Government	56,372	x US$1,000
Hai Phong Port	72,783	x US$1,000
Total	129,155	x US$1,000

(2) Price Level

All income and expenses are assessed at the price level in 1993 when the survey was made. Inflation and a nominal rise of wage during the review period are not taken into account.

(3) Facility Opening Schedule and Volume of Cargo Handling

The execution plan stipulates that the facilities will be made available for use partly in 1997 and fully in 1998. For the volume of cargo used for financial analysis, 4.7 million tons in 1998 is regarded as the upper limit.

(4) Port Charges

Calculation is made on the basis of the current port charge level, i.e., $0.9/ton and container $75.0/TEU. This corresponds to the port income for 1993 computed by the Port Authority.

(5) Staff and Personnel Cost

The Port Authority is presently making a plan to reduce employees to a suitable level in 5 years. As the plan involves considerable personnel cuts, this is excluded from the review and part of the concept is used instead, that is, a certain cost is estimated and a ratio represented by total personnel cost in overall cost is limited.

The ratio of personnel cost to overall cost is set as follows. It represents 20% in 2000 according to the Port Authority's plan.

The wages of the stevedoring sector are the highest.

Table 12-4-2 Personnel Cost

	Operating Cost $/TON	Personnel cost Ratio %
1994	2.227	28
1995	2.225	28
1996	2.223	28
1997	2.221	25
1998	2.219	25

6) Depreciation Cost

Using information verbally supplied by Haiphong Harbor's staff, the service life of major facilities is assumed as follows.

The channel is excluded from depreciation items at a request of the project implementing body, but its inclusion in the items is expected in the future when the Port Authority shares financial responsibility.

Table 12-4-3 Service Life of Main Facilities

Items	Service Life
Quay,Wharf	40 years
Yard	30 years

Heavy Equipment	15 years
Stacker,Vehicle	10-15 years
Building	25 years
Boat,Ship	20 years

(7) Other Cost

Maintenance and management cost, repair cost, water/electricity/fuel charges are set on the basis of actual amounts recorded by the Port Authority. As expenses for related operations, levels at which appropriate profit is expected were set while taking estimated income into consideration.

(8) Taxes and Appropriation of Profit

The capital tax is 3.6% of the amount of the assessed amount of capital and the land use tax is set at a fixed level. Profits are totally appropriated for construction funds.

(9) Replacement Investment

At the end of the life of facilities, the same amount of replacement investment is made.

(10) Procurement of Funds

Funds necessary for the urgent rehabilitation project are mainly procured as a lot of the foreign country's official funds at a low interest rate, while the rest are procured from state funds.

Official loan from foreign country: $129,155 (interest 1.0%, period of repayment: 30 years, grace period: 10 years)

Of the fund to be reimbursed by the Port Authority, state funds (to be appropriated for the repayment of official loan) are dredging cost and interest .

If there is a shortage in funds, a short-term loan is taken. When a surplus is produced, it is operated as a deposit. The interest on short-term loan is 25% and that on cash deposits is 5%.

Rates of Return are as followings.

a)Rates of return paid to Viet Nam Foreign Trade Bank

Foreign Currency	6.0 % / year
Domestic Currency	2.3 % / Month for Business
	2.1 % / Month for Manufacture
	1.8 % / Month for Long term loan

For state business, mortgage is not necessary but there must be a feasibility study approved by authorities in power.

b)Rates of return paid to MARITIME Bank

Foreign Currency	6.5 % / year
Domestic Currency	2.1 % / Month for Manufacture
	2.3 % / Month for Business

(11) Residual Value

For analyzing the profitability of the project itself, residual value is considered at the termination year of the project life.

12-4-4 Analysis Method and Evaluation Technique

(1) Profitability of Project

The urgent rehabilitation project is analyzed by the Discount Cash Flow method and the feasibility of implementing the project is assessed by the level of financial internal rate of return. The financial internal rate of return is a discount rate to satisfy the following equation:

$$\sum_{i=1}^{n} \frac{Bi - Ci}{(1 + r)^{i-1}} = 0$$

n = Project life
Bi = Income in the i-th period
Ci = Cost in the i-th period
r = Discount rate

The ranges of income and expense in the discount cash flow method are as follows:

Income : Operating income

Expenses : Investment amount, expenses excluding depreciation cost

The acceptability of the profitability is judged by whether the internal rate of return exceeds the average acquisition interest. According to the aforementioned average acquisition condition, the average acquisition interest is 1.0%.

