Table 8.4.5 Reductions in Cargo Handling Expenses (Shadow Price: without case)

(Unit: 1,000 US$)

Year	Reductions in expenses for cargo handling by barges	Reductions in cargo handling expenses due to the difference between jetty and reclaimed type wharfs
1988	1,415	133
1989	1,426	133

8.5. Economic Evaluation

8.5.1. Internal Rate of Return (IRR)

There are several indices for evaluating economic returns of a project. Here, the economic returns are evaluated in terms of the Internal Rate of Return (IRR) and B/C Ratio. The IRR is obtained from the following equation.

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

Here, n = Period of calculation of IRR
Bi = Amount of benefit at i-th year
Ci = Amount of cost at i-th year

Project life will be mean useful lifetime weighted by individual cost, which comes to 23 years. The internal rate of return will be calculated for the period of the mean useful lifetime, including construciton period. The results of calculation of internal rate of return (IRR) are as follows:

For market price: 15.0% (Table 8.5.1)
For shadow price: 15.8% (Table 8.5.8)

The B/C ratio for market price is 1.21 as per Table 8.5.9. and the B/C ratio for shadow price is 1.27 as per Table 8.5.10.

The discount rate used to calculate the B/C ratio is 12%.

8.5.2. Evaluation

There are vaious views concerning the critical percentage of IRR used to guide a judgement as to whether a project is feasible or not. The leading view is that the project is feasible if the IRR exceeds the opportunity cost of capital, which is said to be 12% in Indonesia.

In this case the B/C ratio is 1.21, which justifies the project. The results of sensitivity analyses for unforeseen change of costs and benefits are shown in Table 8.4.2 ~ 8.4.7 and as shown IRR is calculated to decrease by about 1% when the benefits is decreased by 5% or the costs increased by 5%. Even with the benefits 15% less than those estimated in the previous section, the IRR is calculated at 12.7% which exceeds the opportunity cost in Indonesia.

Further, the effects of the project are not limited to the quantitative effects already discussed. In general it is to be expected that this project will bring a wide range of benefits to the national economy of the Republic of Indonesia as well as stimulating regional development. All in all this project is evaluated as being fully feasible.

Table 8.5.1 Internal Rate of Return Calculation Sheet

IRR=15.0%
(Unit '000US$)

Unit No.	Years	COSTS Total	Construction	Operation and Maintenance	Equipment	Insurance	BENEFITS Total	Saving in Ship Hail-ing Cost	Saving in Cargo Hand-ling Cost	Net Benefit
1	1984	$ 1,066	$ 1,066	0	0	0	0	0	0	-1,066
2	1985	$ 4,897	$ 4,897	0	0	0	0	0	0	-4,897
3	1986	$ 28,148	$ 28,148	0	0	0	0	0	0	-28,148
4	1987	$ 18,169	17,842	327	0	327	332	332	0	-17,837
5	1988	11,889	10,910	979	0	979	4,035	2,333	1,702	-7,854
6	1989	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
7	1990	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
8	1991	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
9	1992	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
10	1993	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
11	1994	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
12	1995	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
13	1996	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
14	1997	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
15	1998	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
16	1999	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
17	2000	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
18	2001	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
19	2002	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
20	2003	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
21	2004	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
22	2005	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
23	2006	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
24	2007	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
25	2008	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
26	2009	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
27	2010	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
28	2011	11,218	0	1,218	0	1,218	11,240	9,526	1,714	10,022
	Total	284,183	64,863	22,320	262,887	221,763	41,124			178,704

Table 8.5.2 Internal Rate of Return Calculation Sheet

IRR=12.7%

No.	Year	Cost	8% Benefit	-15%	(Unit '000US$)
		COSTS		BENEFITS	
		Total	Construction and Equipment	Operation and Maintenance	Total	Saving in Ship Hauling Cost	Saving in Cargo Handling Cost	Net Benefit
1	1984	1,066	1,066	0	0	0	0	-1,066
2	1985	4,897	4,897	0	0	0	0	-4,897
3	1986	20,148	20,148	0	0	0	0	-20,148
4	1987	18,120	17,842	278	282	282	0	-17,838
5	1988	11,742	10,910	832	3,430	1,983	1,447	-8,312
6	1989	1,035	0	1,035	9,554	8,097	1,457	8,519
7	1990	1,035	0	1,035	9,554	8,097	1,457	8,519
8	1991	1,035	0	1,035	9,554	8,097	1,457	8,519
9	1992	1,035	0	1,035	9,554	8,097	1,457	8,519
10	1993	1,035	0	1,035	9,554	8,097	1,457	8,519
11	1994	1,035	0	1,035	9,554	8,097	1,457	8,519
12	1995	1,035	0	1,035	9,554	8,097	1,457	8,519
13	1996	1,035	0	1,035	9,554	8,097	1,457	8,519
14	1997	1,035	0	1,035	9,554	8,097	1,457	8,519
15	1998	1,035	0	1,035	9,554	8,097	1,457	8,519
16	1999	1,035	0	1,035	9,554	8,097	1,457	8,519
17	2000	1,035	0	1,035	9,554	8,097	1,457	8,519
18	2001	1,035	0	1,035	9,554	8,097	1,457	8,519
19	2002	1,035	0	1,035	9,554	8,097	1,457	8,519
20	2003	1,035	0	1,035	9,554	8,097	1,457	8,519
21	2004	1,035	0	1,035	9,554	8,097	1,457	8,519
22	2005	1,035	0	1,035	9,554	8,097	1,457	8,519
23	2006	1,035	0	1,035	9,554	8,097	1,457	8,519
24	2007	1,035	0	1,035	9,554	8,097	1,457	8,519
25	2008	1,035	0	1,035	9,554	8,097	1,457	8,519
26	2009	1,035	0	1,035	9,554	8,097	1,457	8,519
27	2010	1,035	0	1,035	9,554	8,097	1,457	8,519
28	2011	1,035	0	1,035	9,554	8,097	1,457	8,519
	Total	79,785	54,863	24,922	223,454	188,499	34,955	143,669

Table 8.5.3 Internal Rate of Return Calculation Sheet

IRR=13.5% (Unit '000US$)

