

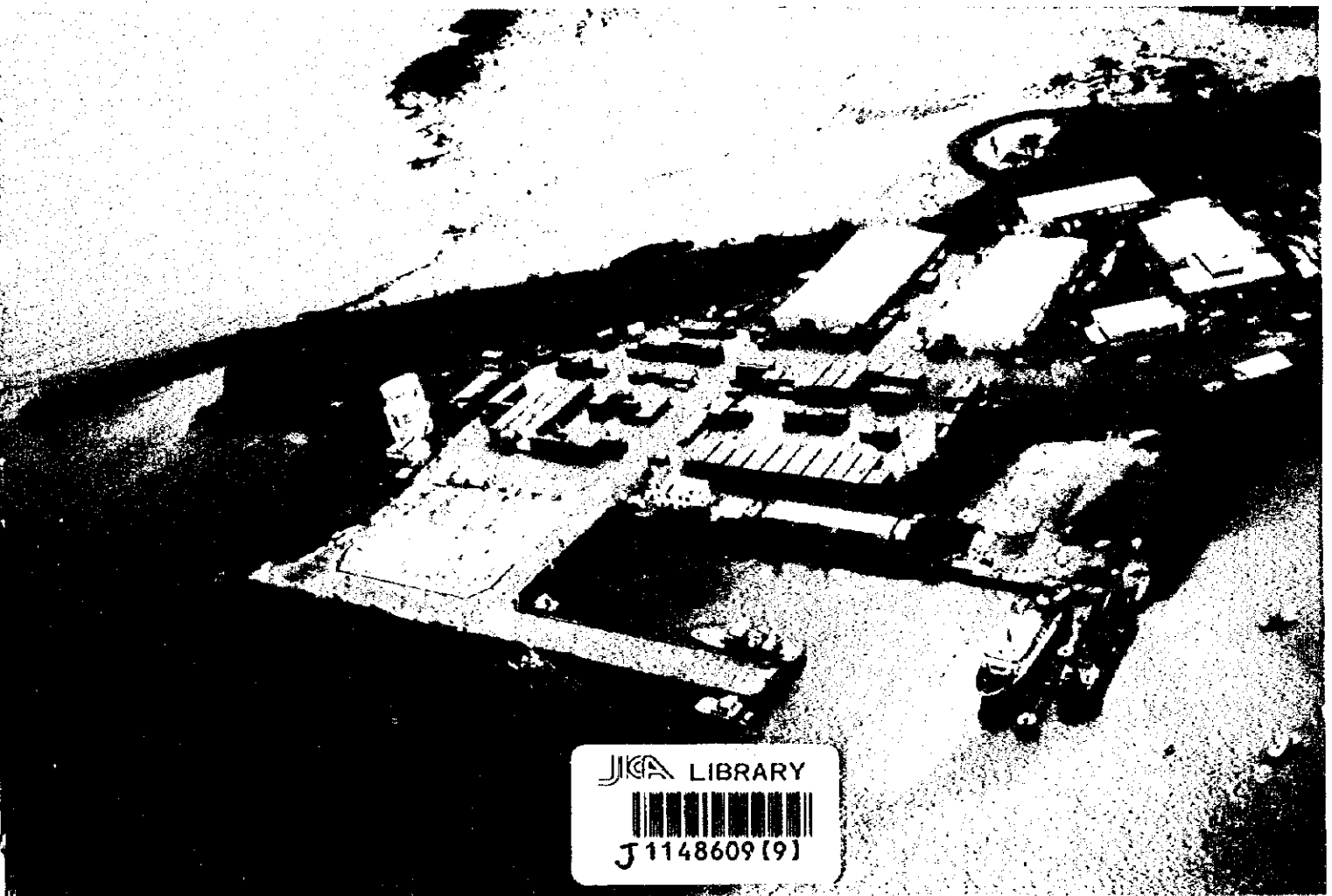
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JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
MINISTRY OF TRANSPORT
SAMOA

No. 32

FINAL REPORT

THE STUDY ON IMPROVEMENT OF APIA PORT IN SAMOA



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(As of September, 1998)

PREFACE

In response to a request from the Government of Samoa, the Government of Japan decided to conduct a study on Improvement of Apia Port in Samoa and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Hisanori Kato of Tetra Co., Ltd. to Samoa, two times between June and October 1998. In addition, JICA set up an advisory committee headed by Hozumi Katsuta, Development Specialist, JICA between June and October 1998, which examined the study from specialist and technical points of view.

The team held discussions with the officials concerned of the Government of Samoa and conducted field surveys at the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of this project and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Samoa for their close cooperation extended to the study.

December 1998



Kimio Fujita
President
Japan International Cooperation Agency

LETTER OF TRANSMITTAL

December, 1998

Mr. Kimio Fujita
President
Japan International Cooperation Agency

Dear Mr. Fujita

It is my great pleasure to submit herewith the Report for the Study on Improvement of Apia Port in Samoa.

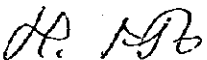
The study team which consists of Tetra Co., Ltd., headed by myself, conducted a survey in Samoa from June to October 1998 as per the contract with the Japan International Cooperation Agency.

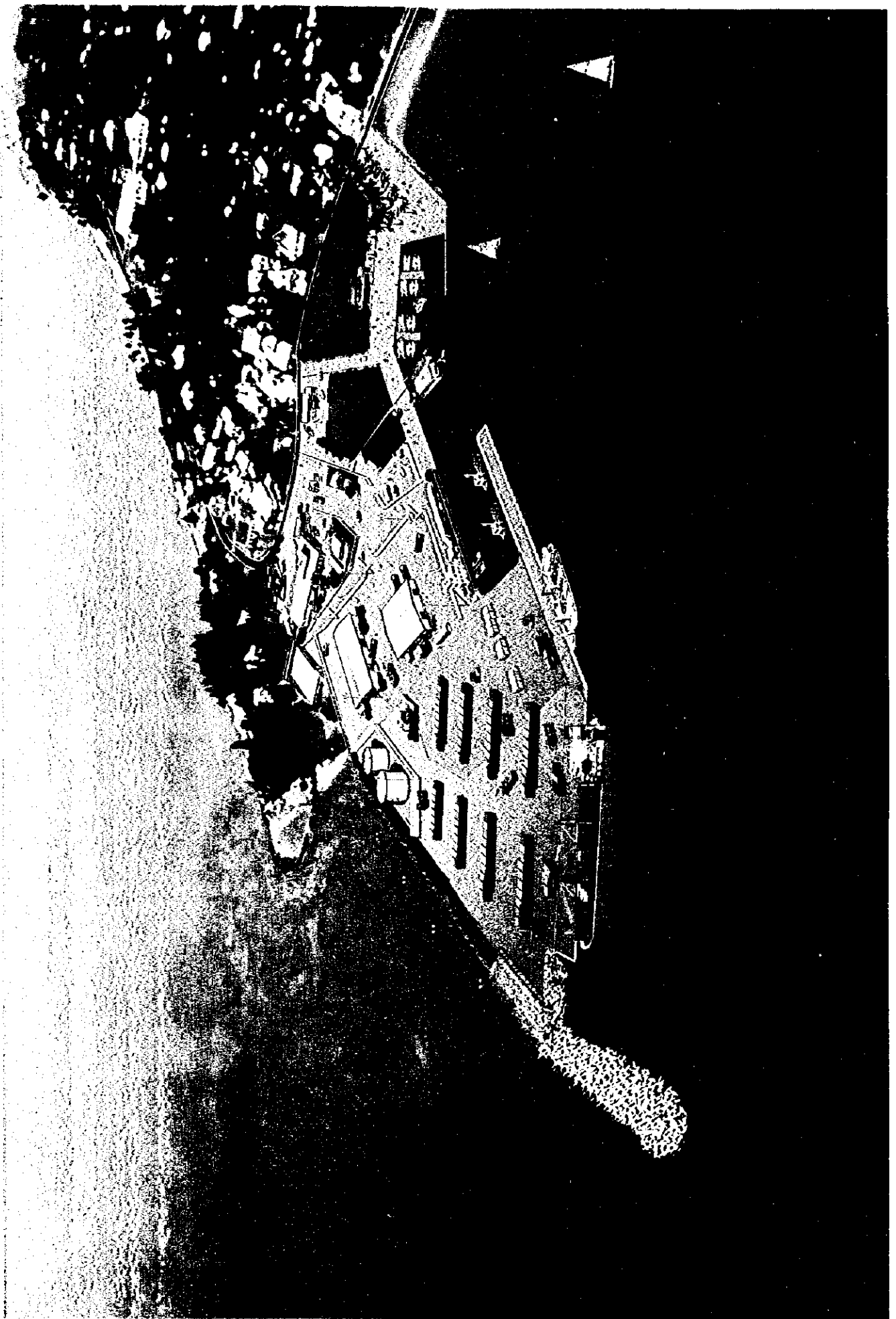
The findings of this survey were fully discussed with the officials of the Ministry of Transport and other authorities concerned to formulate the Master Port Development Plan for the period up to the year 2015 and to formulate and examine the feasibility of the Phased Improvement Plan, and were then compiled into this report.

On behalf of the study team, I would like to express my deepest appreciation to the Government of Samoa and other authorities concerned for their brilliant cooperation and assistance and for the heartfelt hospitality which they extended to the study team during the stay in Samoa.

I am also greatly indebted to the Japan International Cooperation Agency, the Ministry of Foreign Affairs, the Ministry of Transport and the Embassy of Japan in New Zealand for giving us valuable suggestions and assistance during the preparation of this report.

Respectfully,


Hisanori Kato
Leader of the Study Team for
the Study on Improvement of Apia Port
in Samoa



ABBREVIATIONS

ADB	Asian Development Bank
BBE	Betham Brothers Enterprises Limited
CDL	Chart Datum Line
CFS	Container Freight Station
DLSE	Department of Lands, Surveys and Environment
DWT	Dead Weight Tonnage
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
FCL	Full Container Load
FIRR	Financial Internal Rate of Return
GDP	Gross Domestic Products
GRT	Gross Registered Tonnage
IEE	Initial Environmental Examination
JICA	Japan International Cooperation Agency
LCL	Less than Container Load
LOA	Length Overall
MH	Morris Hedstrom Samoa Ltd.
MOT	Ministry of Transport
MSL	Mean Sea Level
NRT	Net Registered Tonnage
PFL	Pacific Forum Line
PWD	Public Works Department
RC	Reinforced Concrete
Ro/Ro	Roll on/Roll off
SPA	Samoa Ports Authority
SS	Suspended Sediment
SSS	Samoa Shipping Service Limited
TEU	Twenty Feet Equivalent Unit
UC	Unity Check
US\$	United States Dollar