(2) Financial Soundness of Management Operating Entity

For this, three financial statements (income statement, cash flow and balance sheet) are used.

The evaluation is carried out from three viewpoints, i.e., profitability, safety and operational efficiency.

The index and standards used for analysis are as follows.

1) Profitability: Rate of Return on Net Fixed Asset

$$= \frac{\text{Operating Profit (before tax and interest)}}{\text{Total Fixed Assets in Use less Accumulated Depreciation}}$$

This is the index to evaluate how much profit is earned by paid capital. From this amount at least interest on borrowed money has to be paid.

Considering that the average acquisition interest on the fund which needs to be repaid by the Port Authority is 1.0%, the net fixed asset profit ratio should exceed it.

2) Safety: Debt Service Coverage Ratio

$$= \frac{\text{Operating Profit + Depreciation expense - Tax}}{\text{Interest and Principal Payments for long-term loan}}$$

The index is to see if cash income in each term can be appropriated for repayment and interest payment. If it is less than 1, it means a shortage of funds.

3) Efficiency of Operation

Operating Ratio

$$= \frac{\text{Working Expenses + Depreciation}}{\text{Operating Revenue (excluding non-operating income)}}$$

Working Ratio (before depreciation)

$$= \frac{\text{Working Expenses - Depreciation Cost}}{\text{Operating Revenue (excluding non-operating income)}}$$

This is an index to see if the operation of the port is carried out efficiently. General guidelines for the former are 70% and the latter 50 - 60%.

12-5 Evaluation

12-5-1 Basic Case

(1) Profitability of Project

The financial internal rate of return (FIRR) of the project is 2.6 %, which is above the average acquisition interest including national subsidies of 1.0 %.

(2) Financial Soundness of Management/Operating Entity

The financial indexes of the basic case are as shown in 12-5-1. Calculation results from the financial statements are shown in Tables 12-5-3 - 5.

1) Profitability

It is 3.9 % in 1998 when the channel is in full use and thereafter a level about 4.0-9.0 % is maintained.

2) Safety

Up to 2006 when full-scale repayment of the official loan from a foreign country begins, the debt service coverage ratio is above 2.0, and in other periods a level above 1.0 or so is maintained, indicating no financial shortage.

3) Efficiency of Operations

Operating ratio remains at a level of 100 % or so. It is a low level. The working ratio is a low level of 80 %.

Table12-5-1 Financial Indexes of Basic Case

FIRR	2.6 %			
	Return on net fixed assets	Debt service coverage	Operating ratio	Working ratio
1998	4.0%	-	101%	82%
2006	7.9%	2.1	95%	77%
2011	8.6%	1.7	95%	77%
2012	4.9%	1.6	100%	82%
2017	4.1%	1.6	102%	84%
2027	9.0%	2.8	85%	78%

2006 : Start payment for official loan
2011-2017 : Replacement investment
2027 : End of project life

12-5-2 Sensitivity Analysis

Sensitivity analysis was done on the income level as a political factor and construction cost and operating expenses on uncertain factors.

(1) In the case of a 5% decrease in port revenue

(2) In the case of a 5% increase in construction cost

The sensitivity analysis results are shown in Table 12-5-2.

In the case of a 5 % decrease in port revenue, financial internal rates of return down to average acquisition interest of 1.0 %.

The debt service coverage does not go below 1.0; there is no problem with repayment of borrowed money or interest payment and there is no shortage of funds.

Both operating ratio and working ratio are at low levels.

Table 12-5-2 Result of Sensitivity Analysis

Case a)	5 % decrease in port revenue :	FIRR = 0.7 %
Case b)	5 % increase in construction cost :	FIRR = 1.6 %

	Return on net fixed assets	Debt service coverage	Operating ratio	Working ratio
1998	3.0% 3.5%	- -	105% 102%	86% 84%
2006	6.4% 6.8%	2.0 2.0	100% 97%	80% 78%
2011	7.0% 7.4%	1.6 1.6	100% 97%	80% 78%
2012	3.7% 4.2%	1.5 1.5	105% 102%	86% 83%
2017	3.0% 3.5%	1.4 1.5	107% 104%	88% 85%
2027	7.1% 7.6%	2.3 2.5	89% 87%	82% 80%

Upper Number : 5% decrease port revenue
Lower Number : 5% increase construction cost
2006 : start repayment of official loan
2011-2017 : replacement investment
2027 : end of project life

12-5-3 Evaluation

Both from the viewpoint of the profitability of the project itself and the financial statement of the management entity, this project can be regarded as feasible.