No.	Year	Cost 0%	COSTS		Benefit -10%	BENEFITS		Net Benefit
		Total	Construction and Equipment	Operation and Maintenance	Total	Saving in Ship Waiting Cost	Saving in Cargo Handling Cost	
1	1984	1,866	1,866	0	0	0	0	-1,866
2	1985	4,897	4,897	0	0	0	0	-4,897
3	1986	20,148	20,148	0	0	0	0	-20,148
4	1987	18,136	17,842	294	299	299	0	-17,838
5	1988	11,791	10,910	881	3,631	2,100	1,532	-8,160
6	1989	1,896	0	1,896	10,116	8,573	1,543	9,020
7	1990	1,896	0	1,896	10,116	8,573	1,543	9,020
8	1991	1,896	0	1,896	10,116	8,573	1,543	9,020
9	1992	1,896	0	1,896	10,116	8,573	1,543	9,020
10	1993	1,896	0	1,896	10,116	8,573	1,543	9,020
11	1994	1,896	0	1,896	10,116	8,573	1,543	9,020
12	1995	1,896	0	1,896	10,116	8,573	1,543	9,020
13	1996	1,896	0	1,896	10,116	8,573	1,543	9,020
14	1997	1,896	0	1,896	10,116	8,573	1,543	9,020
15	1998	1,896	0	1,896	10,116	8,573	1,543	9,020
16	1999	1,896	0	1,896	10,116	8,573	1,543	9,020
17	2000	1,896	0	1,896	10,116	8,573	1,543	9,020
18	2001	1,896	0	1,896	10,116	8,573	1,543	9,020
19	2002	1,896	0	1,896	10,116	8,573	1,543	9,020
20	2003	1,896	0	1,896	10,116	8,573	1,543	9,020
21	2004	1,896	0	1,896	10,116	8,573	1,543	9,020
22	2005	1,896	0	1,896	10,116	8,573	1,543	9,020
23	2006	1,896	0	1,896	10,116	8,573	1,543	9,020
24	2007	1,896	0	1,896	10,116	8,573	1,543	9,020
25	2008	1,896	0	1,896	10,116	8,573	1,543	9,020
26	2009	1,896	0	1,896	10,116	8,573	1,543	9,020
27	2010	1,896	0	1,896	10,116	8,573	1,543	9,020
28	2011	1,896	0	1,896	10,116	8,573	1,543	9,020
	Total	81,251	54,863	26,388	236,598	199,587	37,012	155,347

Table 8.5.4 Internal Rate of Return Calculation Sheet

IRR=14.2%

		Cost			0% Benefit	-5%	(Unit '000US$)
		COSTS			BENEFITS		
No.	Year	Total	Construction and Equipment	Operation and Maintenance	Total	Saving in Ship Waiting Cost	Saving in Cargo Handling Cost	Net Benefit
1	1984	1,066	1,066	0	0	0	0	-1,066
2	1985	4,897	4,897	0	0	0	0	-4,897
3	1986	20,148	20,148	0	0	0	0	-20,148
4	1987	18,153	17,842	311	315	315	0	-17,837
5	1988	11,848	10,910	938	3,833	2,216	1,617	-8,007
6	1989	1,157	0	1,157	10,678	9,050	1,628	9,521
7	1990	1,157	0	1,157	10,678	9,050	1,628	9,521
8	1991	1,157	0	1,157	10,678	9,050	1,628	9,521
9	1992	1,157	0	1,157	10,678	9,050	1,628	9,521
10	1993	1,157	0	1,157	10,678	9,050	1,628	9,521
11	1994	1,157	0	1,157	10,678	9,050	1,628	9,521
12	1995	1,157	0	1,157	10,678	9,050	1,628	9,521
13	1996	1,157	0	1,157	10,678	9,050	1,628	9,521
14	1997	1,157	0	1,157	10,678	9,050	1,628	9,521
15	1998	1,157	0	1,157	10,678	9,050	1,628	9,521
16	1999	1,157	0	1,157	10,678	9,050	1,628	9,521
17	2000	1,157	0	1,157	10,678	9,050	1,628	9,521
18	2001	1,157	0	1,157	10,678	9,050	1,628	9,521
19	2002	1,157	0	1,157	10,678	9,050	1,628	9,521
20	2003	1,157	0	1,157	10,678	9,050	1,628	9,521
21	2004	1,157	0	1,157	10,678	9,050	1,628	9,521
22	2005	1,157	0	1,157	10,678	9,050	1,628	9,521
23	2006	1,157	0	1,157	10,678	9,050	1,628	9,521
24	2007	1,157	0	1,157	10,678	9,050	1,628	9,521
25	2008	1,157	0	1,157	10,678	9,050	1,628	9,521
26	2009	1,157	0	1,157	10,678	9,050	1,628	9,521
27	2010	1,157	0	1,157	10,678	9,050	1,628	9,521
28	2011	1,157	0	1,157	10,678	9,050	1,628	9,521
	Total	82,717	54,863	27,854	249,743	210,675	39,068	167,026

Table 8.5.5 Internal Rate of Return Calculation Sheet

IRR=15.7%

Cost 0% Benefit 5% (Unit '000US$)

No.	Year	COSTS Total	Construction and Equipment	Operation and Maintenance	BENEFITS Total	Saving in Ship Waiting Cost	Saving in Cargo Handling Cost	Net Benefit
1	1984	1,066	1,066	0	0	0	0	-1,066
2	1985	4,897	4,897	0	0	0	0	-4,897
3	1986	20,148	20,148	0	0	0	0	-20,148
4	1987	18,185	17,842	343	349	349	0	-17,837
5	1988	11,938	10,910	1,028	4,237	2,450	1,787	-7,701
6	1989	1,279	0	1,279	11,802	10,002	1,800	10,523
7	1990	1,279	0	1,279	11,802	10,002	1,800	10,523
8	1991	1,279	0	1,279	11,802	10,002	1,800	10,523
9	1992	1,279	0	1,279	11,802	10,002	1,800	10,523
10	1993	1,279	0	1,279	11,802	10,002	1,800	10,523
11	1994	1,279	0	1,279	11,802	10,002	1,800	10,523
12	1995	1,279	0	1,279	11,802	10,002	1,800	10,523
13	1996	1,279	0	1,279	11,802	10,002	1,800	10,523
14	1997	1,279	0	1,279	11,802	10,002	1,800	10,523
15	1998	1,279	0	1,279	11,802	10,002	1,800	10,523
16	1999	1,279	0	1,279	11,802	10,002	1,800	10,523
17	2000	1,279	0	1,279	11,802	10,002	1,800	10,523
18	2001	1,279	0	1,279	11,802	10,002	1,800	10,523
19	2002	1,279	0	1,279	11,802	10,002	1,800	10,523
20	2003	1,279	0	1,279	11,802	10,002	1,800	10,523
21	2004	1,279	0	1,279	11,802	10,002	1,800	10,523
22	2005	1,279	0	1,279	11,802	10,002	1,800	10,523
23	2006	1,279	0	1,279	11,802	10,002	1,800	10,523
24	2007	1,279	0	1,279	11,802	10,002	1,800	10,523
25	2008	1,279	0	1,279	11,802	10,002	1,800	10,523
26	2009	1,279	0	1,279	11,802	10,002	1,800	10,523
27	2010	1,279	0	1,279	11,802	10,002	1,800	10,523
28	2011	1,279	0	1,279	11,802	10,002	1,800	10,523
	Total	85,649	54,863	30,786	276,031	232,851	43,180	190,382