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LOCATION MAPS AND PHOTOS

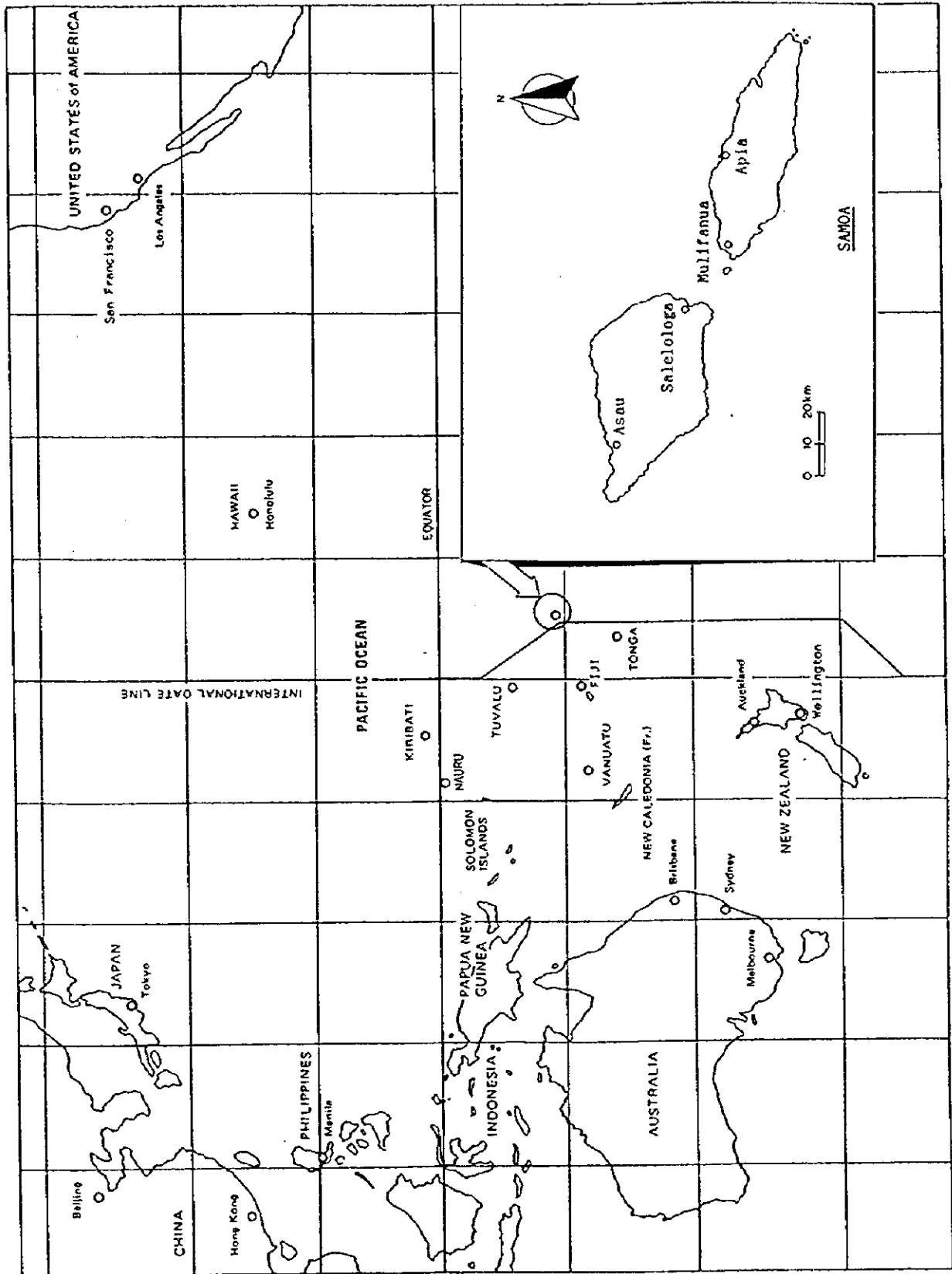


Figure Location of Samoa



Photo - 1 Apia Port

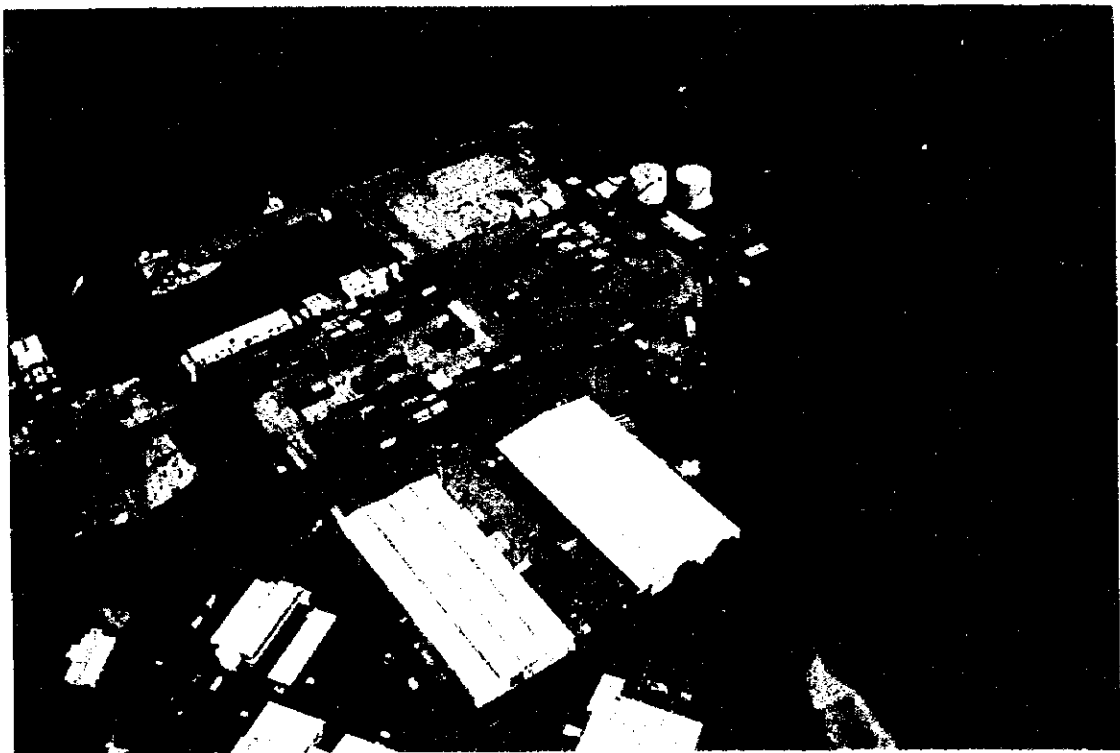


Photo - 2 Port Area

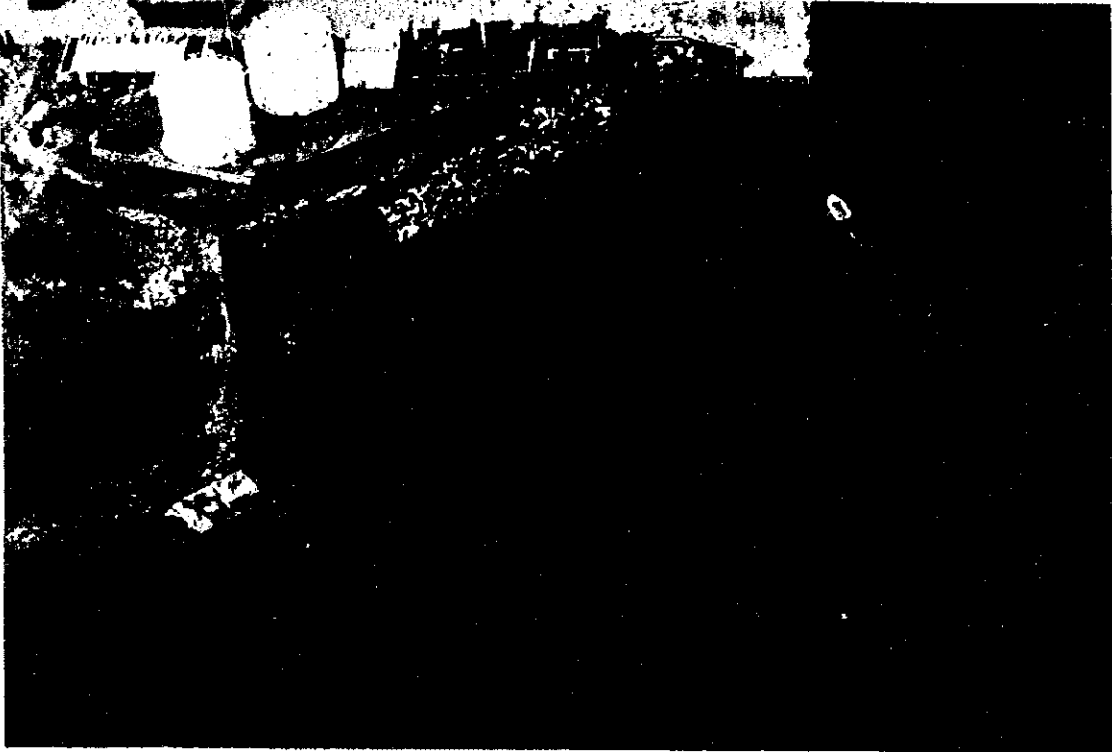


Photo - 3 Proposed Site for New Wharf



Photo - 4 Breakwater and Tanks

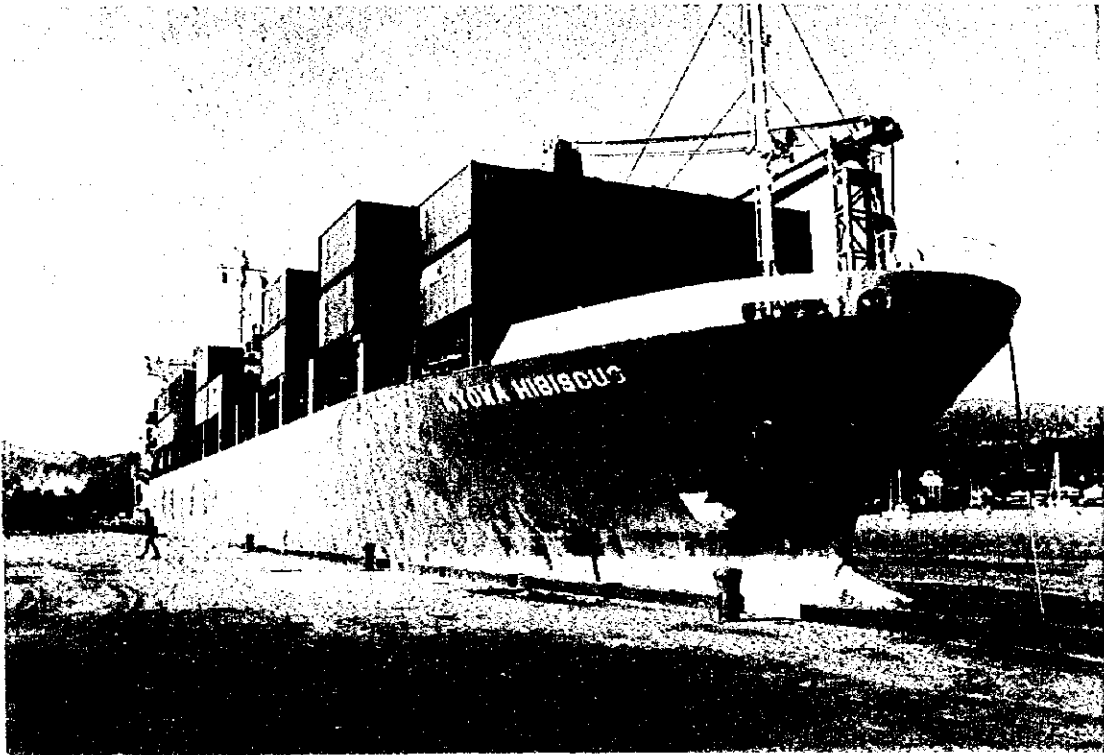


Photo - 5 Berthing of Container Ship, 8000 GRT

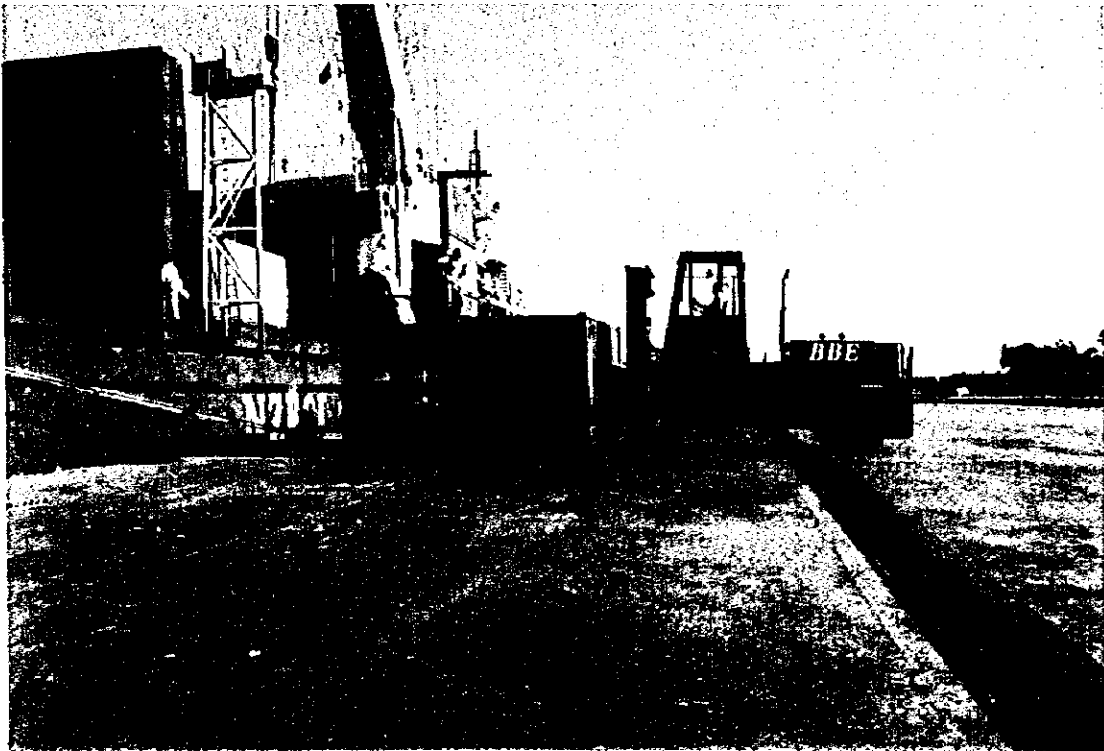


Photo - 6 Forklift caring Container



Photo - 7 Forklift on RoRo Ramp

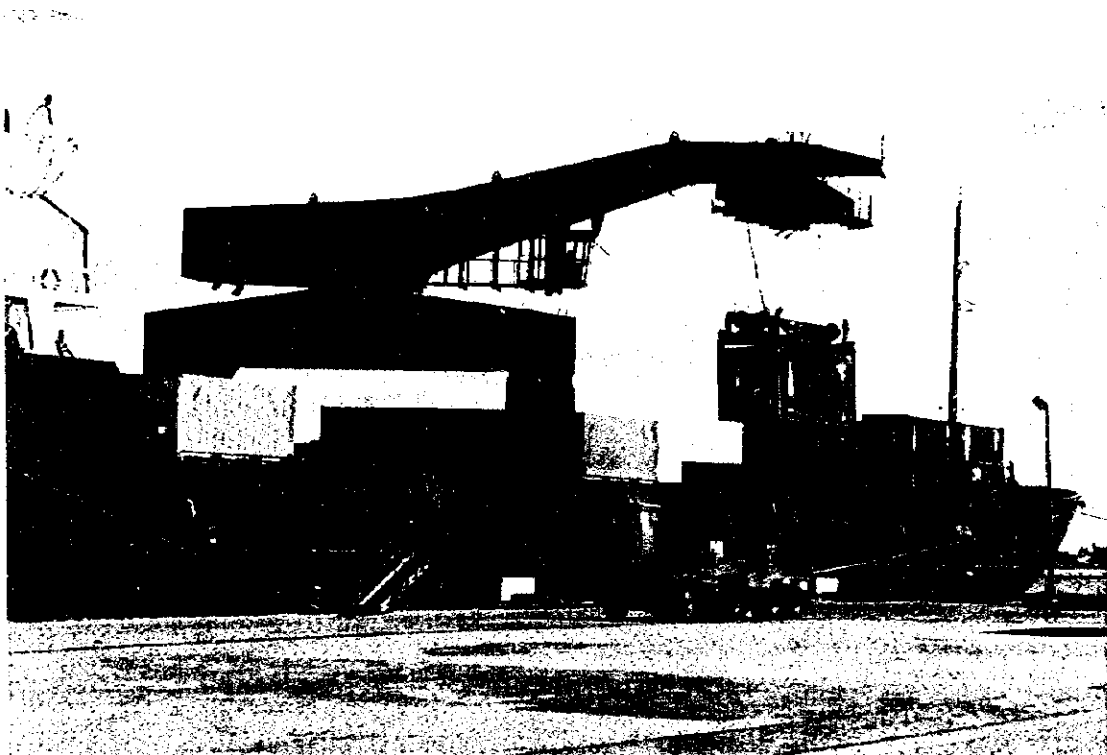


Photo - 8 Container Unloading

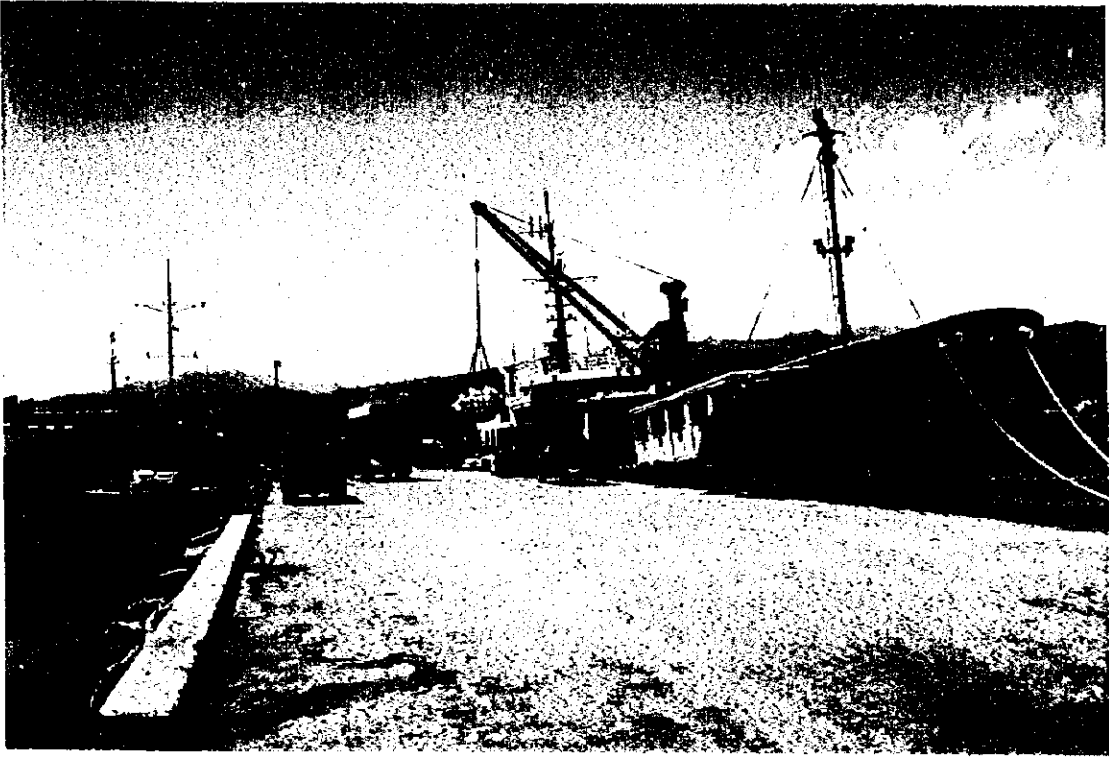


Photo - 9 Conventional Cargo Handling



Photo - 10 Existing Wharf (North End)