But it is very important to change the port tariff timely so as to generate sufficient revenue.

Table12-5-3 Financial of Income Statement

Table Financial of Income Statement 1993-2027

10*3 US$		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
A. REVENUE																									
1. Main Buisiness	6,084	7,661	9,008	10,879	13,178	15,113	15,113	15,113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113
2. Extra Buisiness	1,358	1,426	1,497	1,572	1,650	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733
Total Operating Revenue	7,441	9,087	10,505	12,451	14,828	16,845	16,845	16,845	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846
B. EXPENSES																									
1. Personal Cost	1,514	1,932	1,936	2,196	2,446	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649
2. Social Welfare	130	140	150	160	170	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180
3. Equipment Repairs	934	924	1,613	2,317	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692
4. Management Expenditure	749	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750
5. Fuel	234	341	342	388	485	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
6. Materials	149	180	180	205	256	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277
7. Maintenance	515	585	860	1,142	1,292	1,292	1,292	1,292	1,292	1,292	1,292	1,292	1,292	1,292	1,292	1,292	1,292	1,292	1,408	1,618	1,618	1,618	1,618	1,618	1,808
8. Electricity etc.	131	170	171	194	242	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263
9. Others	1,303	1,354	1,422	1,493	1,568	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646
10. Dues Insurance etc.	362	558	1,522	2,498	2,926	2,815	2,702	2,590	2,478	2,366	2,254	2,142	2,030	1,917	1,805	1,693	1,581	1,469	1,776	2,418	2,307	2,195	2,084	1,972	2,545
11. Maintenance Dredging					750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750
Sub Total	6,235	6,934	8,946	11,342	13,576	13,839	13,726	13,614	13,502	13,390	13,278	13,166	13,054	12,941	12,829	12,717	12,605	12,493	12,916	13,768	13,657	13,545	13,434	13,322	14,085
Depreciation	702	750	750	1,061	3,097	3,097	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,097	3,097	3,097	3,097	3,097
Total Operating Expenses	6,937	7,684	9,696	12,403	16,673	16,936	16,841	16,729	16,617	16,505	16,393	16,281	16,169	16,056	15,944	15,832	15,720	15,608	16,031	16,883	16,754	16,642	16,531	16,419	17,182
Net Operating Revenue	504	1,403	809	48	-1,845	-90	4	116	229	341	453	565	677	789	902	1,014	1,126	1,238	815	-37	92	204	315	427	-336
C. Other Income																									
1. Found Mnagement	281	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
2. Other Interests	0	55	137	206	273	365	535	711	895	1,087	1,286	1,492	1,688	1,814	1,868	1,885	1,904	1,927	1,954	1,970	1,966	1,964	1,965	1,968	1,974
3. Interest on loan	14	14	14	14	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub Total	295	369	451	520	587	679	835	1,011	1,195	1,387	1,586	1,792	1,988	2,114	2,168	2,185	2,204	2,227	2,254	2,270	2,266	2,264	2,265	2,268	2,274
D. Interest Paid	0	0	0	0	0	0	0	0	0	0	0	78	387	703	871	871	871	871	871	871	871	871	871	871	871
Profit/(Loss)	799	1,772	1,260	568	-1,258	589	839	1,127	1,424	1,728	2,039	2,279	2,278	2,201	2,199	2,327	2,459	2,595	2,198	1,362	1,487	1,597	1,709	1,824	1,067
Tax	400	886	630	284	0	294	419	564	712	864	1,019	1,140	1,139	1,100	1,099	1,164	1,230	1,297	1,099	681	744	798	854	912	534
Net Profit/(Loss) after tax	400	886	630	284	-1,258	294	419	564	712	864	1,019	1,140	1,139	1,100	1,099	1,164	1,230	1,297	1,099	681	744	798	854	912	534
OPERATING RATIO	93	85	92	100	112	101	100	99	99	98	97	96	95	95	94	93	93	93	95	100	99	99	98	97	102
WORKING RATIO	84	76	85	91	92	82	81	81	80	79	79	78	77	77	76	75	75	74	77	82	81	80	80	79	84
Debt coverage												17.5	3.7	2.1	1.7	1.7	1.8	1.8	1.7	1.6	1.6	1.7	1.7	1.7	1.6