Table 8.5.6 Internal Rate of Return Calculation Sheet

IRR=16.4%

No.	Year	Cost			0% Benefit	10%	(Unit '000US$)	
			COSTS		BENEFITS			
		Total	Construction Equipment	Operation and Maintenance	Total	Saving in Ship Hauling Cost	Saving in Cargo Handling Cost	Net Benefit
1	1984	1,066	1,066	0	0	0	0	-1,066
2	1985	4,897	4,897	0	0	0	0	-4,897
3	1986	20,148	20,148	0	0	0	0	-20,148
4	1987	18,202	17,842	360	365	365	0	-17,837
5	1988	11,987	10,910	1,077	4,439	2,566	1,872	-7,548
6	1989	1,348	0	1,348	12,364	10,479	1,885	11,024
7	1990	1,348	0	1,348	12,364	10,479	1,885	11,024
8	1991	1,348	0	1,348	12,364	10,479	1,885	11,024
9	1992	1,348	0	1,348	12,364	10,479	1,885	11,024
10	1993	1,348	0	1,348	12,364	10,479	1,885	11,024
11	1994	1,348	0	1,348	12,364	10,479	1,885	11,024
12	1995	1,348	0	1,348	12,364	10,479	1,885	11,024
13	1996	1,348	0	1,348	12,364	10,479	1,885	11,024
14	1997	1,348	0	1,348	12,364	10,479	1,885	11,024
15	1998	1,348	0	1,348	12,364	10,479	1,885	11,024
16	1999	1,348	0	1,348	12,364	10,479	1,885	11,024
17	2000	1,348	0	1,348	12,364	10,479	1,885	11,024
18	2001	1,348	0	1,348	12,364	10,479	1,885	11,024
19	2002	1,348	0	1,348	12,364	10,479	1,885	11,024
20	2003	1,348	0	1,348	12,364	10,479	1,885	11,024
21	2004	1,348	0	1,348	12,364	10,479	1,885	11,024
22	2005	1,348	0	1,348	12,364	10,479	1,885	11,024
23	2006	1,348	0	1,348	12,364	10,479	1,885	11,024
24	2007	1,348	0	1,348	12,364	10,479	1,885	11,024
25	2008	1,348	0	1,348	12,364	10,479	1,885	11,024
26	2009	1,348	0	1,348	12,364	10,479	1,885	11,024
27	2010	1,348	0	1,348	12,364	10,479	1,885	11,024
28	2011	1,348	0	1,348	12,364	10,479	1,885	11,024
	Total	87,115	54,863	32,252	289,176	243,939	45,236	202,061

Table 8.5.7 Internal Rate of Return Calculation Sheet

IRR=17.1% (Unit '000US$)

No.	Year	Cost			0% Benefit	15%		
		Total	COSTS Construction and Equipment	Operation and Maintenance	Total	BENEFITS Saving in Ship Waiting Cost	Saving in Cargo Handling Cost	Net Benefit
1	1984	1,066	1,066	0	0	0	0	-1,066
2	1985	4,897	4,897	0	0	0	0	-4,897
3	1986	20,148	20,148	0	0	0	0	-20,148
4	1987	18,218	17,842	376	382	382	0	-17,836
5	1988	12,036	10,910	1,126	4,640	2,683	1,957	-7,396
6	1989	1,401	0	1,401	12,926	10,955	1,971	11,525
7	1990	1,401	0	1,401	12,926	10,955	1,971	11,525
8	1991	1,401	0	1,401	12,926	10,955	1,971	11,525
9	1992	1,401	0	1,401	12,926	10,955	1,971	11,525
10	1993	1,401	0	1,401	12,926	10,955	1,971	11,525
11	1994	1,401	0	1,401	12,926	10,955	1,971	11,525
12	1995	1,401	0	1,401	12,926	10,955	1,971	11,525
13	1996	1,401	0	1,401	12,926	10,955	1,971	11,525
14	1997	1,401	0	1,401	12,926	10,955	1,971	11,525
15	1998	1,401	0	1,401	12,926	10,955	1,971	11,525
16	1999	1,401	0	1,401	12,926	10,955	1,971	11,525
17	2000	1,401	0	1,401	12,926	10,955	1,971	11,525
18	2001	1,401	0	1,401	12,926	10,955	1,971	11,525
19	2002	1,401	0	1,401	12,926	10,955	1,971	11,525
20	2003	1,401	0	1,401	12,926	10,955	1,971	11,525
21	2004	1,401	0	1,401	12,926	10,955	1,971	11,525
22	2005	1,401	0	1,401	12,926	10,955	1,971	11,525
23	2006	1,401	0	1,401	12,926	10,955	1,971	11,525
24	2007	1,401	0	1,401	12,926	10,955	1,971	11,525
25	2008	1,401	0	1,401	12,926	10,955	1,971	11,525
26	2009	1,401	0	1,401	12,926	10,955	1,971	11,525
27	2010	1,401	0	1,401	12,926	10,955	1,971	11,525
28	2011	1,401	0	1,401	12,926	10,955	1,971	11,525
	Total	88,581	54,863	33,718	302,320	255,028	47,293	213,739

Table 8.5.8 Internal Rate of Return Calculation Sheet (Shadow Price)

IRR = 15.8%
(Unit: '000US$)

No.	Year	COSTS Total	Construction and Equipment	Operation and Maintenance	BENEFITS Total	Saving in Ship Waiting Cost	Saving in Cargo Handling Cost	Net Benefit
1	1984	1,002	1,002	0	0	0	0	- 1,002
2	1985	4,603	4,603	0	0	0	0	- 4,603
3	1986	18,939	18,939	0	0	0	0	-18,939
4	1987	17,069	16,771	298	332	332	0	-16,737
5	1988	11,146	10,255	891	3,881	2,333	1,548	- 7,265
6	1989	1,108	0	1,108	11,085	9,526	1,559	9,977
7	1990	1,108	0	1,108	11,085	9,526	1,559	9,977
8	1991	1,108	0	1,108	11,085	9,526	1,559	9,977
9	1992	1,108	0	1,108	11,085	9,526	1,559	9,977
10	1993	1,108	0	1,108	11,085	9,526	1,559	9,977
11	1994	1,108	0	1,108	11,085	9,526	1,559	9,977
12	1995	1,108	0	1,108	11,085	9,526	1,559	9,977
13	1996	1,108	0	1,108	11,085	9,526	1,559	9,977
14	1997	1,108	0	1,108	11,085	9,526	1,559	9,977
15	1998	1,108	0	1,108	11,085	9,526	1,559	9,977
16	1999	1,108	0	1,108	11,085	9,526	1,559	9,977
17	2000	1,108	0	1,108	11,085	9,526	1,559	9,977
18	2001	1,108	0	1,108	11,085	9,526	1,559	9,977
19	2002	1,108	0	1,108	11,085	9,526	1,559	9,977
20	2003	1,108	0	1,108	11,085	9,526	1,559	9,977
21	2004	1,108	0	1,108	11,085	9,526	1,559	9,977
22	2005	1,108	0	1,108	11,085	9,526	1,559	9,977
23	2006	1,108	0	1,108	11,085	9,526	1,559	9,977
24	2007	1,108	0	1,108	11,085	9,526	1,559	9,977
25	2008	1,108	0	1,108	11,085	9,526	1,559	9,977
26	2009	1,108	0	1,108	11,085	9,526	1,559	9,977
27	2010	1,108	0	1,108	11,085	9,526	1,559	9,977
28	2011	1,108	0	1,108	11,085	9,526	1,559	9,977
Total		78,243	51,570	26,673	259,168	221,763	37,405	180,925