Photo - 11 Crack and Spalling of Concrete on Pile Head



Photo - 12 Damage of Beam

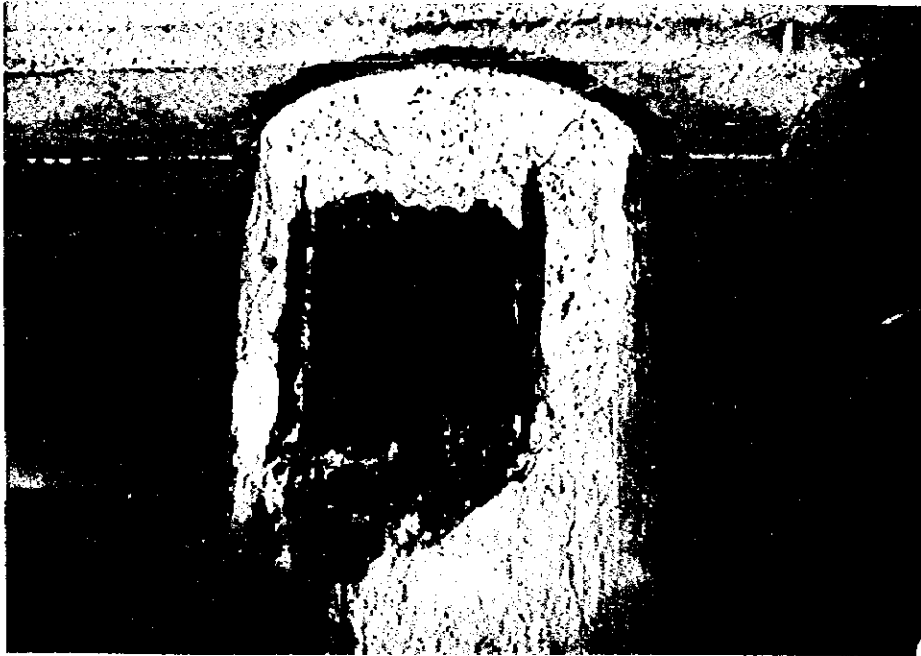


Photo - 13 Corrosion of H Steel Pile



Photo - 14 Broken Concrete Casing of Pile

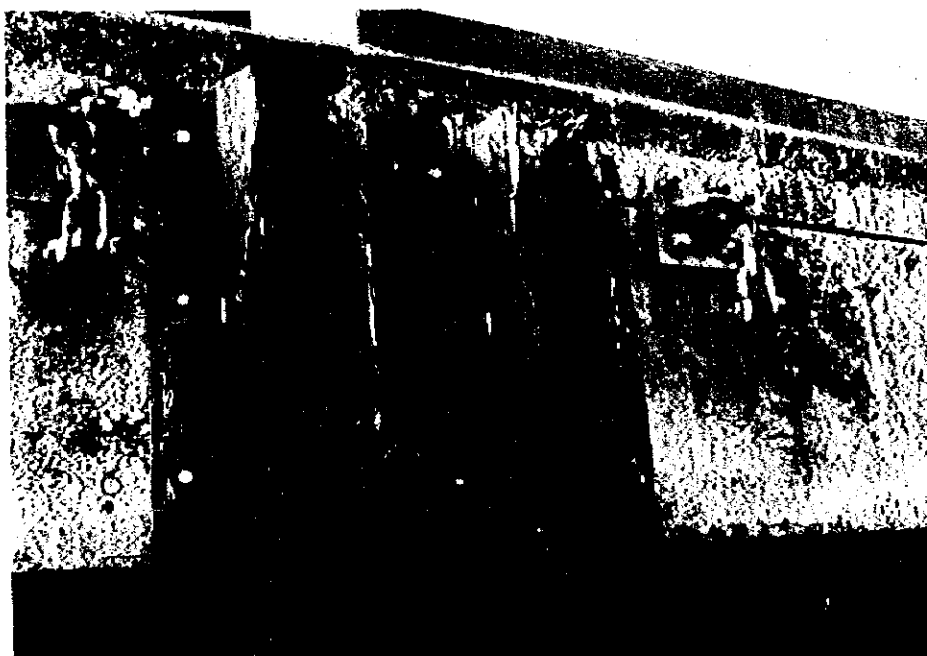


Photo - 15 Damage of Fender

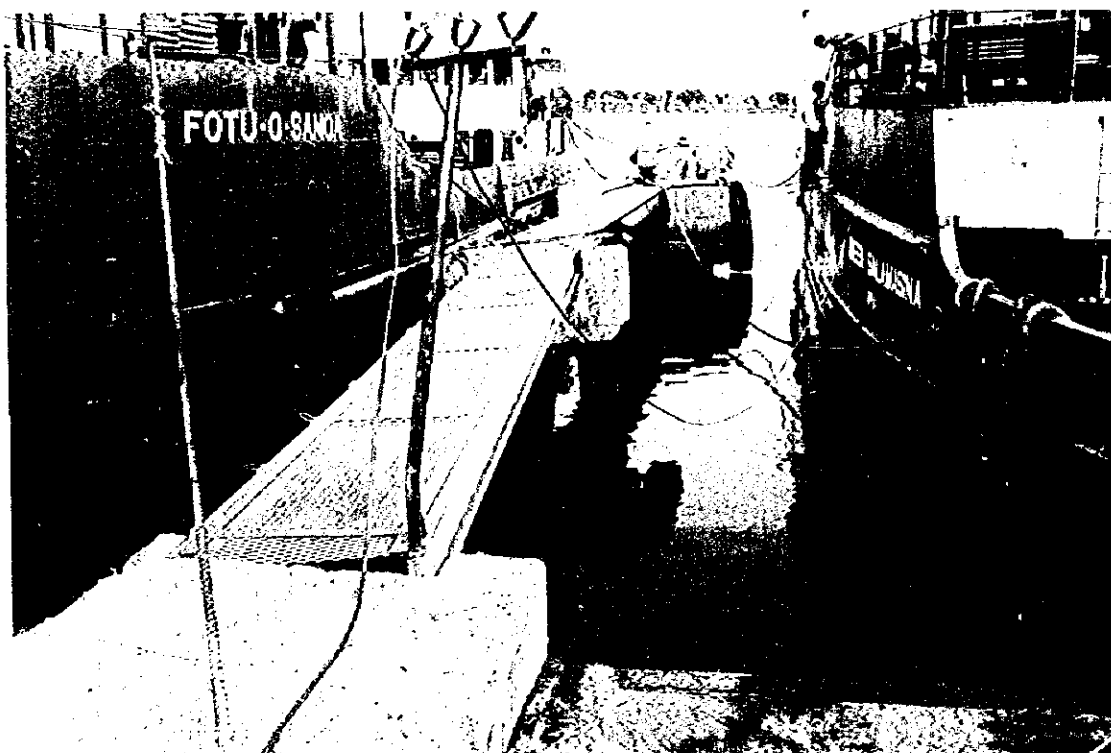


Photo - 16 Damage of Ferry Dolphin



Photo - 17 Cargo Sheds No 3 and No 4

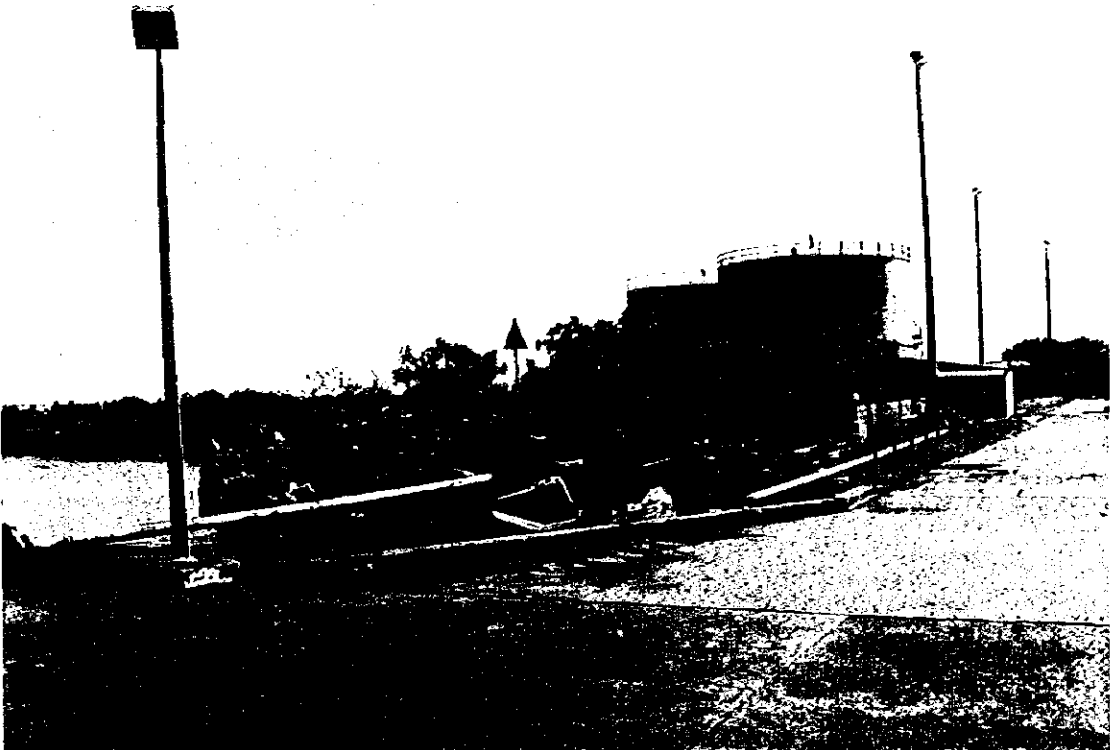


Photo - 18 Tanks and Pipeline

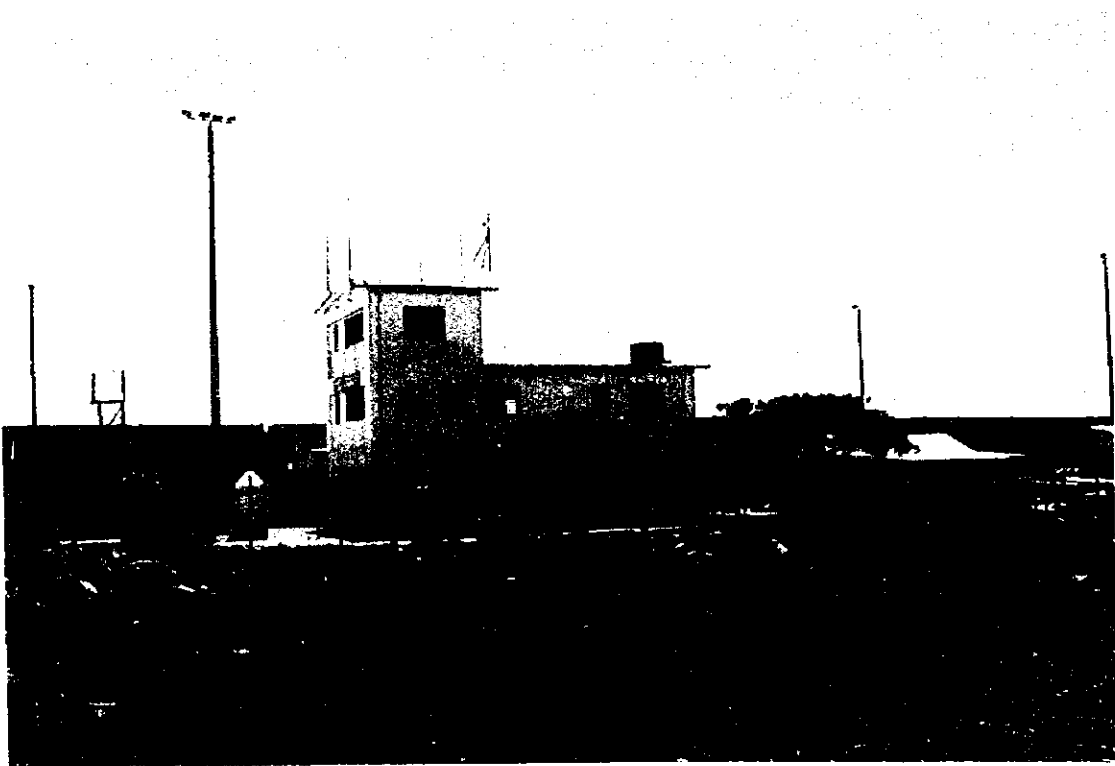


Photo - 19 Marine Office

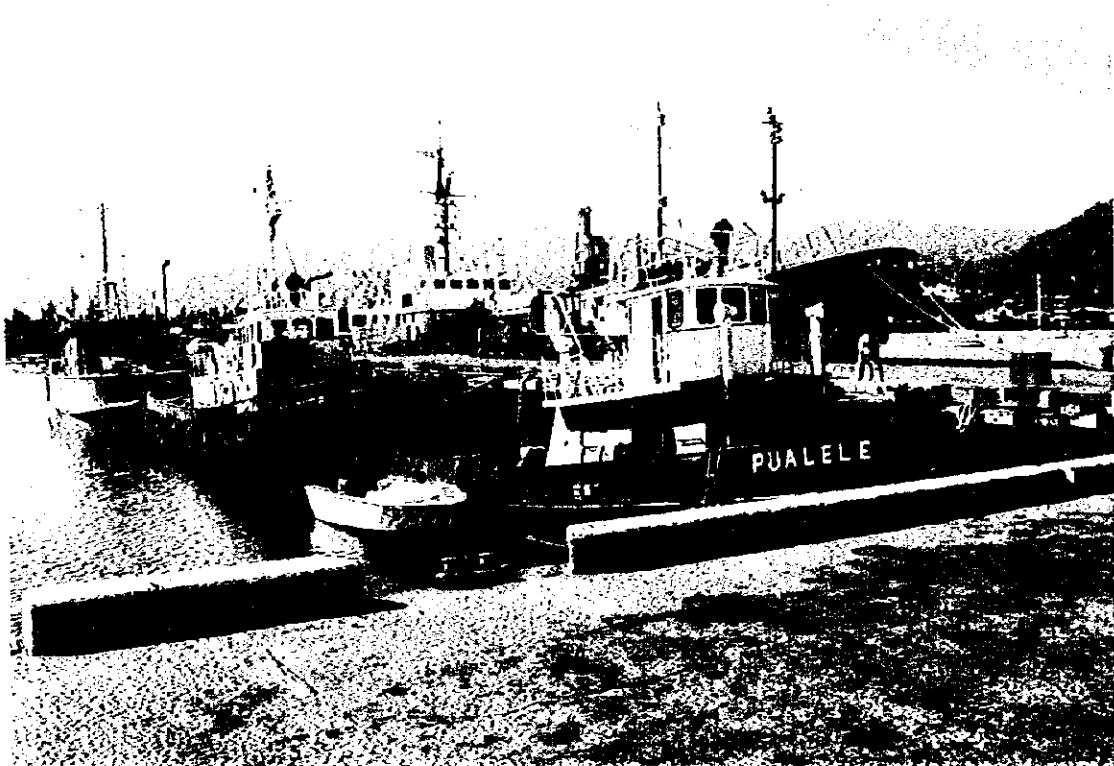


Photo -- 20 Tug Boats, Pualele and Tafola

ABSTRACT

ABSTRACT

Economy and people's lives of Samoa depend heavily on sea transportation due to the country's peculiar geographical conditions. Apia Port is a main gate for international and domestic trades supporting economic activities in Samoa. The existing main wharf has been deteriorated losing structural strength to carry heavy container cargoes. The purpose of the present study is to work out an adequate improvement plan of Apia Port to cope with a future increasing port cargoes.

Recovered from devastating damages caused by two cyclones, cargo volume handled in Apia Port increased from 231,761 t in 1996 to 258,631 t in 1997 with import cargoes of 227,020 t and export cargoes of 31,611 t. In 1997, volume of container cargoes reached to 181,810 t (14,094 TEU). Volume of cargoes to be handled in Apia Port is forecast to increase to 336,013 t in 2003 and 497,969 t in 2015.

1. Present Situation

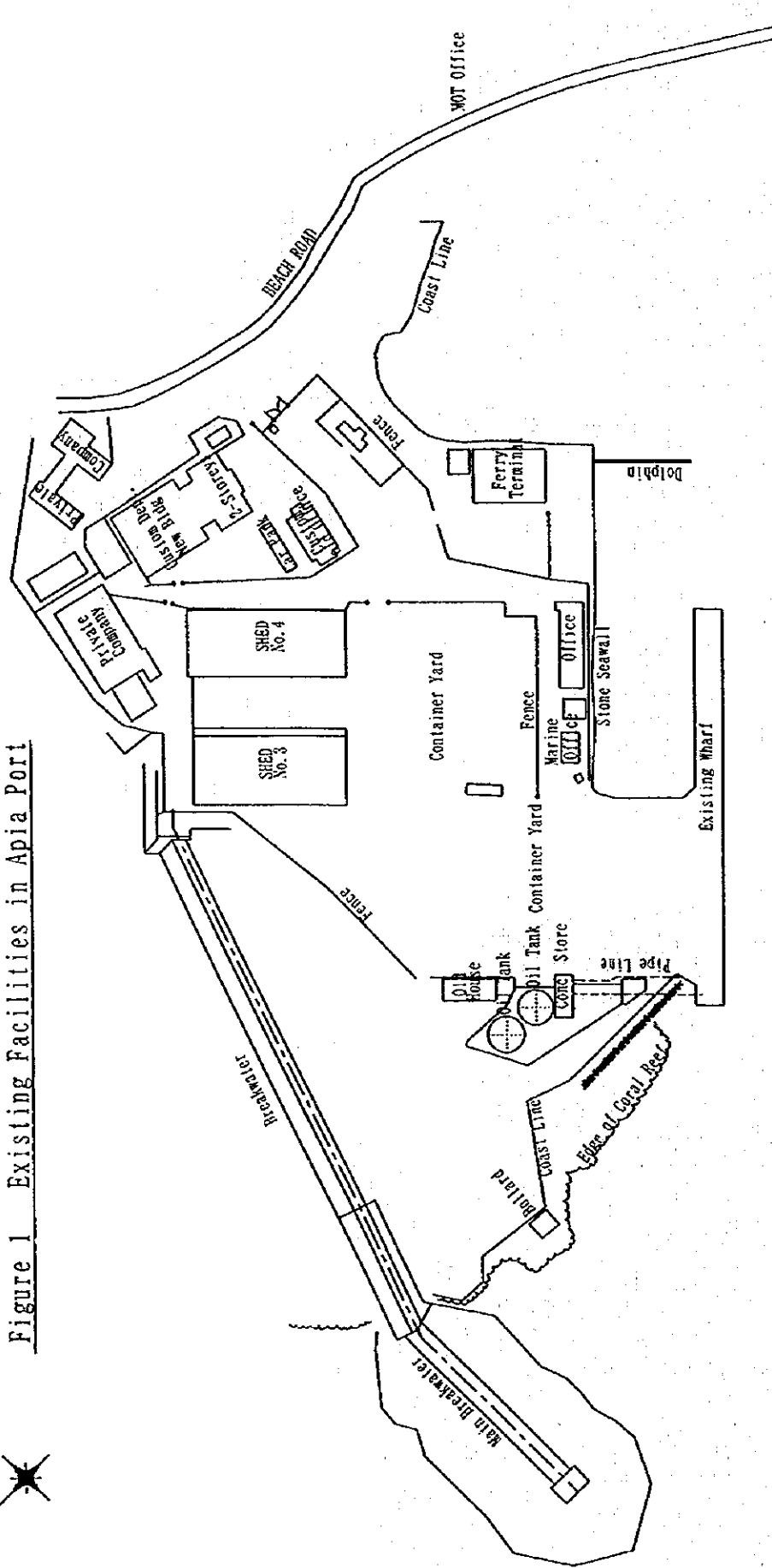
Port Facilities

Layout of Apia Port is shown in Figure-1 and major port facilities are summarized as below,

Breakwater	100 m rehabilitated in 1993
Main Wharf	185 m constructed in 1966
Container Yard	13,000m ² expanded in 1990
Cargo Sheds	2,541m ² , 2,486m ² rehabilitated in 1992
Ferry Wharf	50 m constructed in 1989
Oil Tanks	2 x 1500 t for diesel and coconuts oil
Marine Office	215 m ² , constructed in 1992
Tug Boats	1600 HP purchased in 1991 425 HP purchased in 1972

The existing main wharf of Apia Port has suffered from heavy corrosion on H shaped steel piles supporting the wharf deck to the extent that it could not continue to serve for container handling operation without an urgent rehabilitation work.

Figure 1 Existing Facilities in Apia Port



Cargo and Ship Statistics

Cargo and cargo ship statistics in recent years are summarized in Table-1~2. Cargo volume increased from 171,244 t in 1993 to 258,631 t in 1997 at an annual increase rate of 11 %, while number of container ships' call increased from 130 in 1994 to 154 in 1997 at an annual increase rate of 6 %.

Table-1 Cargo Statistics, 1993-1997 (t)

		1993	1994	1995	1996	1997
Import	Container Cargo	86,764	147,069	102,583	150,569	164,485
	Other Cargo	26,327	32,978	31,010	20,748	23,005
	Oil	41,255	35,197	27,050	31,899	39,530
	Sub Total	154,346	215,244	160,643	203,216	227,020
Export	Container Cargo	10,139	12,295	13,573	13,161	17,325
	Other Cargo	6,759	8,196	9,048	8,895	9,971
	Oil	0	60	6,782	6,489	4,315
	Sub Total	16,898	20,511	29,403	28,545	31,611
Total		171,244	235,795	190,046	231,761	258,631

Table-2 Ship Statistics, 1994-1997

	1994	1995	1996	1997
Cargo Ship				
Container Ship	130	138	134	154
General Cargo Ship	7	8	9	20
Tanker	19	18	20	26
Car Carrier	8	9	2	2
Sub Total	164	173	165	202
Cruise Ship, etc.	40	32	29	38
Grand Total	204	205	194	240

Deterioration Survey

Cross section of the existing wharf is shown in Figure-2. The deterioration of the wharf, having lost the original design strength, led to limitation of load onto the wharf deck and endangers continuation of efficient and safe container cargo handling operation. Results of deterioration surveys are shown in Figure-3~4 and are summarized as below in Table-3;

Table-3 Annual Corrosion Rate of Pile

	No. of Pile Measured	Corrosion Rate, mm/y		No of Pile Cracked	No of Beam Damaged
		w/protection, max./ave.	wo/protection, max./ave.		
Under Water	307	0.01/0.004	0.039/0.015	92	—
Above Water	307	—	0.443/0.30	209	—
Beam	—	—	—	—	35

Note: Number of piles is 266 supporting wharf deck and 41 supporting access bridge totaling 307.

Steel members under water are effectively corrosion-protected by cathodic protection, while the portion above water is not protected at all. About 70 % of piles are cracked on pile head concrete casing above water, and rate of corrosion on H piles through these cracks is measured remarkably high.

Structural Analysis

To evaluate the current and future structural strength of the existing wharf, a 3-dimensional finite-element structural analysis has been conducted based on the results of corrosion survey. Results of structural analysis are shown in Table 4 ~5.

Table-4 Maximum Stress on Pile Head and U.C. Value

	1998		2003	
	Stress (kgf/cm ²)	U.C. Value	Stress (kgf/cm ²)	U.C. Value
Corrosion Rate				
Average 0.3 mm/y	1,361	0.97	1,632	1.17
Max. 0.45 mm/y	1,538	1.10	2,137	1.53

Note: U.C. Value=Stress/Allowable Stress(1400 kgf/cm²)

Based on the results of steel thickness measurement in 1998, corrosion rate is calculated from 1990 to 1998.