Table12-5-4 Cash Flow Statement

Table Cash Flow Statement

10*3 US$		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Cash Beginning	0	1,102	2,738	4,118	5,463	7,302	10,694	14,228	17,907	21,734	25,712	29,847	33,753	36,281	37,362	37,693	38,089	38,550	39,079	39,409	39,322	39,279	39,291	39,359	39,484
A. Cash Inflow																									
1. Net Profit	400	886	630	284	-1,258	294	419	564	712	864	1,019	1,140	1,139	1,100	1,099	1,164	1,230	1,297	1,099	681	744	798	854	912	534
2. Depreciation	702	750	750	1,061	3,097	3,097	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,097	3,097	3,097	3,097	3,097
3. Current Liabilities Increment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4. Long term loan	0	6,971	27,546	28,151	15,000	0	0	0	0	0	0	0	0	0	0	0	0	0	11,639	20,960	0	0	0	0	19,000
5. Dredging Found			46,762	8,110								3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268
Sub-Total	1,102	8,607	75,688	37,606	16,839	3,391	3,534	3,679	3,827	3,979	4,134	7,523	7,522	7,483	7,482	7,547	7,613	7,680	19,121	28,024	7,109	7,163	7,219	7,277	25,899
B. Cash Outflow																									
1. Investment		6,971	27,546	28,151	15,000	0	0	0	0	0	0	0	0	0	0	0	0	0	11,639	20,960	0	0	0	0	19,000
2. Current Assets Increment		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3. Loan Payment	0	0	0	0	0	0	0	0	0	0	0	349	1,726	3,133	3,883	3,883	3,883	3,883	3,883	3,883	3,883	3,883	3,883	3,883	3,883
4. Interest Paid on Loan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5. Dredging Payment			46,762	8,110								3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268
Sub-Total	0	6,971	74,308	36,261	15,000	0	0	0	0	0	0	3,616	4,994	6,401	7,151	7,151	7,151	7,151	18,790	28,111	7,151	7,151	7,151	7,151	26,151
Cash Inflow-Outflow	1,102	1,636	1,380	1,345	1,839	3,391	3,534	3,679	3,827	3,979	4,134	3,906	2,528	1,082	331	395	461	529	330	-87	-43	12	68	125	-253
Cash Ending	1,102	2,738	4,118	5,463	7,302	10,694	14,228	17,907	21,734	25,712	29,847	33,753	36,281	37,362	37,693	38,089	38,550	39,079	39,409	39,322	39,279	39,291	39,359	39,484	39,231
Short Term Loan																									