Table 8.5.9 Cost Benefit Table (Discount Ratio = 12.0%)

(Unit: '000 US$)

No.	Year	Discount Value (Discount Ratio = 12.0%)	
		Costs	Benefits
1	1984	1,066.00	
2	1985	4,372.32	
3	1986	16,061.86	
4	1987	12,932.33	236.31
5	1988	7,555.67	2,564.31
6	1989	691.12	6,377.87
7	1990	617.07	5,694.53
8	1991	550.96	5,084.40
9	1992	491.92	4,539.64
10	1993	439.22	4,053.25
11	1994	392.16	3,618.97
12	1995	350.14	3,231.23
13	1996	312.63	2,885.02
14	1997	279.13	2,575.91
15	1998	249.22	2,299.92
16	1999	222.52	2,053.50
17	2000	198.68	1,833.48
18	2001	177.39	1,637.04
19	2002	158.38	1,461.64
20	2003	141.41	1,305.04
21	2004	126.26	1,165.21
22	2005	112.73	1,040.37
23	2006	100.65	928.90
24	2007	89.87	829.37
25	2008	80.24	740.51
26	2009	71.64	661.17
27	2010	63.97	590.33
28	2011	57.11	527.08
Total		47,962.73	57,935.12

$$\text{B/C Ratio} = \frac{57,935.12}{47,962.73} \fallingdotseq 1.21$$

Table 8.5.10 Cost Benefit Table (Shadow Price) (Discount Ratio = 12.0%)

(Unit: '000 US$)

No.	Year	Discount Value (Discount Ratio = 12.0%)	
		Costs	Benefits
1	1984	1,002.00	
2	1985	4,109.82	
3	1986	15,098.05	
4	1987	12,149.37	236.31
5	1988	7,083.48	2,466.44
6	1989	628.70	6,289.92
7	1990	561.34	5,616.00
8	1991	501.20	5,014.29
9	1992	447.50	4,477.04
10	1993	399.55	3,997.36
11	1994	356.74	3,569.07
12	1995	318.52	3,186.67
13	1996	284.39	2,845.24
14	1997	253.92	2,540.39
15	1998	226.71	2,268.21
16	1999	202.42	2,025.18
17	2000	180.73	1,808.20
18	2001	161.37	1,614.46
19	2002	144.08	1,441.48
20	2003	128.64	1,287.04
21	2004	114.86	1,149.14
22	2005	102.55	1,026.02
23	2006	91.56	916.09
24	2007	81.75	817.93
25	2008	72.99	730.30
26	2009	65.17	652.05
27	2010	58.19	582.19
28	2011	51.95	519.81
Total		44,877.70	57,076.94

$$\text{B/C Ratio} = \frac{57,076.94}{44,877.70} \fallingdotseq 1.27$$

CHAPTER 9.
FINANCIAL ANALYSIS

CHAPTER 9. FINANCIAL ANALYSIS

9.1. Purpose and Mehod of Financial Analysis

The purpose of financial analysis is to ascertain the impact of investments under the present project on the condition of financial control by port management bodies or to determine whether financial healthiness can be ensured.

In other words, based on the premise that financial control is carried out by business accounting, under a self-supporting accounting system, this analysis is to analyse the effect of the investments of the project, i.e., the balance of revenue and expenditure, to ascertain the financing situation, and present the problems found and the measures to be taken.

Needless to say, the ascertainment of financial healthiness is possible only when the management is thoroughly aware of the entire state of financial affairs. Therefore, the analysis covers all the financial operations.

The investment effects of this project are analyzed and evaluated by the following two methods:

(1) Analysis and evaluation of project by financial statements.

(2) Analysis and evaluation of project by the DCF method.

9.1.1. Financial Statements

In conducting the analysis, Financial Statements (Income Statement, Balance Sheet, etc.) will be prepared to ascertain the soundness of financial affairs.

Accordingly, financial analysis of the Port of Dumai will be based on the following premises:

(1) Its revenue will be calculated based on the current port tariff rates authorized by DGSC.

(2) Its accounting will be according to the business accounting system.

(3) The funds necessary to execute this project are to be raised as follows:

i) Domestic currency portion (42.5%): National Development Fund, interest free.

ii) Foreign currency portion (57.5%): Loans from a foreign country under the following loan conditions:

Table 9.1.1 Loan Conditions for Long Term Loans

Rate of interest	3.5% per annum
Grace period	10 years
Repayment period	30 years
Term of loan	40 years

(4) The financial analysis will cover the period from 1984 to 2011.

(5) Depreciation is to be based on the straight line method and the life cycle based on the standard set by the Indonesian Government.

Table 9.1.2 Depreciation Rate and Life Cycle by Facilities

Item	Depreciation Rate	Life Cycle (years)
Quay	0.025	40
Open Storage	0.025	40
Warehouse	0.025	40
Road	0.1	10
Office Building	0.025	40
Water Supply	0.2	5
Power Supply	0.1	10
Navigation Aids	0.2	5
Cargo Handling Equipment	0.15	6.5
Vessel	0.1	10
Bouy	0.2	5

Source: BPP Dumai

(6) Surplus funds

After depreciation and payment of interest, 45% of the Net Profit will be deducted for tax and 30.3% for payment to the National Development Fund – (Net profit 100% – Tax 45%) x 55%. The surplus is to be retained as internal reserve.

9.1.2. Financial Rate of Return (FRR)

In evaluating the project by the DCF method, the FRR (financial rate of return) is determined by Formula 8.5.1 in Chapter 8, using the earning increase after the completion of the project as the Benefit and the project construction cost as the Cost.