Table-5 Allowable Buckling Load and Axial Force

Corrosion Rate	1998			2003		
	Axial Force (tf)	Allowable Buckling Load (tf)	U.C. Value	Axial Force (tf)	Allowable Buckling Load (tf)	U.C. Value
Av. 0.005 mm/y	60	64.7	0.93	60	64.5	0.93
Maximum 0.01 mm/y	60	61.5	0.98	60	61.2	0.98

Note: U.C. Value=Axial Force/Allowable Buckling Load

Based on the results of steel thickness measurement in 1998, corrosion rate is calculated from 1966 to 1998.

The sections of steel piles both above and under water are structurally in a critical condition with U.C. value of about 1 or more under the load condition of 24 t container and 33 t forklift. The existing wharf will be constantly losing structural strength with progressive corrosion on the steel piles, therefore a strict limitation of load onto the wharf is required.

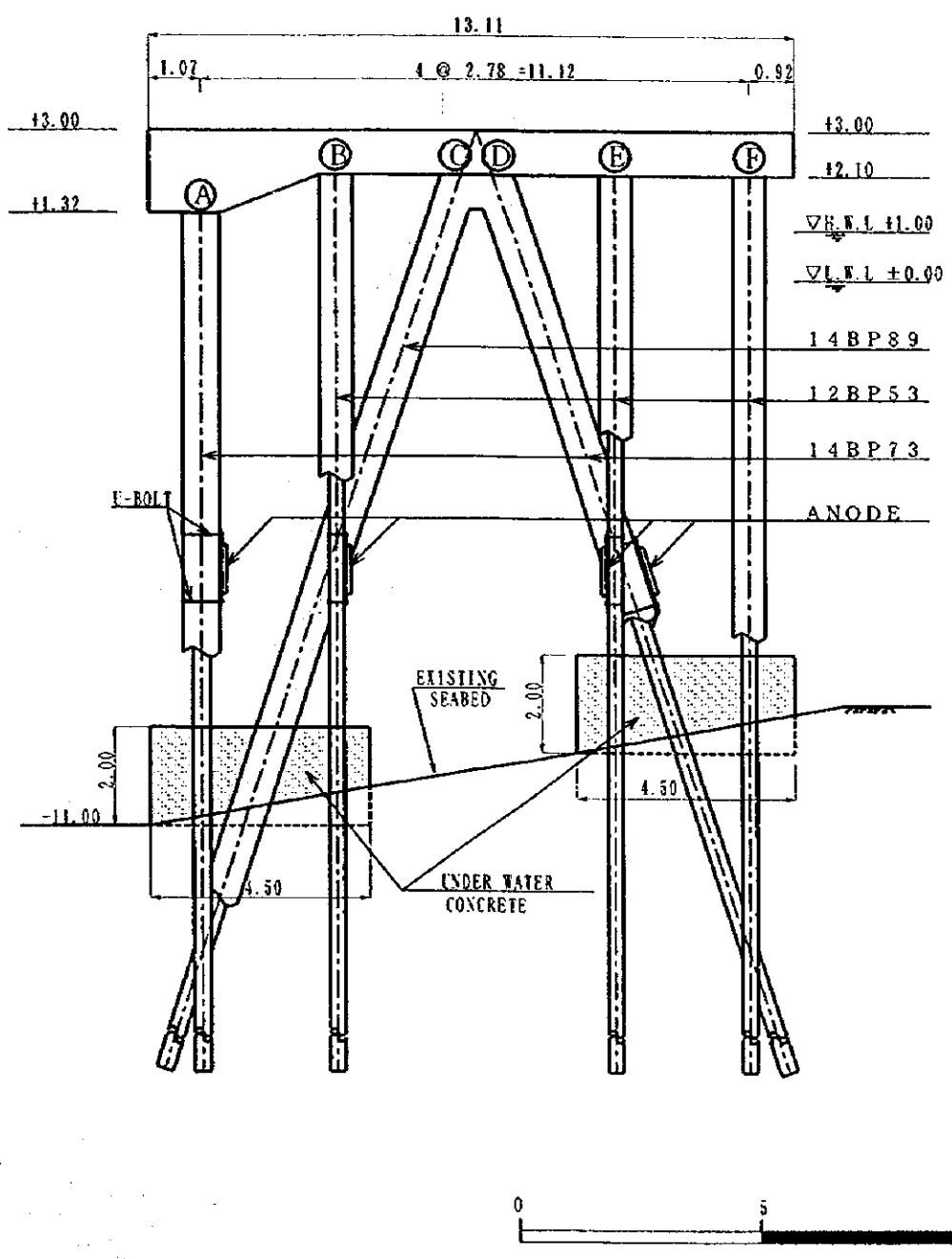
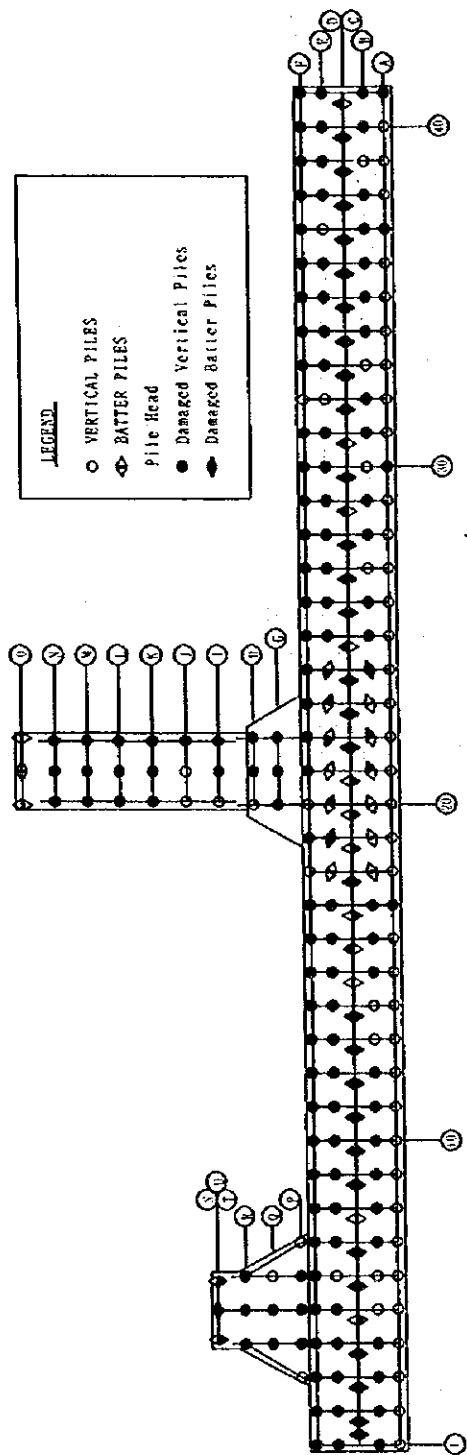


Figure 2 Cross Section of Existing Wharf



CENTRAL APPROACH

Figure 3 Location of Piles Damaged in Pile Head

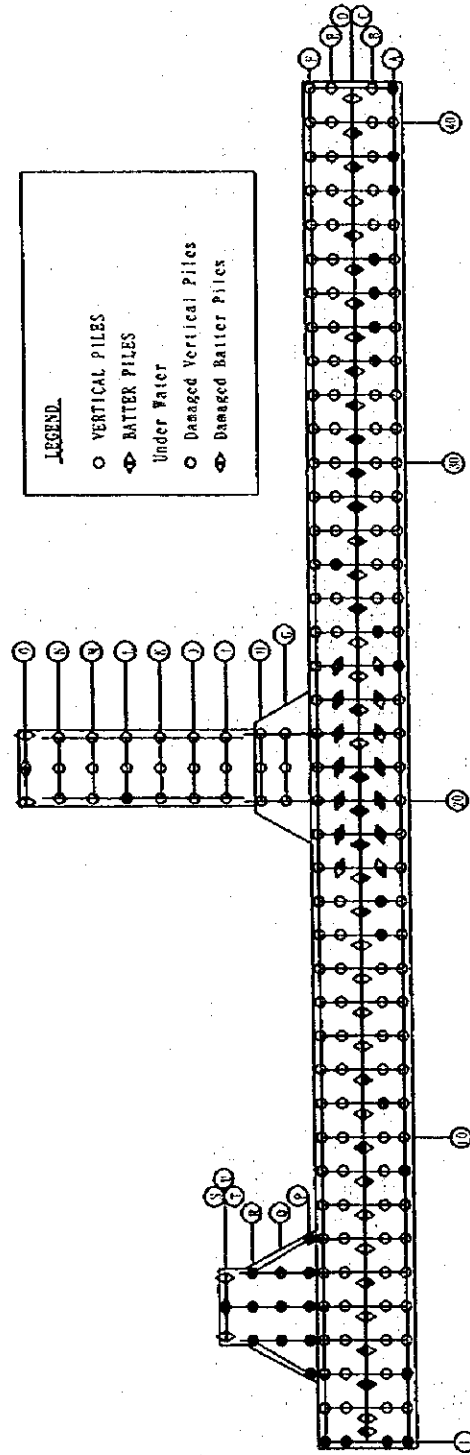


Figure 4 Location of Piles Damaged Underwater

2. Master Port Development Plan

Traffic Demand Forecast

Future traffic demand is forecast as shown in Figure-5 and Table-6. Volume of export cargoes decreased due to serious cyclone damages and taro leaf blight disease, which is made up for by export of tuna and car parts. Recent custom tax cut is expected to bring increase of both import and export. Increasing trend of port cargo to be handled in Apia Port is summarized in Table-7 below,

Table-7 Increase of Port Cargo (000 t)

	1997	2003	2015
Import	227 (100%)	291 (128%)	429 (189%)
Export	32 (100%)	45 (141%)	69 (216%)
Total	259 (100%)	336 (130%)	498 (192%)

Volume of port cargo to be handled in Apia Port increases from the present level of 259,000 t in 1997 to 336,000 t, 1.3 times in 2003 and 498,000 t, 1.9 times in 2015 at an annual rate of about 2 %. Share of export cargo remains at 12-14 % over the total cargo volume.

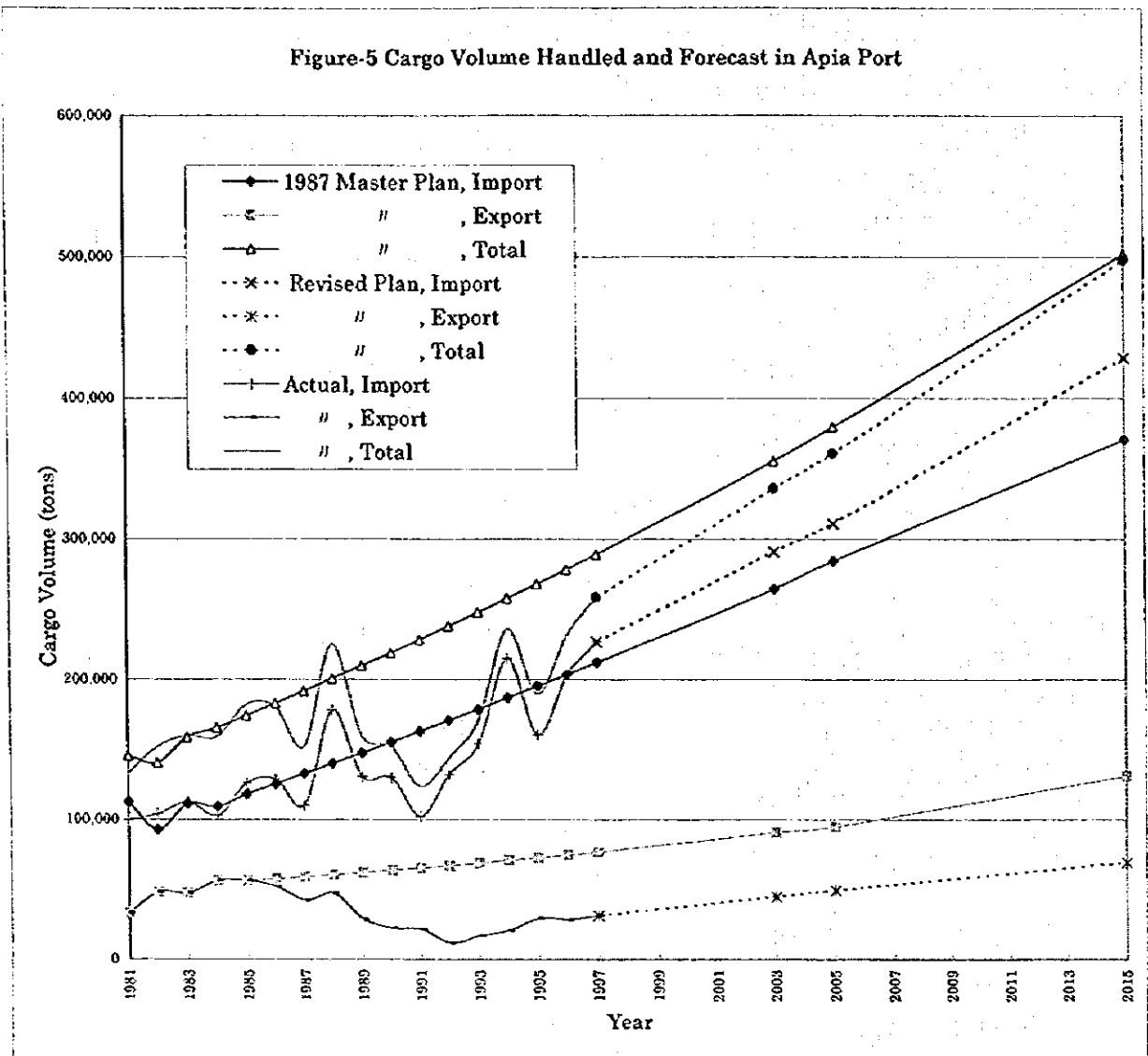
A corresponding number of ships to transport above cargoes is forecast as shown in Figure-8 and Table-8 and summarized in Table-9 below,

Table-9 Increase of Ship's Call

	1997	2003	2015
Container Ship	142	175	227
General Cargo Ship	17	19	24
Tanker	21	6	34
Cruise Ship	13	16	21
Diplomatic Ship	3	3	5
Others	17	21	27
Total	19 (100%)	261 (119%)	338 (154%)

Number of ship's call does not increase at the same rate as port cargo because larger cargo will be carried by one shipment (with larger ship). In 2015, ship's call will increase from 219 in 1997 to 338 at an annual rate of 2.4 %.

Figure-5 Cargo Volume Handled and Forecast in Apia Port



Cargo Avolume (t)

Year	1981	1983	1985	1987	1989	1991	1993	1995	1997	2003	2005	2015
1987 Master Plan, Import	112,526	111,372	118,117	132,814	147,652	163,012	178,879	195,231	212,288	264,538	284,500	370,647
" , Export	33,117	47,448	56,069	58,906	62,043	65,381	68,939	72,737	76,797	90,831	95,000	131,191
" , Total	145,643	158,820	174,186	191,720	209,695	228,393	247,818	267,969	289,085	355,370	379,500	501,838
Revised Plan, Import	99,732	103,875	112,501	102,866	126,124	128,768	110,142	178,272	227,020	291,094	311,229	428,654
" , Export	33,117	48,175	47,448	56,353	56,069	51,871	42,075	47,097	31,611	44,919	49,484	69,315
" , Total	132,849	152,050	159,949	159,219	182,193	180,639	152,217	225,369	258,631	336,013	360,713	497,969
Actual, Import	99,732	112,501	126,124	110,142	130,742	102,139	154,346	160,643	227,020	0	0	0
" , Export	33,117	47,448	56,069	42,075	28,463	21,650	16,898	29,403	31,611	0	0	0
" , Total	132,849	159,949	182,193	152,217	159,205	123,819	171,244	190,046	258,631	0	0	0

Table-6 Cargo Forecast, 2001-2015

(t)

		Commodity	2001	2003	2005	2007	2009	2011	2013	2015	
I M P O R T	G C	Sugar	9,428	9,476	9,524	9,570	9,615	9,658	9,701	9,742	
	E A	Cement	12,353	12,828	13,136	13,723	14,193	14,680	15,183	15,702	
	N R	Steel Products	7,641	7,935	8,126	8,488	8,779	9,080	9,392	9,713	
	E G	Cereals	13,402	14,042	14,713	15,415	16,152	16,923	17,731	18,578	
	R O	Wire Harness	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	
	A	Others	177,233	195,960	212,903	230,646	249,178	267,956	289,267	310,912	
	L	Sub Total	223,557	243,742	261,902	281,342	301,416	321,797	344,773	368,147	
	Oil	Oil Products	44,843	47,353	49,327	51,384	53,527	55,759	58,084	60,507	
	IMPORT TOTAL			268,400	291,094	311,229	332,726	354,943	377,556	402,858	428,654

E X P O R T	Taro	988	2,737	4,667	5,365	6,168	7,090	7,642	7,723	
	G C	Cocoa	67	214	284	355	436	535	655	801
	E A	Copra Meal	4,013	4,245	4,489	4,748	5,021	5,310	5,616	5,940
	N R	Copra	5,635	5,867	6,109	6,361	6,623	6,896	7,181	8,672
	E G	Coconut Cream	1,595	1,687	1,785	1,887	1,996	2,111	2,233	2,362
	R O	Fish	3,781	4,564	5,523	6,683	8,086	9,784	10,000	10,000
	A	Wire Harness	4,700	4,700	4,700	4,700	4,700	4,700	4,700	4,700
	L	Others	10,521	11,015	11,476	12,417	13,122	13,867	14,654	15,343
	L	Sub Total	31,301	35,029	39,033	42,516	46,152	50,294	52,681	55,541
	Oil	Coconut Oil	9,620	9,889	10,451	11,044	11,672	12,334	13,035	13,775
EXPORT TOTAL			40,921	44,919	49,484	53,561	57,824	62,628	65,716	69,315
GRAND TOTAL			309,320	336,013	360,713	386,287	412,767	440,184	468,573	497,969

I M P O R T	Container Cargo	201,201	219,367	235,712	253,208	271,274	289,617	310,296	331,332	
	Other Dry Cargo	22,356	24,375	26,190	28,134	30,142	32,180	34,477	36,815	
	Oil Products	44,843	47,353	49,327	51,384	53,527	55,759	58,084	60,507	
	Sub Total	268,400	291,094	311,229	332,726	354,943	377,556	402,858	428,654	
	TEU									
E X P O R T	Container Cargo	21,910	24,520	27,323	29,761	32,307	37,721	39,511	41,656	
	Other Dry Cargo	9,390	10,509	11,710	12,755	13,846	12,574	13,170	13,885	
	Coconut Oil	9,620	9,889	10,451	11,044	11,672	12,334	13,035	13,775	
	Sub Total	40,921	44,918	49,484	53,561	57,824	62,628	65,716	69,315	
	TEU									
GRAND TOTAL			309,320	336,012	360,713	386,287	412,767	440,184	468,573	497,969

Table 8 Ship's Call Forecast, 2001-2005

Year	2001	2003	2005	2007	2009	2011	2013	2015
Ship's Type								
Container Ship	166	175	184	192	201	210	218	227
General Cargo Ship	18	19	20	21	22	22	23	24
Tanker	25	26	27	29	30	31	33	34
Cruise Ship	15	16	17	18	19	19	20	21
Diplomatic Ship	4	4	4	4	5	5	5	5
Others	20	21	22	23	24	25	26	27
Total	248	261	274	287	301	312	325	338

Port Development Plan

Master Port Development Plan is formulated to meet traffic demand forecast in 2015 as shown in Figure-6. The capacity of Apia Port is evaluated from viewpoint of handling future port cargoes, and then improvement of the existing port facilities such as berth, container yard, open storage yard, sheds, etc. is planned to meet future traffic demand in an efficient and safe manner.