Table12-5-3 Financial of Income Statement

99	7 2000	8 2001	9 2002	10 2003	11 2004	12 2005	13 2006	14 2007	15 2008	16 2009	17 2010	18 2011	19 2012	20 2013	21 2014	22 2015	23 2016	24 2017	25 2018	26 2019	27 2020	28 2021	29 2022	30 2023	31 2024	32 2025	33 2026	34 2027
113	15,113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113	15113
733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733	1,733
845	16,845	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846	16,846
649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649	2,649
180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180
692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692	2,692
750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750
525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525
277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277	277
292	1,292	1,292	1,292	1,292	1,292	1,292	1,292	1,292	1,292	1,292	1,292	1,408	1,618	1,618	1,618	1,618	1,618	1,808	1,808	1,808	1,808	1,808	1,808	1,808	1,808	1,808	1,808	1,808
263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263	263
646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646	1,646
702	2,590	2,478	2,366	2,254	2,142	2,030	1,917	1,805	1,693	1,581	1,469	1,776	2,418	2,307	2,195	2,084	1,972	2,545	2,433	2,322	2,210	2,099	1,987	1,876	1,789	1,703	1,662	1,621
750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750
726	13,614	13,502	13,390	13,278	13,166	13,054	12,941	12,829	12,717	12,605	12,493	12,916	13,768	13,657	13,545	13,434	13,322	14,085	13,973	13,862	13,750	13,639	13,527	13,416	13,329	13,243	13,202	13,161
115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,097	3,097	3,097	3,097	3,097	3,097	3,097	3,097	3,097	3,097	3,097	2,399	2,399	1,141	1,141
841	16,729	16,617	16,505	16,393	16,281	16,169	16,056	15,944	15,832	15,720	15,608	16,031	16,883	16,754	16,642	16,531	16,419	17,182	17,070	16,959	16,847	16,736	16,624	16,513	15,728	15,642	14,343	14,302
4	116	229	341	453	565	677	789	902	1,014	1,126	1,238	815	-37	92	204	315	427	-336	-224	-113	-1	110	222	333	1,118	1,204	2,503	2,544
300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
535	711	895	1,087	1,286	1,492	1,688	1,814	1,868	1,885	1,904	1,927	1,954	1,970	1,966	1,964	1,965	1,968	1,974	1,982	1,951	1,944	1,939	1,907	1,825	1,744	1,665	1,663	1,708
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
835	1,011	1,195	1,387	1,586	1,792	1,988	2,114	2,168	2,185	2,204	2,227	2,254	2,270	2,266	2,264	2,265	2,268	2,274	2,262	2,251	2,244	2,239	2,207	2,125	2,044	1,965	1,963	2,008
0	0	0	0	0	78	387	703	871	871	871	871	871	871	871	871	871	871	871	871	871	871	871	871	871	871	793	484	168	0
839	1,127	1,424	1,728	2,039	2,279	2,278	2,201	2,199	2,327	2,459	2,595	2,198	1,362	1,487	1,597	1,709	1,824	1,067	1,166	1,268	1,371	1,478	1,558	1,588	2,369	2,685	4,297	4,552
419	564	712	864	1,019	1,140	1,139	1,100	1,099	1,164	1,230	1,297	1,099	681	744	798	854	912	534	583	634	686	739	779	794	1,185	1,343	2,149	2,276
419	564	712	864	1,019	1,140	1,139	1,100	1,099	1,164	1,230	1,297	1,099	681	744	798	854	912	534	583	634	686	739	779	794	1,185	1,343	2,149	2,276
100	99	99	98	97	97	96	95	95	94	93	93	95	100	99	99	98	97	102	101	101	100	99	99	98	93	93	85	85
81	81	80	79	79	78	77	77	76	75	75	74	77	82	81	80	80	79	84	83	82	82	81	80	80	79	79	78	78
					17.5	3.7	2.1	1.7	1.7	1.8	1.8	1.7	1.6	1.6	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.5	1.2	1.2	1.1	1.6	1.8	2.8

Table12-5-4 Cash Flow Statement

99	7 2000	8 2001	9 2002	10 2003	11 2004	12 2005	13 2006	14 2007	15 2008	16 2009	17 2010	18 2011	19 2012	20 2013	21 2014	22 2015	23 2016	24 2017	25 2018	26 2019	27 2020	28 2021	29 2022	30 2023	31 2024	32 2025	33 2026	34 2027
,694	14,228	17,907	21,734	25,712	29,847	33,753	36,281	37,362	37,693	38,089	38,550	39,079	39,409	39,322	39,279	39,291	39,359	39,484	39,231	39,028	38,875	38,775	38,145	36,508	34,885	33,303	33,257	34,167
419	564	712	864	1,019	1,140	1,139	1,100	1,099	1,164	1,230	1,297	1,099	681	744	798	854	912	534	583	634	686	739	779	794	1,185	1,343	2,149	2,276
,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,115	3,097	3,097	3,097	3,097	3,097	3,097	3,097	3,097	3,097	3,097	3,097	2,399	2,399	1,141	1,141
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	11,639	20,960	0	0	0	0	19,000	0	0	0	0	0	0	0	0	0	0
					3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268			
,534	3,679	3,827	3,979	4,134	7,523	7,522	7,483	7,482	7,547	7,613	7,680	19,121	28,024	7,109	7,163	7,219	7,277	25,899	6,948	6,999	7,051	7,104	7,144	7,159	3,583	3,741	3,290	3,417
0	0	0	0	0	0	0	0	0	0	0	0	11,639	20,960	0	0	0	0	19,000	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	349	1,726	3,133	3,883	3,883	3,883	3,883	3,883	3,883	3,883	3,883	3,883	3,883	3,883	3,883	3,883	3,883	4,465	5,513	5,513	5,165	3,788	2,380	1,630
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268	3,268			
0	0	0	0	0	3,616	4,994	6,401	7,151	7,151	7,151	7,151	18,790	28,111	7,151	7,151	7,151	7,151	26,151	7,151	7,151	7,151	7,733	8,781	8,781	5,165	3,788	2,380	1,630
,534	3,679	3,827	3,979	4,134	3,906	2,528	1,082	331	395	461	529	330	-87	-43	12	68	125	-253	-203	-153	-101	-629	-1,637	-1,623	-1,582	-46	910	1,787
,228	17,907	21,734	25,712	29,847	33,753	36,281	37,362	37,693	38,089	38,550	39,079	39,409	39,322	39,279	39,291	39,359	39,484	39,231	39,028	38,875	38,775	38,145	36,508	34,885	33,303	33,257	34,167	35,954