As stated in the foregoing paragraphs all aspects of the operation of the Port of Dumai will be analysed. The profitability of the project will be judged independently in the analysis. Thus, profit before depreciation and interest payment for the entire port must be calculated for every year. The estimated profit before depreciation and interest payment for the Port of Dumai is regarded as the benefit.

The profit, before depreciation and before interest payment, for each year after 1987 when investment effects begin to appear, is the operating profit, i.e., the benefit.

By using the above method, the financial rate of return (FRR) is calculated on the independent profit system of the Port of Dumai.

9.2. Revenues

9.2.1. Method of estimation

As indicated in the assumptions, the revenue is calculated from the Indonesian Government's set tariff rates, not from special port tariff rates for the Port of Dumai set on the cost basis arising from this project. The current port tariff rates are the new rates set in the revision of Jan. 1983. Dues and charges are composed of the following types.

1) Ship Charges:

(1) Harbour Dues: The unit charge per gross ton was established, and was multiplied by the per annum gross tonnage of entering vessels, classified by type.

(2) Berthage: The unit charge per gross ton was established, and was multiplied by the per annum gross tonnage and berthing days, for each type of vessel.

(3) Pilotage: Cumulative computation was made on the basis of the tariff, estimating the number of vessels classified by type and size for each fiscal year.

(4) Towage: Cumulative computation was made on the basis of the tariff, estimating the number of vessels classified by type and size for each fiscal year.

(5) Water Supply: Total revenues were estimated from the past business records.

2) Cargo and Facilities Charges

(1) Facilities charge: The unit charge per ton of cargo was established and was multiplied by the volume of cargo passing through the facilities each year. This unit charge includes for wharves, transit sheds and open storage.

(2) Equipment rental: The unit charge per ton of cargo handled was established and was multiplied by the total volume of cargo to be handled during each year.

3) Others: Total revenues were estimated from the past business records.

4) Ship and Cargo Utilization of the Port

The number of ships calling at the port and the volume of cargo handled by the port facilities are set in accordance with the demand forecast in Chapter 5 in Table 9.2.1 and Table 9.2.2. Cargo volume handled at the sheds and open storage is shown in Table 9.2.3.

Table 9.2.1 Number of Ship Calls

Kinds of Ships \ Year		1987	1988	1989
Ships in foreign trade	8,000 ~ 10,000 DWT Class	69	88	111
	10,000 ~ 15,000 DWT Class	11	12	13
	25,000 ~ 30,000 DWT Class	6	8	10
Ships in domestic trade	300 ~ 500 DWT Class	240	255	275
	1,000 ~ 2,300 DWT Class	164	195	229
	5,000 ~ 8,000 DWT Class	67	72	78
Tanker	12,500 ~ 35,000 DWT Class	507	521	535
	100,000 DWT Class	520	535	550

Table 9.2.2 Cargo Volume

(Unit: '000t)

Commodity	1987				1988				1989			
	Foreign Trade		Domestic Trade		Foreign Trade		Domestic Trade		Foreign Trade		Domestic Trade	
	In	Out	In	Out	In	Out	In	Out	In	Out	In	Out
Palm Oil		237		102		318		136		411		176
Palm Kernel		29		20		40		27		53		36
Fertilizer			222				238				254	
Sawn Timber		91		10		102		11		113		13
Rice	49		40	18	51		42	19	54		44	19
Rubber		5				9				14		
General Cargo	35		84	16	35		90	18	35		99	19
Total	84	362	346	166	86	469	370	211	89	591	397	263

Table 9.2.3 Cargo Using Shed and Open Storage

(Unit: '000t)

Commodity \ Year	1987			1988			1989		
	Shed	Open Storage	Total	Shed	Open Storage	Total	Shed	Open Storage	Total
Sawn Timber	–	101	101	–	113	113	–	126	126
Fertilizer	204.4	–	204.4	219.2	–	219.2	234	–	234
Rice	64.2	–	64.2	61.6	11.2*	72.8	59.7	17.6*	77.3
Palm Kernel	49	–	49	60	7	67	71	18*	89
Rubber	5	–	5	9	–	9	14	–	14
General Cargo	121.5	–	121.5	111.6	11.4*	123	105.6	26*	131.6
Total	444.1	101	545.1	461.4	142.6	604	484.3	187.6	671.9

* Container cargo.

9.3. Expenditures

Expenditures may be classified into five categories: personnel costs, general administrative costs, maintenance/operating costs, depreciation expenses and interest on loans. They are to be calculated as follows:

1) Personnel Cost

In 1981, the average annual per capita personnel cost for Dumai Port Administration was 1,992 US$. The average annual per capita personnel cost in 1982 is estimated at 2,111.76 US$ by adding more than 6% to the 1981 figure.

The present organization and personnel of Dumai Port Administration are in accord with its present facilities and port activities. So, the future number of personnel for the Dumai Port Administration was determined in view of the proposed new facilities and the port demand forecast.

The number of personnel at Dumai Port Administration is shown Table 9.3.1.

Table 9.3.1 Number of Personnel at Dumai Port Administration

	1981	1984	1985	1986	1987	1988	1989
Port Administrator Secretariat	65	65	69	69	69	71	71
Traffic Division	11	17	18	18	19	22	25
Service Division	37	40	41	42	43	54	59
Technical Division	42	45	49	50	52	60	62
Finance Division	33	35	36	36	36	39	39
Pilotage Division	118	123	123	125	127	130	130
Fire Brigade	15	15	15	15	15	15	15
Total	321	340	351	355	361	389	401

2) General Administrative Cost

The general administrative cost of Dumai Port Administration for 1981, was 22% of the personel cost. So, 22% of the personnel cost is used here to estimate the general administrative cost.

3) Maintenance/Operating Cost

The maintenance/operating cost of each facility was estimated, as shown in Table 9.3.2, by setting a maintenance/operation ratio representing a certain proportion of the construction or purchase cost of that facility.

The maintenance/operating cost includes the existing facilities, the 500 m jetty under construction and the tugboats (4), pilot boats (5) and mooring boats (4) to be purchased in 1984 and 1985.

Table 9.3.2 Maintenance and Operating Costs

Facilities	Rates (%)
Wharf	1.0
Revetment	0.3
Navigation Aids	2.0
Shed	1.0
Building	1.5
Road/Pavement	1.0
Water Supply	3.0
Electric Supply	3.0
Cargo Handling Equipment	10.0

The rates of maintenance and operation costs, as shown in Table 9.3.2, were assumed to refer to JICA's reports.