The deterioration survey and structural analysis have revealed that the existing wharf has already become unable to carry heavy container handling equipment due to progressive corrosion of the piles. Therefore, provision of one container berth by either new construction or reconstructing/reinforcing the existing wharf is absolute and urgent necessity. While, the port cargoes are forecast to increase to almost double the present volume.

The future conditions of port congestion are analyzed and compared for three cases of

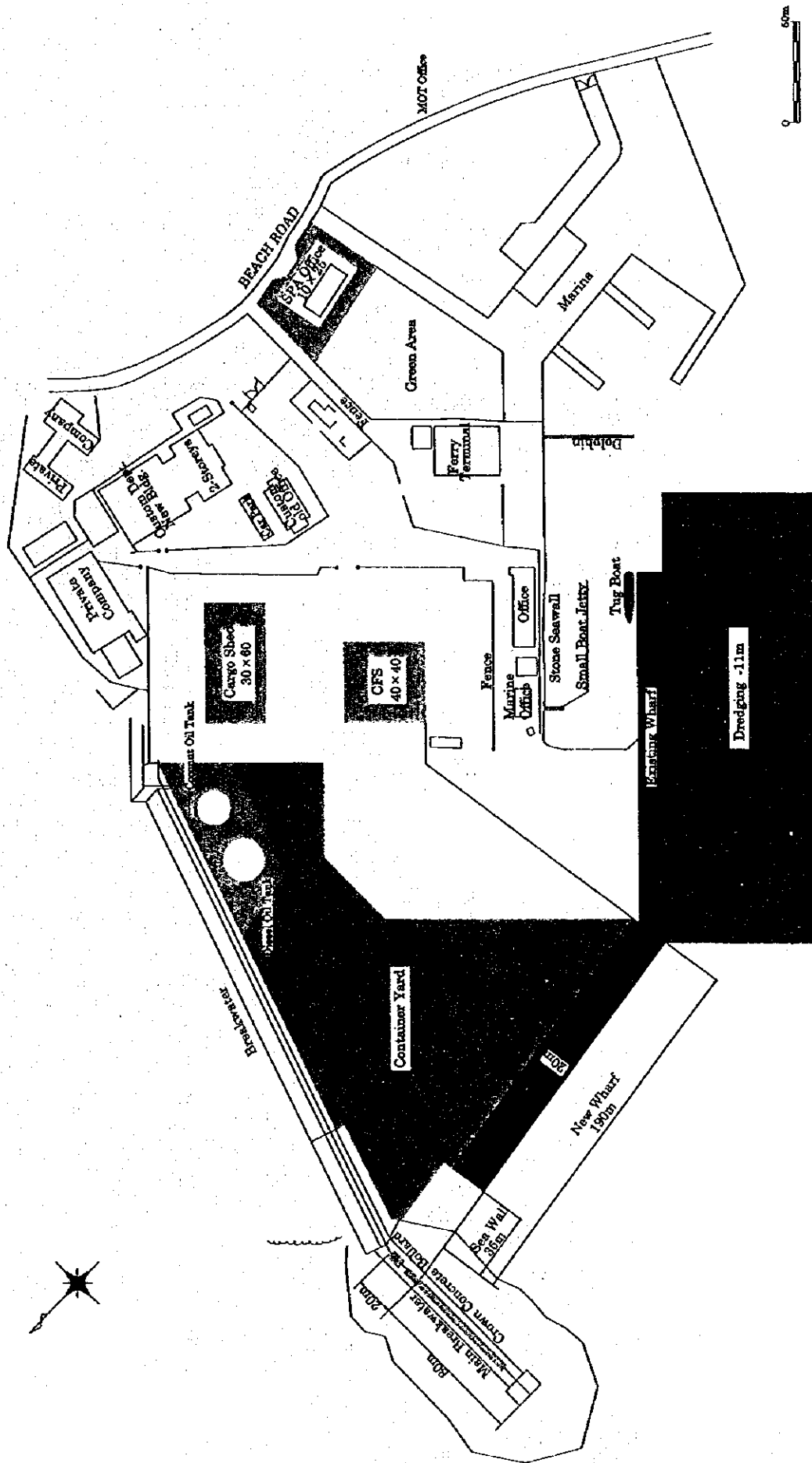
- 1) one improved existing wharf for all ships,
- 2) one new wharf for container ships plus one rehabilitated existing wharf for the other ships and
- 3) one improved existing wharf plus one new wharf both for all ships as summarized in Table-10.

Table-10 Future Conditions of Apia Port

	1997	2015
Ship's Call	219 (100%)	338 (154%)
Case 1: 1 Berth		
Berth Occupancy	50.0	80.9
Waiting Time/Ship (hour)	15.4	29.3
Case 2: New & Rehab. Berths		
Berth Occupancy	50.0	47.2
Waiting Time/Ship	15.4	14.8
Case 3: 2 New Berths		
Berth Occupancy	50.0	45.8
Waiting Time/Ship	15.4	10.3

Waiting time of ship in Case 1 increases to 1.90 times the present level in 2015 and 1.27 times in 2003, while in Case 2, waiting time remains at an acceptable level of 0.77 and 0.96 times the present level in the same year. Case 3 gives the waiting time much smaller than the present value. Value of berth occupancy in three cases indicates that the port has already reached saturation point of congestion and shall be provided two berths.

Figure-6 MASTER PORT DEVELOPMENT PLAN, 2015



Improvement works required to the port facilities in the master plan are summarized in Table-11.

Table-11 Major Port Facilities Proposed in 2015

(1) Dredging turning and berthing areas	210,000 m ³
(2) Breakwater crown concrete block placement	70 m
(3) Existing Wharf corrosion protection to piles	307 Nos
(4) New Wharf	190 m
(5) Small Boat Jetty	20 m
(6) Mooring Buoy for Tanker relocation to offshore	1 LS
(7) Container Yard	21,000 m ²
(8) CFS	1,600 m ²
(9) Shed	1,800 m ²
(10) Oil Tanks relocation to innermost part of container yard	1 LS
(11) Administration Office	450 m ²
(12) Tug Boat	1 No, 1600 HP

(1) Dredging

Water depth along the line perpendicular to the center of the wharf is estimated to decrease to about 9.5 m. This siltation will endanger safe ship maneuvering and the dredging work shall be planned.

(2) Breakwater

The berthing area in front of the new wharf is not sheltered enough for efficient cargo handling operation. Improvement of the existing breakwater is planned in the phased improvement plan to be improved to reduce transmitting waves.

(3) Existing Wharf

According to the results of deterioration and corrosion survey and to meet the increasing traffic demand, adequate repair work to the existing wharf is required for conventional cargo handling.

(4) New Wharf

Construction of a new wharf is planned in the phased improvement plan due to difficulty of extending service life of the existing wharf by repair or reinforcement. One berth is not enough to handle increasing port cargoes in future.

(5) Small Boat Jetty

A small boat jetty is required in front of the existing pilot office for efficient port services to be rendered by tug boats and pilot boats.

(6) Mooring Buoy for Tanker

Relocation of the mooring buoys for tanker is necessary to secure navigational safety in the channel and turning basin.

(7) Container Yard

A container yard is required at the back of the new wharf. Layout of the container yard is different from the layout proposed in the feasibility study in 1987 due to the installation of the breakwater on the reef flat located in the north of the port area.

(8) CFS

CFS (Container Freight Station) is planned together with cargo sheds to replace the existing sheds.

(9) Shed

Cargo sheds are planned in the same manner of the CFS.

(10) Oil Tanks

The existing diesel and coconut oil tanks located in the center of the planned new container yard are planned to be demolished and the new tanks be constructed in the innermost part of the container yard for safe and smooth container handling operation.

(11) Administration Office

A new office is necessary to accommodate Port Authority Staff and planned in the phased improvement plan.

(12) Tug Boat

Introduction of a tug boat of the same specifications as those of the previous one is planned to replace the existing one purchased in 1972.

Construction cost of Master Port Development Plan is shown in Table-12.

Table-12 Construction Cost of Master Plan

No	Facility	Unit	Quantity	Unit Cost (Tala)	Construction Cost (Tala thousand)		
					Total	Foreign Portion	Local Portion
1.	Dredging	m ³	210,000	50	10,500	8,400	2,100
2.	Improvement of Breakwater	M	70	21,600	1,511	907	604
3.	Rehabilitation of Existing Wharf	M	185	15,450	2,858	2,715	143
4.	New Wharf	M	190	162,200	30,822	25,188	5,634
5.	Minor Repair Works	Ls	1		409	245	164
6.	Small Boat Jetty	M	20	3,300	70	60	10
7.	Relocation of Mooring Buoy for Tanker	Ls	1		440	374	66
8.	Container Yard	m ²	21,000	450	9,450	2,835	6,615
9.	Renovation of Existing Gate	Ls	1		220	44	176
10.	Marina	m ²	10,000	420	4,200	1,260	2,940
11.	Green Area	m ²	4,500	160	720	144	576
12.	CFS	m ²	1,600	3,400	5,100	1,530	3,570
13.	Shed	m ²	1,800	2,300	3,450	1,035	2,415
14.	Maintenance Shop	m ²	200	2,800	560	168	392
15.	Oil Tanks	Ls	1		810	324	486
16.	Administration Office	m ²	450	3,450	1,553	450	1,103
17.	Tug Boat 1600 HP	No	1		7,063	7,063	0
	Sub-total				79,736	52,742	26,994
18.	Engineering Services (No.1 to No.17) x 0.09	Ls	1		7,176	4,111	3,065
19.	Physical Contingency (No.1 to No.11) x 0.10	Ls	1		6,120	4,217	1,903
	Sub-total				13,296	8,328	4,968
	Grand Total				93,032	61,070	31,962

1 Tala = 0.3280 US Dollar = 44.95 Japanese Yen

3. Phased Improvement Plan

It is clarified through deterioration survey and structural analysis on the existing wharf that the existing wharf is seriously deteriorated and shall be urgently replaced with a newly constructed wharf or be reinforced/ reconstructed in order to maintain safe and efficient container handling services in Apia Port.

On this background, the following three structural design alternatives shown in Figure 7~9 are taken up as a possible improvement work to the existing wharf in the phased improvement plan,

-Plan 1 (Figure-7)

to construct a new container berth and rehabilitate the existing wharf serviceable beyond 2015 for conventional cargoes,

-Plan 2/3 (Figure-8, -9)

to demolish and reconstruct the existing wharf (Plan 2), or to reinforce it with additional piles (Plan 3-1 with 2 piles, Plan 3-2 with 5 piles) and construct the second container berth later, until then accepting port congestion.

Berthing facilities in each option are illustrated in Figure-10,

Figure-10 Improvement Schedule of Berthing Facilities

	1998	2003	2013	2015
Plan 1
Existing Wharf repaired
New Wharf
<hr/>				
Plan 3-2
Existing Wharf no repair
Reconstruction of Existing Wharf
2nd Wharf

Above plans are evaluated by means of internal rate of return (EIRR) and the alternative plan 1 has been ranked as the best.

Figure-11 illustrates accumulated net benefits of Plan 1 and Plan 3-2 over the period from commencement of the project to 2005 and higher economic return of Plan 1 is clearly seen.

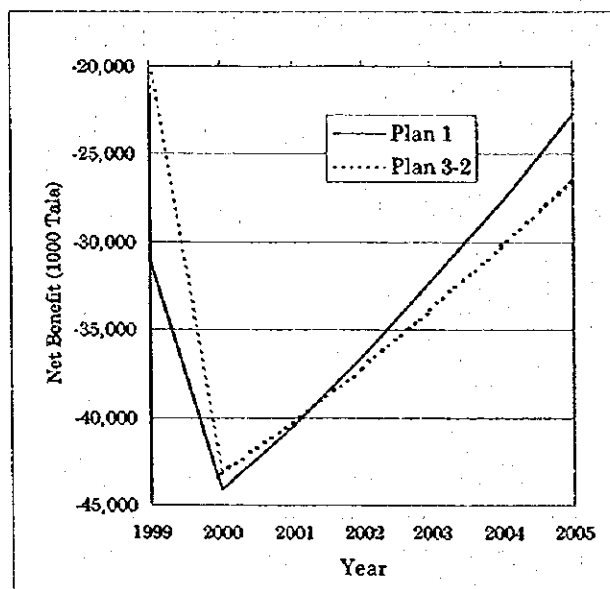


Figure-11 Comparison of Net Benefit

Three alternative improvement plans are compared as shown in Table-13 below;

Table-13 Comparison of Alternative Plans

	Plan 1	Plan 2	Plan 3-1	Plan 3-2
Interference with Port Operation	Negligible	Serious	Considerable	Considerable
Ease of Construction	Good	Fair	Bad	Fair
Construction Cost	Medium	High*	Low*	Low*
Economic Benefits	Excellent	Fair	Fair	Fair
Overall Evaluation	○	×	△	△

* : Construction cost becomes higher than that of Plan 1 when 2nd berth is included.

Through comparison above, Plan 1 is evaluated as the best and selected in the phased improvement plan.

Of the improvement works proposed in the Master Plan, the works which need to be urgently implemented, are included in the phased improvement plan. The phased improvement plan, adopting the alternative plan 1, includes such major components as 1) improvement of the breakwater, 2) rehabilitation of the existing wharf, 3) construction of the new wharf, 4) construction of a new office building, 5) purchase of a tug boat and 6) minor repair works.