Table12-5-5 Balance Sheet

Table Financy of Balance Sheet

10*3 US$	1993	1 1994	2 1995	3 1996	4 1997	5 1998	6 1999	7 2000	8 2001	9 2002	10 2003	11 2004	12 2005	13 2006	14 2007	15 2008	16 2009	17 2010	18 2011	19 2012	20 2013	21 2014	22 2015	23 2016	24 2017
(ASSETS)																									
A. Fixed Assets																									
1. Land	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
2. Cnstruction in Progress	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3. Deprecible Assets	6,083	13,054	40,600	68,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	95,390	116,350	116,350	116,350	116,350	116,350	135,350
Sub-Total	6,083	13,054	40,600	68,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	95,390	116,350	116,350	116,350	116,350	116,350	135,350
B. Accumulated Depriciation	702	1,452	2,202	3,264	6,361	9,457	12,572	15,687	18,802	21,917	25,032	28,147	31,262	34,377	37,492	40,607	43,722	46,837	49,952	53,067	56,164	59,261	62,357	65,454	68,551
Net Fixed Assets	5,381	11,602	38,398	65,488	77,391	74,294	71,179	68,064	64,949	61,834	58,719	55,604	52,489	49,374	46,259	43,144	40,029	36,915	45,439	63,284	60,187	57,090	53,993	50,896	66,799
C. Investment																									
D. Current Assets																									
1. Reserved Assets	0																								
2. Cash & Deposit	0	1,636	3,016	4,362	6,201	9,592	13,126	16,805	20,632	24,610	28,745	32,651	35,179	36,261	36,592	36,987	37,448	37,977	38,307	38,220	38,177	38,189	38,257	38,382	38,129
Sub-Total	0	1,636	3,016	4,362	6,201	9,592	13,126	16,805	20,632	24,610	28,745	32,651	35,179	36,261	36,592	36,987	37,448	37,977	38,307	38,220	38,177	38,189	38,257	38,382	38,129
Total Assets	5,381	13,238	41,414	69,849	83,591	83,886	84,305	84,869	85,581	86,445	87,464	88,255	87,668	85,635	82,851	80,131	77,478	74,891	83,746	101,504	98,364	95,279	92,250	89,278	104,928
(LIABILITIES)																									
Current Liabilities	0																								
Fixed Liabilities	0	6,971	34,517	62,668	77,668	77,668	77,668	77,668	77,668	77,668	77,668	77,319	75,594	72,460	68,577	64,693	60,810	56,927	64,682	81,759	77,875	73,992	70,109	66,225	81,342
(Net Worth)																									
1. Fixed Capital	4,981	5,381	6,267	6,897	7,181	5,923	6,217	6,637	7,200	7,912	8,776	9,795	10,935	12,074	13,174	14,274	15,437	16,667	17,964	19,063	19,744	20,488	21,286	22,141	23,052
2. Working Capital	0																								
3. Fund	0																								
4. Net Incomes	400	886	630	284	-1,258	294	419	564	712	864	1,019	1,140	1,139	1,100	1,099	1,164	1,230	1,297	1,099	681	744	798	854	912	534
5. Construction Capital	0																								
Sub-Total	5,381	6,267	6,897	7,181	5,923	6,217	6,637	7,200	7,912	8,776	9,795	10,935	12,074	13,174	14,274	15,437	16,667	17,964	19,063	19,744	20,488	21,286	22,141	23,052	23,586
Total Liabilities & Net Worth	5,381	13,238	41,414	69,849	83,591	83,885	84,305	84,868	85,580	86,444	87,463	88,254	87,668	85,634	82,850	80,131	77,477	74,891	83,745	101,503	98,363	95,278	92,249	89,278	104,928
Return on net fixed assets	22.4	18.6	4.1	1.7	1.6	4.0	4.4	4.7	5.1	5.6	6.1	6.6	7.2	7.9	8.7	9.6	10.6	11.8	8.6	4.9	5.3	5.8	6.3	6.9	4.1