(1) Report on the Development Project of the Port of Colombo
The Democratic Socialist Republic of Sri Lanka
March, 1980

(2) The Feasibility Study for Kelantan Port Development Project in Malaysia
February, 1981

(3) Final Report for the Study on the Development Project of the Port of Sorong
The Republic of Indonesia
May, 1981

(4) The Feasibility Study on the Second Stage Expansion Project of the Port of Caldera
Republic of Costa Rica
December, 1981

(5) The Study on the Development Project of the Port of Irene
Republic of the Philippines Philippine Ports Authority
March, 1982

The rates of maintenance and operation costs by the UNCTD published, Port Development: a handbook for planners in developing countries, are also shown in Tables 9.3.3 and 9.3.4.

Table 9.3.3 Maintenance Costs for Structural Elements: Values Adopted for Estimating Purposes

Class of structure and type	Annual average maintenance costs as a percentage of current new cost or replacement value
Quay structures	
Steel sheet piling	0.30
Steel piling with reinforced concrete deck	1.00
Reinforced concrete piles and deck	0.75
Rubber fendering	1.00
Embankments	
Rockfill	0.75
Surfacing	
Concrete aprons or roads	1.00
Asphalt	1.50
Other surfaces (gravel, etc.)	7.50
Breakwater	2.00

Table 9.3.4 Maintenance Cost for Mobile Equipment: Values Adopted for Estimating Purposes

Type of equipment	Annual maintenance cost (1973), as a percentage of purchase price
Container crane	5
3/5-ton quay crane (rail-mounted)	5
Mobile crane (10 tons at 20 m)	8
Mobile crane (25 tons at 25 m)	10
Straddle carrier	12
Fork-lift truck (20-ton)	8
Fork-lift truck (5-ton)	14
Road tractor	10
Trailer	3

Source: Paper on 'Problems de manutention portuaire', presented by CERLIC (Centre d'Etudes et de Recherches de Logistique Industrielle et Commerciale) to the second UNCTAD/SIDA Port Training Course held at Algiers in 1973.

4) Depreciation

The amount of depreciation is computed cumulatively, based on the depreciation rate and the life cycle (Table 9.1.2). With regard to the fixed assets of existing facilities, actual investments after 1982 are cumulatively computed for each facility and added to the figures from the table of fixed assets as of the end of 1981 prepared by Dumai Port Administration.

This computation includes the 500 m jetty under construction and the tugboats (4), pilot boats (5) and mooring boats (4) to be purchased in 1984 and 1985.

The average service life for this project is 23 years, ending in 2011. The fixed assets schedule is presented in Table 9.3.5.

5) Interest on Long Term Loans

This is calculated, as shown in Table 9.3.6, on the assumption that the foreign currency portion of the project cost will be met by the above-mentioned foreign loans.

Table 9.3.5 Fixed Assets Schedule

(Unit: '000US$)

Item \ Year	(1983)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 ~ 1998	1999 ~ 2003	2004 ~ 2011
Fixed Assets at Beginning Year		17,500	22,178	30,687	50,023	66,898	76,510	73,248	69,986	66,724	63,462	60,200	43,890	27,580
Non-Depreciable Assets (land)		84	84	84	84	84	84	7,033	7,033	7,033	7,033	7,033	7,033	7,033
Depreciable Assets		19,594	24,273	28,952	30,431	34,390	35,146	79,302	79,302	79,302	79,302	79,302	79,302	79,302
Depreciation		3,657	4,724	5,860	6,996	8,330	9,825	13,087	16,349	19,611	22,873	26,135	42,445	58,755
Written down value		15,937	19,549	23,092	23,435	26,060	25,321	66,215	62,953	59,691	56,429	53,167	36,857	20,547
Construction in Process		1,479	2,545	7,511	26,504	40,754	51,105							
Investment		5,745	9,645	20,472	18,209	11,107								
Existing Facilities		4,679	4,679											
New Facilities		1,066	4,966	20,472	18,209	11,107								
Non-Depreciable Assets							6,949							
Depreciable Assets		4,679	4,679	1,479	3,959	756	44,156							
Construction in Process		2,545	6,445	20,472	18,209	11,107								
Depreciation		1,067	1,136	1,136	1,334	1,495	3,262	3,262	3,262	3,262	3,262	16,310	16,310	20,547
Fixed Assets at End of Year	17,500	22,178	30,687	50,023	66,898	76,510	73,248	69,986	66,724	63,462	60,200	43,890	27,580	7,033
Non-Depreciable Assets (land)	84	84	84	84	84	84	7,033	7,033	7,033	7,033	7,033	7,033	7,033	7,033
Depreciable Assets	19,594	24,273	28,952	30,431	34,390	35,146	79,302	79,302	79,302	79,302	79,302	79,302	79,302	79,302
Depreciation	3,657	4,724	5,860	6,996	8,330	9,825	13,087	16,349	19,611	22,873	26,135	42,445	58,755	79,302
Written down value	15,937	19,549	23,092	23,435	26,060	25,321	66,215	62,953	59,691	56,429	53,167	36,857	20,547	0
Construction in Process	1,479	2,545	7,511	26,504	40,754	51,105								

Table 9.3.6 Long Tenn Loans Schedule

(Unit: '000 US$)

Year	Project Cost			Loan Repayment Amount	Loan Balance at End	Interest on Loan
	National Development Fund	Long Term Loan	Total			
1984	376	690	1,066		690	24
1985	1,704	3,262	4,966		3,952	138
1986	7,908	12,564	20,472		16,516	578
1987	8,950	9,259	18,209		25,775	902
1988	4,803	6,304	11,107		32,079	1,123
1989					32,079	1,123
1990					32,079	1,123
1991					32,079	1,123
1992					32,079	1,123
1993					32,079	1,123
1994				1,069	31,010	1,085
1995				1,069	29,941	1,048
1996				1,069	28,872	1,011
1997				1,069	27,803	973
1998				1,069	26,734	936
1999				1,069	25,665	898
2000				1,069	24,596	861
2001				1,069	23,527	826
2002				1,069	22,458	786
2003				1,069	21,389	749
2004				1,069	20,320	711
2005				1,069	19,251	674
2006				1,069	18,182	636
2007				1,069	17,113	599
2008				1,069	16,044	562
2009				1,069	14,975	524
2010				1,069	13,906	487
2011				1,069	12,837	449

9.4. Financial Situation

Financial statements for 1984 to 2011 were prepared according to the above estimate of revenues and expenditures. Table 9.4.1 is an income statement, Table 9.4.2 is a statement of sources and applications of funds and Table 9.4.3 is a balance sheet.

The income statement shows that the operating revenue is sufficient to cover the operating expenditure. The balance of revenues and expenditures and the earning position shown by Table 9.4.1 are extremely favorable in that a relatively large amount can be set aside each year for internal reserve.

The statement of sources and applications of funds shows the cash flow after the execution of the project, in order to ascertain the long term debt or the repayment schedule of the loans.