Figure-7 ALTERNATIVE IMPROVEMENT PLAN 1

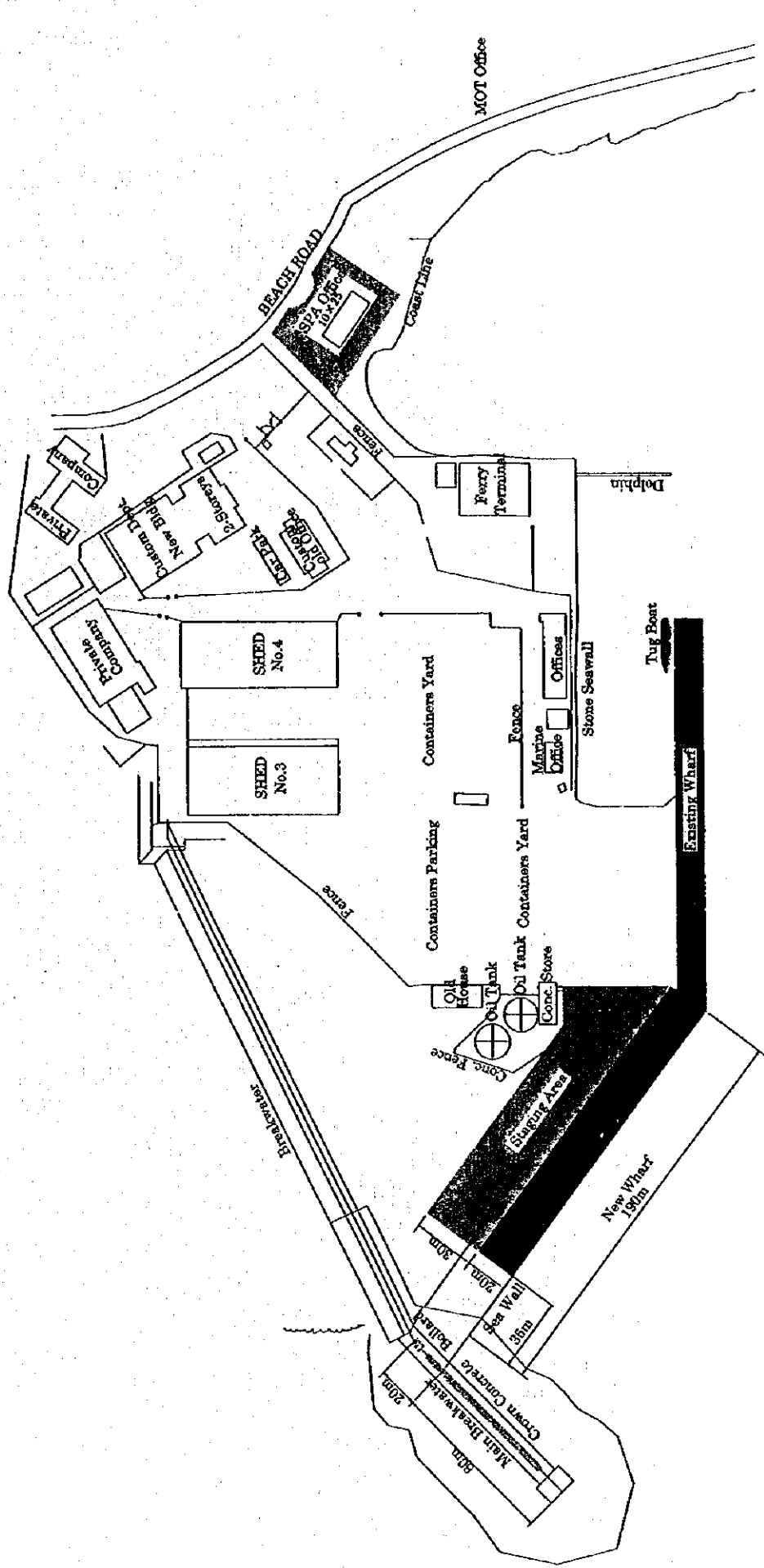


Figure-8 Alternative Improvement Plan 2

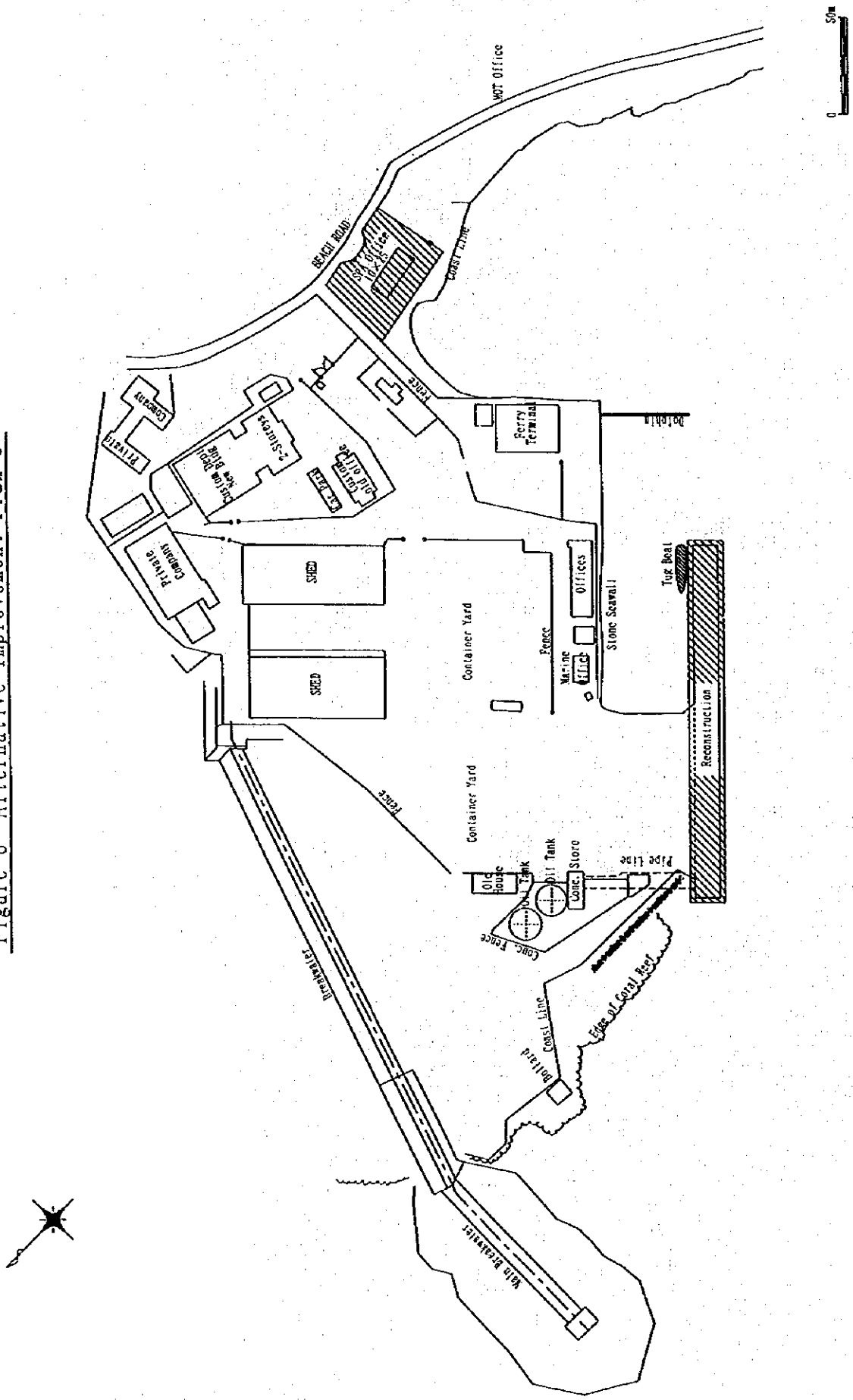
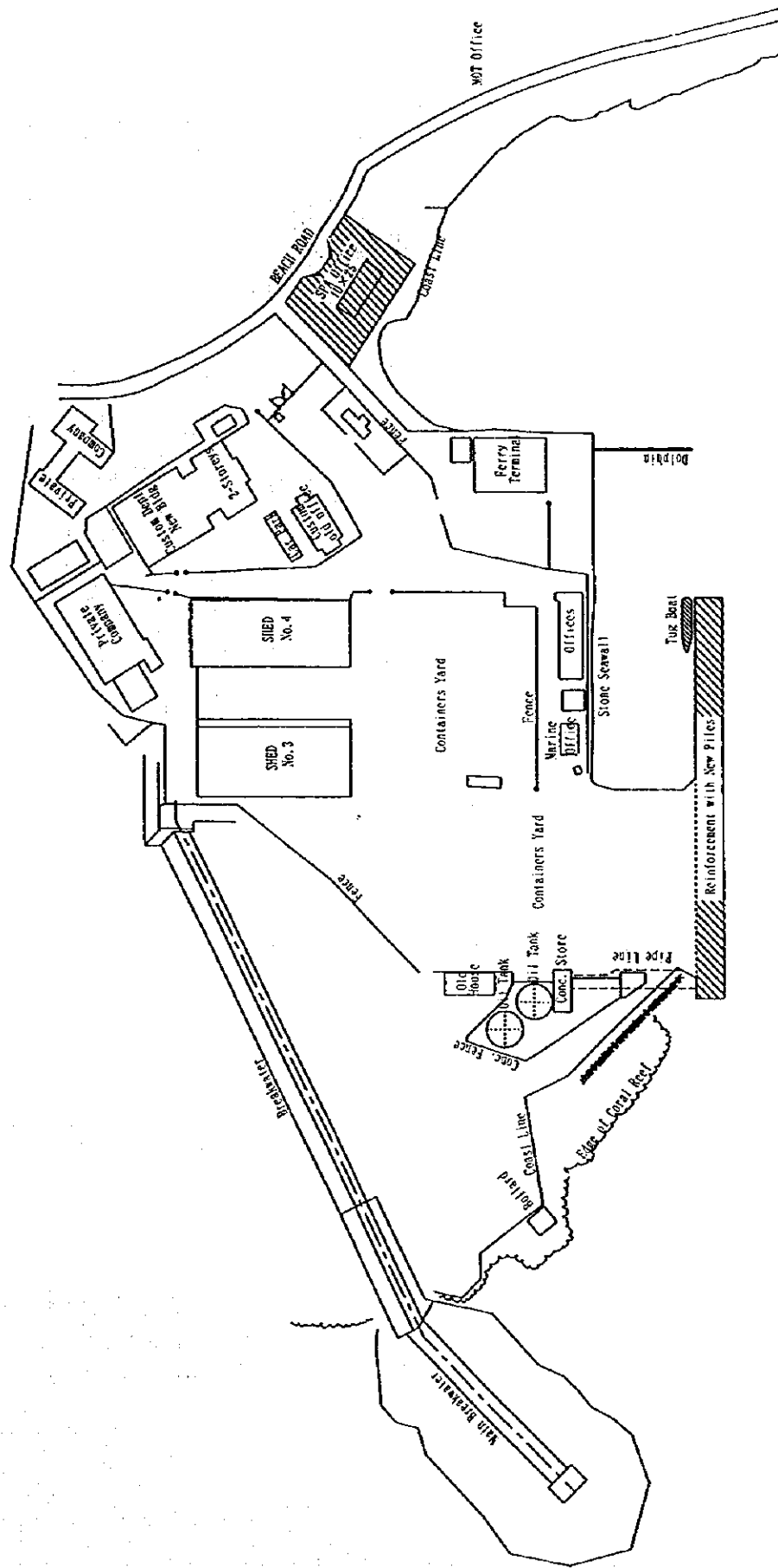


Figure-9 Alternative Improvement Plan 3



Construction costs of alternative phased improvement plans are shown in Table-14.

Table-14 Comparison of Construction Cost on Alternative Plans

Facility	Unit	Quantity	Construction Cost (Tala thousand)			
			Plan 1	Plan 2	Plan 3-1	Plan 3-2
1. Construction of New Wharf	m	190	30,822	0	0	0
2. Improvement of Breakwater	m	70	1,511	0	0	0
3. Pavement of Staging Area	m ²	4,500	1,307	0	0	0
4. Rehabilitation of Existing Wharf	m	185	2,858	41,723	32,742	30,904
5. Administration Office	m ²	450	1,553	1,553	1,553	1,553
6. Tug Boat	No	1	7,063	7,063	7,063	7,063
7. Minor Repair Works	Ls	1	409	409	409	409
Sub-total (1 to 7)			45,523	50,748	41,767	39,929
8. Engineering Services	Ls	1	4,086	4,558	3,749	3,586
Sub-total (1 to 8)			49,609	55,306	45,516	43,515
9. Physical Contingency	Ls	1	3,707	4,230	3,332	3,148
Grand Total			53,316	59,536	48,848	46,663

1 Tala = 0.3280 US Dollar = 44.95 Japanese Yen

4. Management and Operation

Port Authority Act

Apia Port is currently operated and managed under Marine Department of Ministry of Transport. Ports Authority Act has been approved by the parliament and shall come into force by 1 January 1999 at the latest. The Act is intended to establish a separate legal entity with autonomous functions and powers with financial viability.

The Authority consists of a chairman and four members and shall have the power to appoint, license and regulate operators or suppliers of stevedores and other labor and equipment in a port. Also, the Authority shall control construction and use of wharves, docks and other works, within a port or the approaches to a port.

The revenues of the Authority consist of dues and rates of vessels and goods levied to the port users and expenses consist of the interest and capital repayments, salaries, depreciation, investment and maintenance costs, etc.

The original assets of the Authority shall consists of

- a) All buildings, installations and improvements, located on or adjacent to or vicinity of the ports, which are in use by the Government at the date this act comes into force for the maintenance and operation of ports; and
- b) All vessels, vehicles, plant, machinery, equipment, stores, furniture and apparatus afloat or on shore which are in use by the Government.
- c) The Government shall cause the land, real and other property, all debts and liabilities to be transferred to the Authority.
- d) Persons employed by the Government and engaged in discharging any of the functions vested in the Authority shall be deemed to be transferred to the service of the Authority.

New Port Organization

Obviously, Samoa Ports Authority (SPA) can be established by taking over most of the existing staff of the Marine Division of Ministry of Transport. The functions of the Assistant Secretary of Marine Division shall keep the position as at present with more policy-oriented duty and are complementary to those of SPA. The organization of new port authority is proposed to have a new division in charge of maintaining all the civil and mechanical facilities owned by SPA.

Management and Finance

SPA shall be operated as a self-financing organization and shall determine future management policies and work out improvement plans toward sound profitability. The present organization shall be reinforced for more business-oriented management. Every revenue and expenditure shall be examined for its appropriateness and necessity, and if found necessary be amended. Budget enough for adequate maintenance works shall be secured not only to save otherwise unnecessary renewal or major repair costs but to provide safe and efficient port services.

5. Environmental Examination

Initial Environmental Examination (IEE) has been conducted for various aspects and then Environmental Impact Assessment (EIA) has been carried out on water quality contamination by dispersion of SS expected to be caused by dredging works. Through overall examination of biota and suspended solids around the planned project site, the construction works within the present port area are considered not to affect the environment because of rare biota around the project site, on condition that such an appropriate counter-measure as silt curtain is installed during the dredging work. Turbidity around the project area shall be monitored during the construction work.

6. Economic and Financial Analyses

The phased improvement plan is economically and financially evaluated in terms of Internal Rate of Return (IRR) and financial statements.

Economic Analysis

With implementation of the project, present load limitation of 38 t onto the wharf will be removed and the port will be operated fully with an efficient container handling service. In the case that the project will not be implemented, the steel piles supporting the wharf deck will be progressively corroded and container handling operation will become impossible on the wharf necessitating other costly and time consuming cargo handling operation.

Difference of ship and cargo handling costs between with and without the project brings major benefit. The costs of the project include capital investment, operation and maintenance costs while the major benefits are savings of ship operation costs and cargo handling costs. The benefits brought from saving of ship operation and cargo handling costs will return to economy of Samoa through immediate effect to sea freight. Since, this particular project is to prevent discontinuation of container handling services which will undoubtedly bring considerable rise in sea freight, the benefits brought by the project are assumed to be widely shared by Samoan economy.

The EIRRs calculated for alternative improvement plans are shown in Table-15.

Table-15 Results of Economic Analysis, EIRR

			EIRR
Alternative Plan 1			12.84 %
Sensibility Analysis			
Alternative Plan 1	Construction Cost	-10 %	13.98
		+10 %	11.87
	Benefits	-10 %	11.76
		+10 %	13.88

The phased improvement plan is evaluated economically feasible justifying implementation of the project which ensures continuation of container handling operation in future. Alternative improvement plan 1 has been evaluated as the best with EIRR of 12.84 %. The alternative improvement plan 1 has an advantage of higher berthing capacity with the existing wharf rehabilitated for handling cargoes other than container. The rehabilitation costs to the existing wharf are low while saving of ship waiting time is high due to steadily increasing number of ship's call.

Financial Analysis

The financial analysis is to appraise the financial feasibility of the project by means of Financial Internal Rate of Return (FIRR) and to evaluate the financial soundness of SPA by three financial statements of Income and Expenditure, Source and Application of Funds and Balance Sheet.

In cost-benefit analysis, the costs of the project include capital investment, operation and maintenance costs while the benefits consists of increase of income and decrease of operating costs achieved in the with-project case.

In the case of raising the tariff of Apia Port to the same level as those of the ports in the neighboring countries, FIRR is calculated at +1.01%. The port revenues can recover not only operation cost including maintenance cost but also depreciation cost in project life. If the investment of this project is provided to SPA from the Government, Plan 1 can be implemented as planned from a financial viewpoint. But, in the case of raising port tariff only to the lowest level of neighboring ports, FIRR is calculated at -0.09% in which the port revenues can recover only operation cost including maintenance cost.

The results of financial analysis show need to improve financial performance in order to cover all the expenses with the current level of port revenues suggesting necessity of

- 1) diversification of SPA activities in coordination with private companies,
- 2) revision of the present port tariff including stevedoring and
- 3) introduction of government subsidy etc. to acheive financial independence of SPA.

The current tariff level of Apia Port is significantly low compared with those of the ports in neighboring countries. Information on port management and operation shall be periodically interchanged with the neighboring ports in South Pacific area in this regard.

7. Conclusion and Recommendation

Conclusion

Master Port Development Plan with the target year of 2015 has been formulated and in line with the plan, Phased Improvement Plan has been worked out. The Phased Improvement Plan which includes the following major project components shall be urgently implemented,

- | | | |
|-------------------|---|---------------------------|
| 1) New Wharf | : | 190 m |
| 2) Staging Area | : | 4,500 m ² |
| 3) Existing Wharf | : | L.S. Corrosion Protection |
| 4) SPA Office | : | 450 m ² |

- | | | |
|------------------------|---|---------------------|
| 5) Tug Boat | : | 1 No. 1600 HP |
| 6) Ferry Dolphin, etc. | : | 1 L.S. Repair Works |

Serious corrosion of the steel piles, the existing wharf has led to limitation of load. Further deterioration of the wharf could suspend container handling operation. Drop in cargo handling capacity against increasing traffic demand will affect the country's future economy through rise of sea freight.

Construction of a new wharf is necessary for an efficient and safe handling operation of container cargoes. While rehabilitation of the existing wharf for handling the cargoes other than container will relieve the port from otherwise unnecessary future ship's waiting time for berth.

A new office building is necessary to accommodate the staffs of Samoa Ports Authority.

One of the existing tug boats shall be replaced with a new one for safe maneuvering of large ships calling the port.

The berthing facility of the existing ferry terminal requires a structural alteration to the access bridge for a new ferry boat.