Table12-5-5 Balance Sheet

9	7 2000	8 2001	9 2002	10 2003	11 2004	12 2005	13 2006	14 2007	15 2008	16 2009	17 2010	18 2011	19 2012	20 2013	21 2014	22 2015	23 2016	24 2017	25 2018	26 2019	27 2020	28 2021	29 2022	30 2023	31 2024	32 2025	33 2026	34 2027
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	95,390	116,350	116,350	116,350	116,350	116,350	135,350	135,350	135,350	135,350	135,350	135,350	135,350	135,350	135,350	135,350
751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	83,751	95,390	116,350	116,350	116,350	116,350	116,350	135,350	135,350	135,350	135,350	135,350	135,350	135,350	135,350	135,350	135,350
572	15,687	18,802	21,917	25,032	28,147	31,262	34,377	37,492	40,607	43,722	46,837	49,952	53,067	56,164	59,261	62,357	65,454	68,551	71,648	74,745	77,842	80,939	84,036	87,133	89,532	91,930	93,071	94,212
179	68,064	64,949	61,834	58,719	55,604	52,489	49,374	46,259	43,144	40,029	36,915	45,439	63,284	60,187	57,090	53,993	50,896	66,799	63,702	60,605	57,508	54,411	51,314	48,217	45,819	43,420	42,279	41,138
126	16,805	20,632	24,610	28,745	32,651	35,179	36,261	36,592	36,987	37,448	37,977	38,307	38,220	38,177	38,189	38,257	38,382	38,129	37,926	37,773	37,673	37,043	35,406	33,783	32,202	32,155	33,065	34,852
126	16,805	20,632	24,610	28,745	32,651	35,179	36,261	36,592	36,987	37,448	37,977	38,307	38,220	38,177	38,189	38,257	38,382	38,129	37,926	37,773	37,673	37,043	35,406	33,783	32,202	32,155	33,065	34,852
305	84,869	85,581	86,445	87,464	88,255	87,668	85,635	82,851	80,131	77,478	74,891	83,746	101,504	98,364	95,279	92,250	89,278	104,928	101,628	98,379	95,181	91,454	86,720	82,001	78,020	75,576	75,344	75,990
668	77,668	77,668	77,668	77,668	77,319	75,594	72,460	68,577	64,693	60,810	56,927	64,682	81,759	77,875	73,992	70,109	66,225	81,342	77,458	73,575	69,692	65,226	59,713	54,200	49,035	45,247	42,867	41,237
217	6,637	7,200	7,912	8,776	9,795	10,935	12,074	13,174	14,274	15,437	16,667	17,964	19,063	19,744	20,488	21,286	22,141	23,052	23,586	24,169	24,803	25,489	26,228	27,007	27,800	28,985	30,328	32,477
419	564	712	864	1,019	1,140	1,139	1,100	1,099	1,164	1,230	1,297	1,099	681	744	796	854	912	534	583	634	686	739	779	794	1,185	1,343	2,149	2,276
637	7,200	7,912	8,776	9,795	10,935	12,074	13,174	14,274	15,437	16,667	17,964	19,063	19,744	20,488	21,286	22,141	23,052	23,586	24,169	24,803	25,489	26,228	27,007	27,800	28,985	30,328	32,477	34,753
305	84,868	85,580	86,444	87,463	88,254	87,668	85,634	82,850	80,131	77,477	74,891	83,745	101,503	98,363	95,278	92,249	89,278	104,928	101,628	98,378	95,180	91,454	86,720	82,000	78,020	75,575	75,344	75,990
4.4	4.7	5.1	5.6	6.1	6.6	7.2	7.9	8.7	9.6	10.6	11.8	8.6	4.9	5.3	5.8	6.3	6.9	4.1	4.5	4.9	5.4	5.9	6.5	7.1	7.7	8.3	8.6	9.0

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