9.4.1. Evaluation by Financial Statements

A financial ratio analysis was made as to the soundness of the financial affairs of the port management body, using figures from the three financial statements (Table 9.4.1, 9.4.2 and 9.4.3). In this case, the financial statements cover all aspects of the Dumai Port Administration. As for the period to be analyzed, since management is expected to be stabilized during the period from 1994 to 1998, annual averages for that period are to be used. Needless to say, the ascertainment of financial healthiness is possible only when the management ascertains the entire state of financial affairs, and then presents them as the object of analysis.

1) Financial Ratios Used for Analysis

The following five financial ratios are to be used for analysis.

(1) Working Ratio ..... to ascertain the income position

$$\frac{\text{Operating expenditure}}{\text{Operating revenue}} \times 100$$

(2) Operating Ratio ..... to ascertain the income position

$$\frac{\text{Total operating expenses}}{\text{Total operating revenues}} \times 100$$

(3) Return on Net Fixed Assets ..... to ascertain the earning capacity

$$\frac{\text{Profit after depreciation}}{\text{Net fixed assets at end of year}} \times 100$$

(4) Interest Earned Ratio ..... to ascertain interest payment capacity

$$\frac{\text{Profit after depreciation}}{\text{Interest on long term loans}} \times 100$$

(5) Debt Service Coverage ..... to ascertain loan repayment capacity

$$\frac{\text{Operating profit}}{\text{Repayment and interest on long term loans}} \times 100$$

2) Evaluation of Financial Ratios

For the financial ratios, average figures taken from Financial Statements (Table 9.4.1, 9.4.2 and 9.4.3) are listed below.

Table 9.4.1 Income Statement

(Unit: '000US$)

Item \ Year	(1983)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 ~ 1998	1999 ~ 2003	2004 ~ 2011
Operating Revenue	7,373	7,631	7,997	8,389	8,803	9,327	9,876	9,876	9,876	9,876	7,876	49,380	49,380	79,008
Operating Expenditure	3,421	3,684	3,947	3,958	3,978	4,204	4,409	4,409	4,409	4,409	4,409	22,045	22,045	35,272
Operating Profit	3,952	3,947	4,050	4,431	4,825	5,123	5,467	5,467	5,467	5,467	3,467	27,335	27,335	43,736
Depreciation	710	1,067	1,136	1,136	1,334	1,495	3,262	3,262	3,262	3,262	3,262	16,310	16,310	20,547
Interest on Loan		24	138	578	902	1,123	1,123	1,123	1,123	1,123	1,123	5,053	4,120	4,642
Profit after Depreciation and Interest on Loan	3,242	2,856	2,776	2,717	2,589	2,505	1,082	1,082	1,082	1,082	1,082	5,972	6,905	18,547
Tax	1,459	1,285	1,249	1,223	1,165	1,127	487	487	487	487	487	2,687	3,107	8,346
National Development Fund Reserve	981	864	840	822	783	758	327	327	327	327	327	1,807	2,089	5,611
Net Profit	802	707	687	672	641	620	268	268	268	268	268	1,478	1,709	4,590
Acumulated Net Profit from 1981	7,088	7,795	8,482	9,154	9,795	10,415	10,683	10,951	11,219	11,487	11,755	13,233	14,942	19,532

Table 9.4.2 Statement of Source and Application of Funds

(Unit: '000US$)

Item \ Year	(1983)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 ~ 1998	1999 ~ 2003	2004 ~ 2011
Source of Funds (A)														
Net Profit	802	707	687	672	641	620	268	268	268	268	268	1,478	1,709	4,590
Depreciation	710	1,067	1,136	1,136	1,334	1,495	3,262	3,262	3,262	3,261	3,262	16,310	16,310	20,547
Long term Loan		690	3,262	12,564	9,259	6,304								
National Development Fund	1,479	5,055	6,383	7,908	8,950	4,803								
Total	2,991	7,519	11,468	22,280	20,184	13,222	3,530	3,530	3,530	3,530	3,530	17,788	18,109	25,137
Application of Funds (B)														
Cost of Fixed Assets Addition	1,479	5,745	9,645	20,472	18,209	11,107						5,345	5,345	8,522
Repayment of Long term Loans														
Total	1,479	5,745	9,645	20,472	18,209	11,107						5,345	5,345	8,522
Decrease/Increase of Net Current Assets (C) (C = A - B)	1,512	-1,774	1,823	1,808	1,975	2,115	3,530	3,530	3,530	3,530	3,530	12,443	12,674	16,585
Net Current Assets at Begining of Year	1,028	2,540	4,314	6,137	7,945	9,920	12,035	15,565	19,095	22,625	26,155	29,685	42,128	54,802
Net Current Assets a End of Year (C + D)	2,540	4,314	6,137	7,945	9,920	12,035	15,565	19,095	22,625	26,155	29,685	42,128	54,802	71,387

Table 9.4.3 Ballance Sheet

(Unit: '000US$)

Item \ Year	(1983)	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994 ~ 1998	1999 ~ 2003	2004 ~ 2011
Assets														
Fixed Assets	17,500	22,178	30,687	50,023	66,898	76,510	73,248	69,986	66,724	63,462	60,200	43,890	27,580	7,033
(Non Depreciable Assets)	84	84	84	84	84	84	7,033	7,033	7,033	7,033	7,033	7,033	7,033	7,033
(Depreciable Assets)	15,937	19,549	23,092	23,435	26,060	25,321	66,215	62,953	59,691	56,429	53,167	36,857	20,527	
(Construction in Process)	1,479	2,545	7,511	26,504	40,754	51,105								
Net Current Assets	2,540	4,314	6,137	7,945	9,920	12,035	15,565	19,095	22,625	26,155	29,685	42,128	54,802	71,387
Total	20,040	26,492	36,824	57,968	76,818	88,545	88,813	89,081	89,349	89,617	89,885	86,018	82,382	78,420
Liabilities														
Capital Loan by Government (National Development Fund)	12,952	18,007	24,390	32,298	41,248	46,051	46,051	46,051	46,051	46,051	46,051	46,051	46,051	46,051
Long term Loan		690	3,952	16,516	25,775	32,079	32,079	32,079	32,079	32,079	32,079	26,734	21,389	12,837
Capital & Reserve	7,088	7,795	8,482	9,154	9,795	10,415	10,683	10,951	11,219	11,487	11,755	13,233	14,942	19,532
Total	20,040	26,492	36,824	57,968	76,818	88,545	88,813	89,081	89,349	89,617	89,885	86,018	82,382	78,420

Table 9.4.4 Financial Ratios (%)

Financial Ratios	1989	1994~1998
(1) Working Ratio	45	45
(2) Operating Ratio	89	88
(3) Return on Net Fixed Assets	3	4
(4) Interest Earned Ratio	196	218
(5) Debt Service Coverage	407	263

(1) Working Ratio

The working ratio is very good compared with those of the ports in European and American countries (including Australia), performing business accounting.