Recommendation

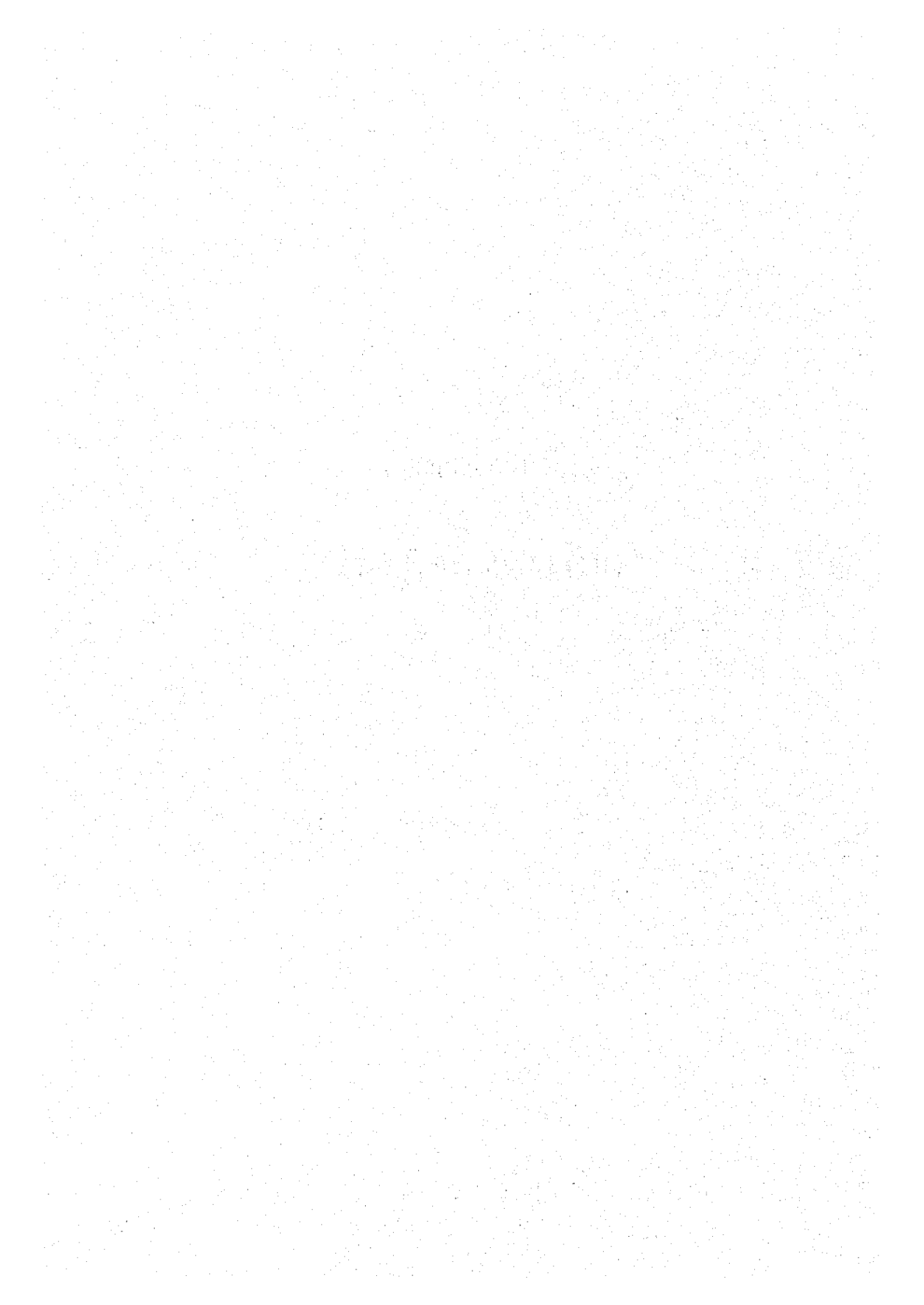
The Phased Improvement Plan as proposed in the study is recommended to be urgently implemented. A new wharf shall be constructed to take over container handling operation from the existing wharf, while the deteriorated existing wharf shall be rehabilitated to meet an increasing future traffic demand.

The existing wharf as well as the new wharf shall be periodically investigated for any damages especially after occasions of cyclone, etc. and properly maintained with necessary repairs under control and supervision of SPA. For safe and smooth operation of the port, engineering staff shall be trained for maintenance works of the port facilities.

A new organization of SPA is under process of establishment. For sound management of Apia Port, SPA is recommended to exercise utmost effort to reinforce administration and management aspects. The staff of SPA shall be trained under appropriate training programs.

CHAPTER 1

OUTLINE OF SAMOA



CHAPTER 1 OUTLINE OF SAMOA

1.1 Geography and Climate

1.1.1 Geographical Conditions

Samoa is an insular country located in the center of the South Pacific Ocean between latitude 13° S and 14° S and between longitude 171° W and 173° W, some 3,700 km SSW from Hawaii and 2,900 km NNE from Auckland. Samoa has a total national land area of 2,936 km² with the two main islands of Upolu (1,122 km²) and Savaii(1,714 km²) accounting for 95% of the total land area and a few small islands comprising the remainder. The islands are protected from rough seas by coral reefs which are more developed around Upolu Island than Savaii Island. Both the main islands are of volcanic origin. Savaii Island has a thin deposit layer and many lava outcrops especially in the northern coastal areas, and its population of some 40,000 is only one-third of that of Upolu Island, mainly because of the poor land fertility.

1.1.2 Climatic Conditions

The climate of Samoa is typically tropical oceanic and divided into dry and rainy seasons. Dry season is during May to October and rainy season is during November to April. Temperature range is from 17°C to 34°C and in rainy season the temperature is high. The average annual temperature is 26.5 °C in coastal areas (shown in Table 1.1.2-1), and the average relative humidity is 83 % in Apia. Rainfall varies from 2,500mm in the north-western parts of main islands (shown in Table 1.1.2-2), to over 6,000mm in the highlands of Savaii. The predominant surface winds are south-easterly trades during dry and wet seasons (shown in Table 1.1.2-3). These patterns result in high rainfall in eastern Upolu, and rain-shadow areas in western Upolu and eastern, northern and western Savaii.

Cyclones generated in the South-West Pacific Ocean affect Samoa from November to April. 1 cyclone affects Samoa generally every three years. Cyclone "Ofa" in 1990 and cyclone "Val" in 1991 are the largest cyclones in the last hundred years. These cyclones caused widespread damages on ports, roads, houses and etc. in Samoa.

Table 1.1.2-1 Meteorological Elements, 1941-1997

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
TX	31.9	31.7	31.8	31.6	31.5	30.9	30.5	30.5	30.8	30.9	31.4	31.4	31.2
TN	22.0	22.3	22.4	22.2	21.4	20.9	20.2	20.3	20.5	21.3	21.6	21.9	21.4
AP	1009	1009	1009	1012	1012	1013	1012	1013	1012	1013	1011	1011	1011.3
UU	83.0	82.5	85.0	80.5	80.0	77.5	80.8	79.0	76.5	78.5	76.5	80.0	80.0

Source : Ministry of Agriculture Forests Fisheries and Meteorology, Meteorology Division

Notes TX : Maximum Temperature (° C):1941-1997

TN : Minimum Temperature (° C):1941-1997

AP : Air Pressure (hPa):Monthly Mean 1996-1997

UU : Relative Humidity(%) : Monthly Mean 1996-1997

Table.1.1.2- 2 Monthly Rainfall, 1996-1997

	1996	1997
January	485.4	820.8
February	452.1	488.3
March	227.9	482.2
April	non	82.8
May	non	131.1
June	79.0	202.9
July	132.0	59.4
August	53.9	165.1
September	165.7	65.7
October	403.6	191.0
November	147.6	125.3
December	426.8	374.0
Total	2574.0	3188.6

Source : Meteorology Division Apia

Unit : mm

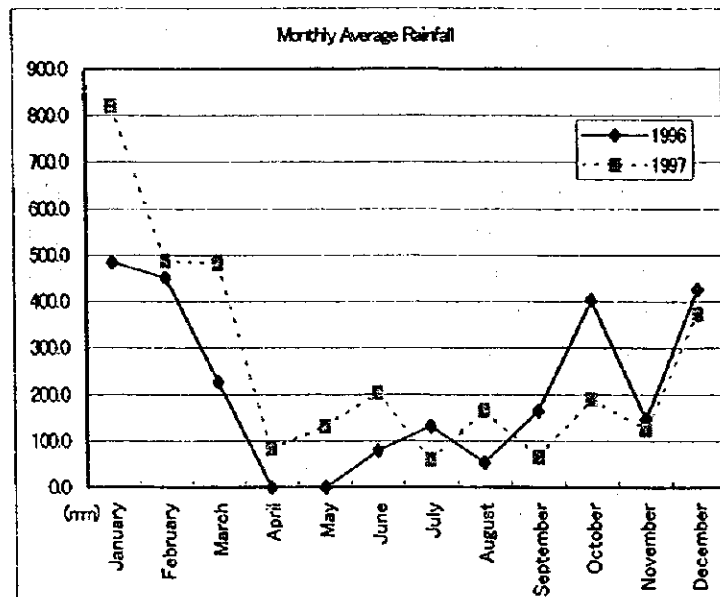


Table 1.1.2-3 Wind Velocity and Direction, 1941-1997

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
WVX	2.9	3.2	2.8	2.3	3.0	2.8	3.3	3.3	3.5	6.3	3.1	3.2	
WDX	150	100	90	90	80	90	90	90	100	60	130	100	
WVM	2.3	2.5	2.2	1.8	1.8	2.1	2.3	2.5	2.6	2.9	2.4	2.3	2.3
WDM	100	120	100	90	80	80	80	90	90	90	90	100	90

Source : Ministry of Agriculture Forests Fisheries and Meteorology, Meteorology Division

Note : WVX ; Maximum Wind Velocity (m/sec) :1986-1997

WDX ; Maximum Wind Direction (degree) :1986-1997

WVM ; Mean Wind Direction (m/sec) :1986-1997

WDM ; Mean Wind Direction (degree) :1986-1997

Wind Speeds and directions during Tropical Cyclones are not included.

1.2 Socio-economic Situation

1.2.1 Population

Population and growth rate are summarized in Table 1.2.1-1 and Figure 1.2.1-1. Population of Samoa in 1991 is 161,298 with its growth rate less than 1% per year. The low annual growth rate from the 1970's is largely attributable to the continuing outflow of Samoans to overseas destinations, principally to New Zealand where 1,100 Samoans emigrate every year under Immigration Quota System of New Zealand. Population of Samoa is expected to growth at the low rate in foreseeable future.

Table 1.2.1-1 Record of the Population

Year	Population	Growth Rate (%)
1961	114,427	3.3
1966	131,377	2.8
1971	146,627	2.2
1976	151,983	0.7
1986	157,158	0.1
1991	161,298	0.5

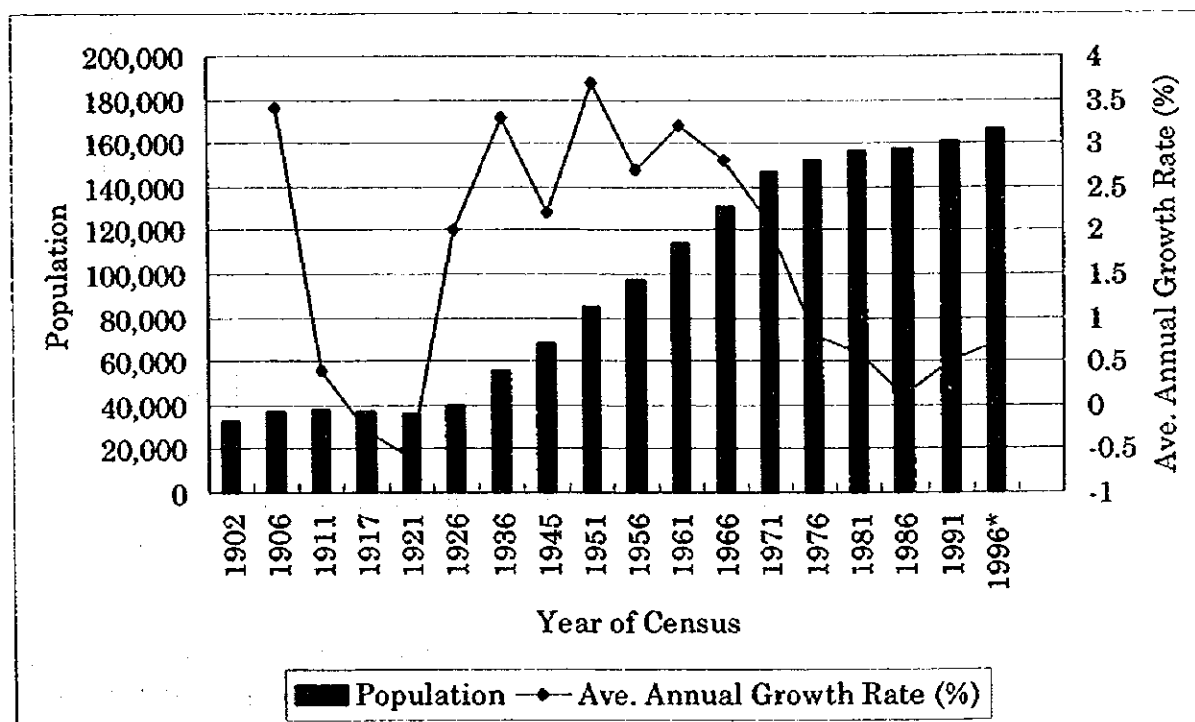


Figure 1.2.1-1 Population Growth of Samoa 1902 - 1996

1.2.2 Gross Domestic Product

The real GDP of Samoa by Industrial Origin at 1982 prices from 1988 to 1996 is shown in Table 1.2.2-1. GDP of Samoa in 1994 was 126.8 million Tala at 1982 price and the growth rate from 1990 to 1994 was -1.32%, affected by the cyclones "Ofa" in 1990 and "Val" in 1991 and by taro leaf blight disease in 1994. GDP per capita in 1994 was 771 Tala.

Details and trend of the GDP by sector from 1988 to 1996 are shown in Table 1.2.2-2. The GDP share by sector in 1990 showed a predominant 44% for agriculture, forestry and fisheries followed by 25% for service, mainly public service sector. The industrial sector accounted for only 18.5%. Main agricultural products are copra, taro, cocoa and banana, while main industrial products are coconut oil, beer, tobacco, match, soap and sawn timber. The real GDP of Agriculture decreased remarkably from 28.8 million Tala in 1989 to 10.9 (38% of the year 1989) in 1994. In 1996, it recovered to 18.2 million Tala (63% of the year 1989).

Indicators of Agricultural Production in 1991-1996 are shown in Table 1.2.2-3. In 1991 affected by cyclone, indicators of copra, banana and cocoa decreased remarkably to 0.2, 21.0 and 0.0, respectively, from 100 of the base year 1982. Especially, copra was not produced in 1993 and the indicator recovered to 39.2 in 1996. While, the indicator of fish catch in 1996 increased to 172.1 from 100 of the base year 1982.

Trend of Export and Import of Automotive Wiring Harnesses of Samoa is shown in Table 1.2.2-4. In October 1991, Yazaki Samoa Limited commenced production of automotive wiring harnesses as an invited foreign company. Its annual amount of exports in 1997 was 127.4 million Tala. The production of wiring harness and the increase of fish catch contribute to recovery of the real GDP in 1995-1996.

The Real GDP growth at 1982 prices in 1980-1996 is shown in Table 1.2.2-1 and Figure 1.2.2-1. From 1980 - 1989 without the affection of cyclone and leaf blight disease, the average annual growth rate of the real GDP was 1.7%. Affected by cyclones in 1990 and 1991, the annual growth rate of the real GDP fell down respectively to -7.5% and -2.5%. In 1994 with taro leaf blight disease, the annual growth rate of the real GDP fell down to -6.5%.

The real GDP of Samoa in 1995 and 1996 recovered remarkably to 139.0 and 147.1 million Tala, respectively. The annual growth rate of real GDP recovered to 9.6% in 1995 and 5.8% in 1996. The real GDP in 1996 recovered to 101.8% of the real GDP in 1989 before cyclone, and the average annual growth rate of the real GDP was 0.26% from 1989 to 1996.

Table 1.2.2-1 Real, Nominal and Per Capita GDPs at Factor Cost

Year	1988	1990	1992	1994	1996
(A) Real GDP at 1982 prices(Tala million)	140.8	133.7	130.2	126.8	147.1
(B) GDP at current prices(Tala million)	237.9	258.8	295.1	347.1	431.5
(C) Population('000)	158.8	160.5	162.4	164.5	166.7
(A/C) Per Capita GDP(Tala)	886.7	833.2	801.9	770.9	882.4
(B/A) GDP Deflator (Index 100 in 1982)	169.0	193.6	226.7	273.7	293.3
(A') Annual Growth Rate of Real GDP (%)	0.1%	-7.5%	-0.2%	-6.5%	5.8%

Source : Treasury Department, Fund staff estimates

Table 1.2.2-2 GDP by Sector at Constant 1982 Prices

(unit : Tala million)

Year	1988	1990	1992	1994	1996
Subsistence sector	38	36.1	31.5	34.3	34.3
Agriculture, forestry and fishing	25.1	22.4	21.2	10.9	18.2
Primary sector	63.1	58.5	52.7	45.2	52.5
Manufacturing	18.4	15.7	14.3	16.0	26.0
Electricity	5.7	5.5	6.5	7.9	9.3
Construction	7.4	3.6	6.6	3.2	3.8
Secondary sector	31.5	24.8	27.4	27.1	39.1
Distribution, restaurant and hotels	13.1	14.6	11.2	15	16.5
Transportation	4.7	6.3	8.7	9.0	9.5
Other services	12.2	12.8	13.5	14.1	14.5
Tertiary sector	30.0	33.7	33.4	38.1	40.5
Government	16.2	16.9	16.7	16.5	15.1
Real GDP at factor cost in 1982 prices	140.8	133.9	130.2	126.9	147.2

Source : Treasury Department, Fund staff estimates

Table 1.2.2-3 Indicators of Agricultural Production

(Base Year 1982=100)

Description	1991	1992	1993	1994	1995	1996
Copra	0.2	4.2	0.0	0.2	36.2	39.2
Taro	191.3	179.8	190.2	61.3	70.5	63.5
Fish	17.6	44.2	51.3	55.1	60.9	172.1
Bananas	21.0	11.4	42.1	64.1	71.9	67.3
Cocoa	0.0	0.0	0.0	0.0	0.9	1.8
Beef	169.5	171.2	174.6	142.4	111.9	115.3
Pork	343.8	343.8	331.3	337.5	350.0	387.5
Passion fruit	51.1	0.0	0.0	0.0	0.0	0.0
Poultry	26.7	26.7	26.7	26.7	26.7	26.7
Total	73.4	73.8	77.7	41.0	58.3	71.5
% over the previous year	-13.7	0.6	5.3	-47.2	42.2	22.6
Production Value(note-1)	43.7	50.2	41.5	47.2	60.3	96.1
% over the previous year	-3.8	14.9	-17.4	13.8	27.8	59.4