(2) Operating Ratio

This, like the working ratio is a very favorable value. That both ratios are so favorable is accounted for mainly by the large revenue from tankers and the absence of large maintenance costs as, for example, for dredging.

(3) Return on Net Fixed Assets

This also is very good when compared with the ports in European and American countries. Notwithstanding the fact that the net fixed assets coming from the new investment account for an overwhelming proportion, it is noteworthy that thae earning capacity taken as a whole is as high as this.

(4) Interest Earned Ratio

The high value of this ratio shows the high capability of this port for handling the interest charges.

(5) Debt Service Coverage

The high value of this ratio shows that there will be no problem in repaying the loans. One of the principle reasons is the above mentioned high revenue.

9.4.2. Evaluation by FRR

The result obtained for the FRR is 8.9% (Table 9.4.5). We considered it desirable that the FRR remains above the level of the interest rate. Supposing an interest rate of 3.5% for the foreign currency loan portion of the investment funds, and interest free National Development Funds, for the local currency portion;

(Investment funds) foreign currency portion, 57.5%
Local currency portion, 42.5%
Loan interest: foreign currency portion, 3.5%; local currency portion, interest free National Development Funds
Over all interest rate:
3.5 x 57.5% = 2.0 (%)

Thus, the FRR is well above the interest rate, showing the financial possibility of this project. The sensitivity analyses for unexpected changes in operating revenue yield:

Case A: The case where operating revenue decreases by 15%
FRR: 5.2% (Table 9.4.6)

Case B: The case where operating revenue decreases by 25%
FRR: 2.4% (Table 9.4.7)

Even should the revenue fall 25% below present estimates the FRR, at 2.4%, is still above the interest rate.

9.4.3. Conclusion

As shown by the foregoing financial ratios, based on data from the three financial statements (Tables 9.4.1, 9.4.2 and 9.4.3), and the FRR, there is no problem in balancing revenues and expenses or in fund raising. That is, with the new investment executed, the financial healthiness of the port is easily secured and financial viability clearly demonstrated.

Table 9.4.5 Financial Rate of Return Calculation Sheet FRR = 8.90%

(Unit: '000 US$)

Year		Balance			Discounted Value (B - C)
		Project Cost (C)	Operating Profit (B)	(B - C)	
1	1984	1,066		- 1,066	- 1,066
2	1985	4,966		- 4,966	- 4,560
3	1986	20,472		-20,472	-17,260
4	1987	18,209	4,825	-13,384	-10,361
5	1988	11,107	5,123	- 5,984	- 4,254
6	1989		5,467	5,467	3,568
7	1990		5,467	5,467	3,276
8	1991		5,467	5,467	3,009
9	1992		5,467	5,467	2,763
10	1993		5,467	5,467	2,537
11	1994		5,467	5,467	2,329
12	1995		5,467	5,467	2,139
13	1996		5,467	5,467	1,964
14	1997		5,467	5,467	1,803
15	1998		5,467	5,467	1,656
16	1999		5,467	5,467	1,520
17	2000		5,467	5,467	1,396
18	2001		5,467	5,467	1,281
19	2002		5,467	5,467	1,177
20	2003		5,467	5,467	1,081
21	2004		5,467	5,467	992
22	2005		5,467	5,467	911
23	2006		5,467	5,467	837
24	2007		5,467	5,467	768
25	2008		5,467	5,467	705
26	2009		5,467	5,467	648
27	2010		5,467	5,467	595
28	2011		5,467	5,467	546
Total		55,820	135,689	79,869	0

Table 9.4.6 Financial Rate of Return Calculation Sheet FRR = 5.22%

(Unit: '000 US$)

Year		Balance			Discounted Value (B - C)
		Project Cost (C)	Operating Profit (B)	(B - C)	
1	1984	1,066		- 1,066	- 1,066
2	1985	4,966		- 4,966	- 4,719
3	1986	20,472		-20,472	-18,487
4	1987	18,209	3,505	-14,704	-12,619
5	1988	11,107	3,724	- 7,383	- 6,021
6	1989		3,986	3,986	3,089
7	1990		3,986	3,986	2,936
8	1991		3,986	3,986	2,790
9	1992		3,986	3,986	2,651
10	1993		3,986	3,986	2,519
11	1994		3,986	3,986	2,394
12	1995		3,986	3,986	2,275
13	1996		3,986	3,986	2,162
14	1997		3,986	3,986	2,055
15	1998		3,986	3,986	1,953
16	1999		3,986	3,986	1,855
17	2000		3,986	3,986	1,763
18	2001		3,986	3,986	1,676
19	2002		3,986	3,986	1,592
20	2003		3,986	3,986	1,513
21	2004		3,986	3,986	1,438
22	2005		3,986	3,986	1,366
23	2006		3,986	3,986	1,299
24	2007		3,986	3,986	1,234
25	2008		3,986	3,986	1,173
26	2009		3,986	3,986	1,114
27	2010		3,986	3,986	1,059
28	2011		3,986	3,986	1,006
Total		55,820	98,907	43,087	0

Operating Revenue -15%
Cost 0%

Table 9.4.7 Financial Rate of Return Calculation Sheet FRR = 2.44%

(Unit: '000 US$)

Year		Balance			Discounted Value (B - C)
		Project Cost (C)	Operating Profit (B)	(B - C)	
1	1984	1,066		- 1,066	- 1,066
2	1985	4,966		- 4,966	- 4,849
3	1986	20,472		-20,472	-19,507
4	1987	18,209	2,624	-15,585	-14,496
5	1988	11,107	2,791	- 8,316	- 7,551
6	1989		2,998	2,998	2,657
7	1990		2,998	2,998	2,594
8	1991		2,998	2,998	2,532
9	1992		2,998	2,998	2,472
10	1993		2,998	2,998	2,413
11	1994		2,998	2,998	2,355
12	1995		2,998	2,998	2,299
13	1996		2,998	2,998	2,244
14	1997		2,998	2,998	2,191
15	1998		2,998	2,998	2,138
16	1999		2,998	2,998	2,087
17	2000		2,998	2,998	2,038
18	2001		2,998	2,998	1,989
19	2002		2,998	2,998	1,942
20	2003		2,998	2,998	1,895
21	2004		2,998	2,998	1,850
22	2005		2,998	2,998	1,806
23	2006		2,998	2,998	1,763
24	2007		2,998	2,998	1,721
25	2008		2,998	2,998	1,680
26	2009		2,998	2,998	1,640
27	2010		2,998	2,998	1,601
28	2011		2,998	2,998	1,563
Total		55,820	74,369	18,549	1

Operating Revenue -25%

Cost 0%