Source; [Central Bank of Samoa, Bulletin], March 1998

note-1; unit : Tala million

Table 1.2.2-4 Export and Import of Automotive Wiring Harnesses

Year	Import Volume of Materials		Export Volume of W/H Products		Added GDP 1000 Tala
	TEU	tons	TEU	tons	
1991	17	77	23	104	357
1992	291	1,310	397	1,787	5,705
1993	291	1,310	397	1,787	5,628
1994	291	1,310	397	1,787	4,724
1995	440	1,980	600	2,700	7,088
1996	660	2,970	900	4,050	9,991
1997	765	3,443	1,043	4,696	10,968

note-1 : Estimate data in 1993-1995

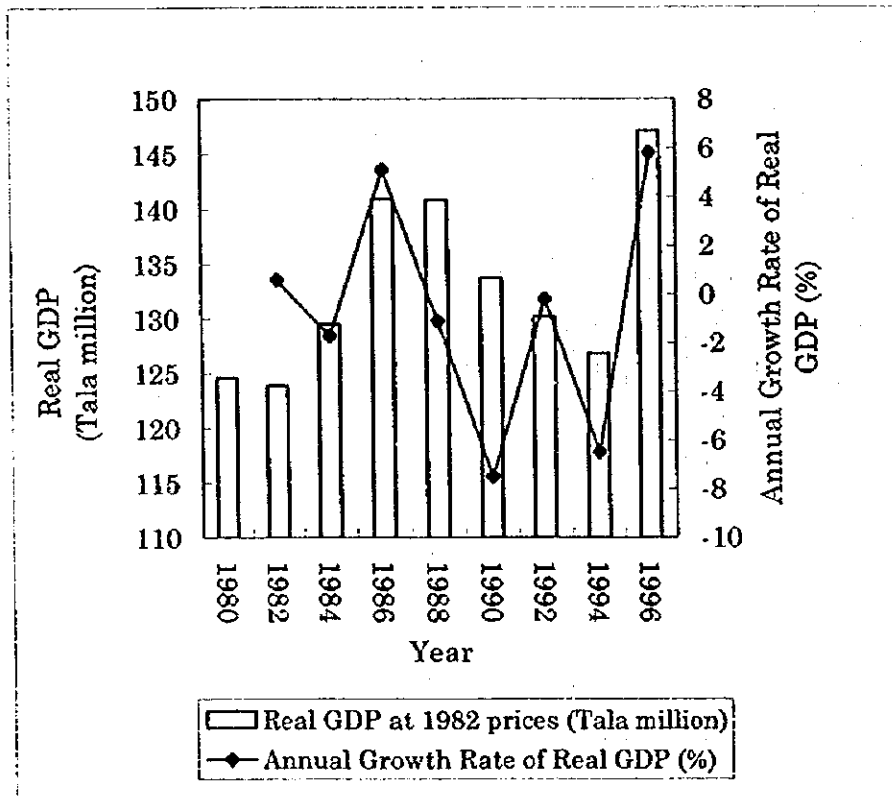


Figure 1.2.2-1 Real GDP by Industrial Origin

1.2.3 Trade Statistics

Trend of imports by broad economic categories is shown in Table 1.2.3-1 and in Figure 1.2.3-1. Imports in 1996 amounted to about 244 million Tala consisting of capital goods (11.5%), intermediate goods (50.5%), and consumption goods (37.2%). Share of industrial supplies (26.4%), food and beverages (23.7%) and consumer goods (11.0%) occupies more than 60%.

Table 1.2.3-2 and Figure 1.2.3-2 show the remarkable decrease of the value of major agricultural exports such as coconut oil, copra, copra meal and cocoa from 1990 to 1994, and the remarkable decrease of taro export by leaf blight disease after 1994, and in place of these agricultural exports, increased share of automotive wiring harnesses (74.4%) and fish (8.6%) in 1997.

Economy of Samoa is a typical mono-culture economy which is dependent on export of such agricultural products as copra, taro and cocoa with exports of these three products accounting for about 75% of total export value. Balance of trade has been mostly in red and the import value for the last three years exceeded the export value by more than four times despite relatively high import duties, restrictions on import items and stagnation of economic growth.

Structural trade deficit is compensated for by remittance of money from Samoans working abroad and also by capital account surplus.

The main directions of exports in 1997 are American Samoa (32.1%), Australia (23.0%), New Zealand (15.6%), United Kingdom (13.0%) and U.S.A (9.0%). The main sources of imports in 1997 are New Zealand (37.9%), Australia (20.7%), U.S.A (15.5%), Fiji (15.0%) and Japan (4.5%).

New import duty rates are applied from 30 May 1998. According to the 1998 – 1999 Budget Statement by the Minister of Finance, the cuts to import duties in many cases are major. Except for some tobacco, beverage and petroleum products, the highest rate of duty is now only 20%.

Goods which were previously subject to duty of 50% - 60% are now subject to duty of just 20%. Goods which were previously subjected to duty of 35% to 42% will now be subjected to duty of just 15%. The current rates of 0%, 5% and 10% will remain but some items currently subject to 0% are moved to higher brackets. In most cases duties have been reduced in accordance with the rates shown in Table 1.2.3-3.

Table 1.2.3-3 New Import Duty Rates

Existing Duty Rate	0%	5%	10%	20%	35%-42%	50%-60%
New Duty Rate	0%	5%	10%	15%	15%	20%

Table 1.2.3-1 Imports by Broad Economic Categories

				(unit : 1,000 tala)			
Commodities	1978	1980	1982	1992	1994	1996	share
Transport equipment	2,806	1,943	1,931	11,487	6,856	9,333	3.8%
Others	5,914	8,362	5,166	32,547	16,925	18,598	7.6%
Capital goods	8,720	10,305	7,097	44,034	23,781	27,931	11.5%
Food and beverages	2,397	3,995	4,282	19,646	18,729	19,141	7.9%
Industrial Supplies n.e.s.	9,767	15,903	18,024	94,051	62,213	64,400	26.4%
Fuel (primary)	0	135	4	11	53	135	0.1%
Fuel (motor spirit)	243	3,198	2,576	7,562	6,962	9,062	3.7%
Fuel (other processed)	2,980	6,262	6,477	21,652	13,836	19,536	8.0%
Parts for transport equipment	909	1,081	2,322	7,424	3,962	4,007	1.6%
Parts for other capital goods	633	696	1,494	12,087	7,873	6,789	2.8%
Intermediate goods	16,929	31,270	35,179	162,433	113,628	123,070	50.5%
Food and beverages, primary	580	482	1,133	4,017	4,380	5,587	2.3%
Food and beverages, processed	6,439	7,849	9,345	34,878	38,269	57,690	23.7%
Transport equipment	34	154	93	599	280	719	0.3%
Consumer goods, n.e.s.	5,491	6,990	6,922	24,505	21,888	26,745	11.0%
Consumption goods	12,544	15,475	17,493	63,999	64,817	90,741	37.2%
Goods not elsewhere specified	81	12	100	73	379	9	0.0%
Passenger motor cars	293	226	279	786	339	1973	0.8%
Goods n.e.s.	374	238	379	859	718	1982	0.8%
Total	38,567	57,288	60,148	271,325	202,944	243,724	100.0%

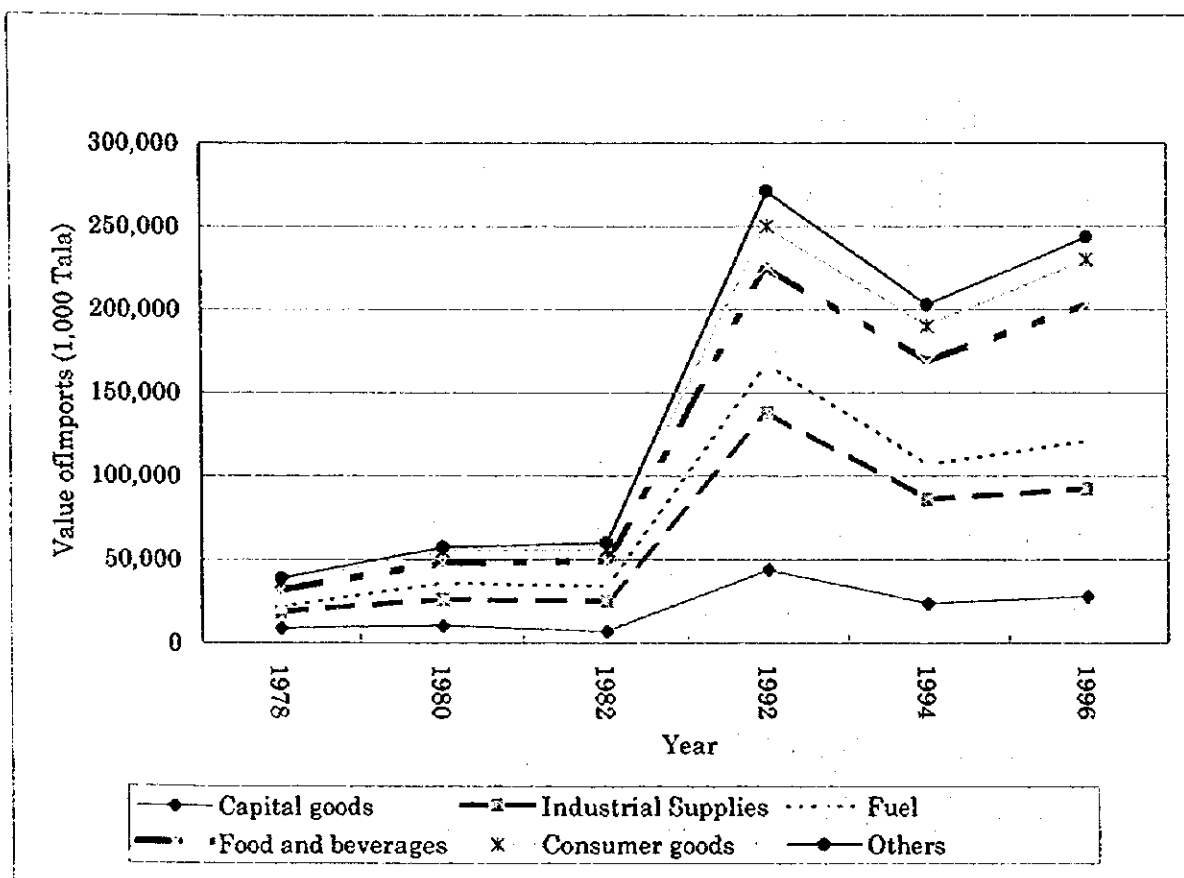


Figure 1.2.3-1 Imports by Broad Economic Categories

Table 1.2.3-2 Trend of Value of Major Exports

(unit : 1,000 tala)

Commodities	1982	1984	1986	1988	1990	1992	1994	1996	1997	share
Coconut oil	0	20,810	6,452	11,688	4,168	697		6,825	6,761	4.7%
Cocoa	985	2,414	3,087	1,260	502					
Copra meal	189	545	646	929	375	8		622	542	0.4%
Copra	2,760		1,058	1,970	1,101		58	4,078	7,882	5.5%
Taro	2,126	4,223	4,262	5,201	3,502	4,696	153	98	99	0.1%
Coconut cream	937	1,583	1,972	3,874	5,576	4,852	4,519	4,913	4,772	3.3%
Beer	651.2	815.9	269	643	861	1696	1,170	1,107	1,603	1.1%
Cigarettes	383.9	576.5	680	684	586	938	756	268	0	0.0%
Kava	15	31	10	421	461	47	124	1,120	1,485	1.0%
Fish							257	2,287	12,327	8.6%
Wiring harnesses						48,478	48,500	109,886	107,305	74.4%
Other	2,692	4,146	5,896	1,952	2,269	1,364	1,210	1,806	1,255	0.9%
Re-export	1,168	960	3,434	1,666	1,057	27	270	147	131	0.1%
Total of Apia Port	11,907	36,104	27,765	30,288	20,458	62,803	57,022	133,157	144,162	100.0%

Banana (by Air)	597	159	40	25	15	2	217	724	474
Timber (Asau)	1,208	1,478	780	1,084	21	22	163	832	124
Total Exports	13,712	37,741	28,585	31,397	20,494	62,827	57,402	134,713	144,760

Source: (1) [Central Bank of Samoa, Bulletin], March 1998, 1992
 (2) Department of Statistics, Annual Statistical Abstract 1987, 1994

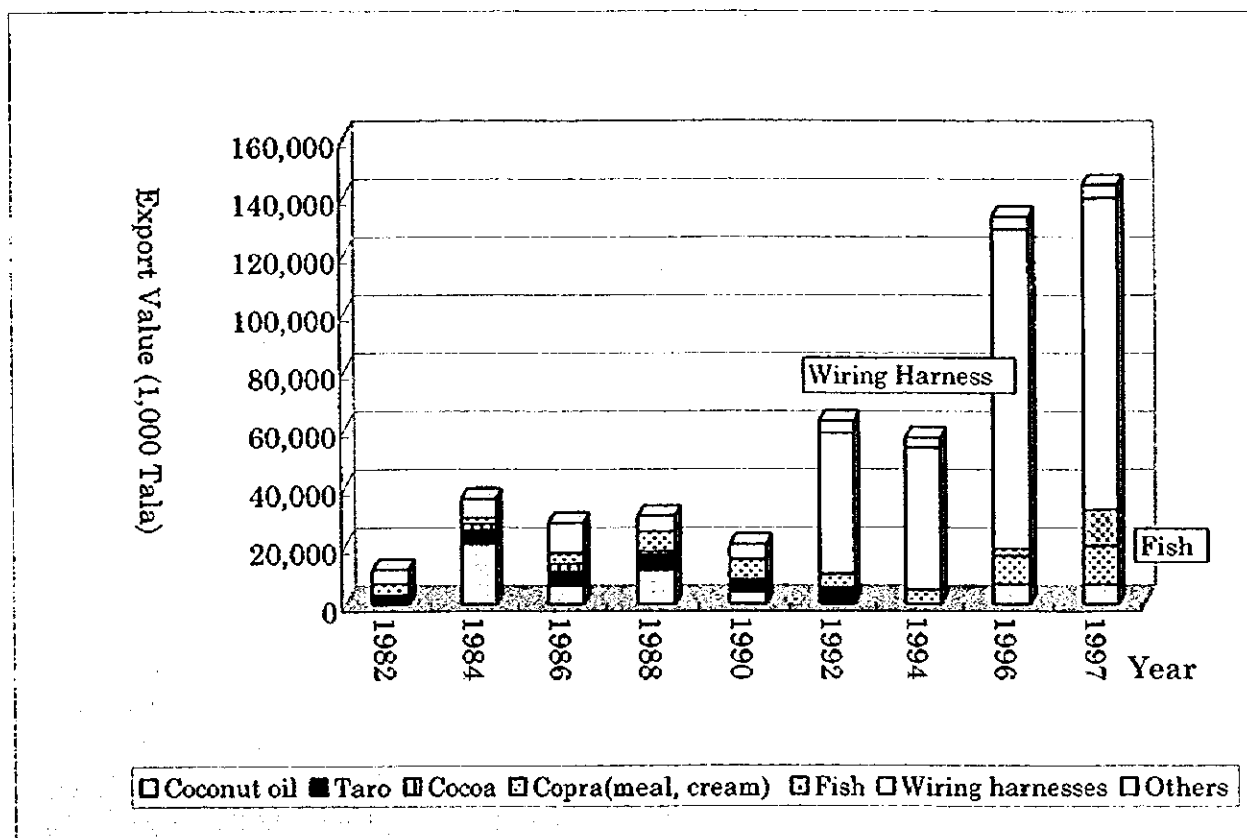


Figure 1.2.3-2 Export Value by Commodity

1.2.4 National Development Plan

In A Statement of Economic Strategy, 1998-1999 (hereafter referred to as the Economic Strategy), by the end of 1996, the economy had fully recovered from the adverse impact of the two cyclones and the taro leaf blight disease.

Real per capita incomes had once again reached the 1989, pre-cyclone levels. In the two years 1995 and 1996, the economy achieved high rate of growth of 9.5% and 5.8%, respectively. Preliminary indications suggested that a high rate of growth will also be achieved in 1997 as the economy has shown further signs of moving towards a period of both sustained and sustainable economic growth. This should enable real per capita incomes to continue to increase over the coming years.

Now then, as future strategies, the Economic Strategy sets the targets for macroeconomic performance as follows;

- 1) Real per capita GDP to grow at an annual average rate of 3-4 %
- 2) Population to increase at an annual rate of 1 %
- 3) Exports (exclude wiring harnesses) are forecast to increase to the equivalent of 15% of imports by 2001, up from 10% in 1996 at an average annual growth of 17%
- 4) Import to increase at an annual rate of 10%
- 5) Using monetary and fiscal policy to keep the rate of inflation at or below 6% whilst at the same time
- 6) Protect the nation's external position by maintaining a level of net foreign assets of at least six-month's import value
- 7) Maintaining a competitive exchange rate to assist export development, promotion of domestic industry and tourism
- 8) Enabling the private sector to have access to domestic credit sufficient to maintain continued expansion in the sector.

1.3 Transport Sector

1.3.1 Sea Transport

Marine and air transportation play an important role in Samoa due to country's geographical conditions. Marine transportation in particular is essential, not only for foreign trade but also to maintain vital link between Upolu and Savaii Islands.

Table 1.3.1-1 shows cargo volume handled in Apia Port, and as shown 214,786 tons of general cargo and 43,845 tons of oil were handled in 1997. The volume of imports and exports in 1997 were 227,020 tons and 31,611 tons, respectively.

As shown in Table 1.3.1-2, International Ferry Service at the ferry terminal of Apia Port to Pagopago, Port of American Samoa provided 117 services carrying 18,859 passengers and the cargo of 7,157 tons in 1997.

New ferry boat replacing the existing ferry, Queen Salamasina will commission early 1999.

As shown in Table 1.3.1-3, Domestic Ferry Service between Mulifanua Port in Upolu Island and Salelologa Port in Savaii Island carried 419,873 passengers and 35,439 vehicles in 1996.

Asau Port of Savaii Island is used for import of oil and export of timber.

Table 1.3.1-1 Cargo Volume in Apia Port (unit : tons)

Year	General cargo	Oil	Import	Export	Total
1995	156,214	33,832	160,643	29,403	190,046
1996	193,373	38,388	203,216	28,545	231,761
1997	214,786	43,845	227,020	31,611	258,631

Table 1.3.1-2 International Ferry Service in 1996

Sea Route	Number of Voyage	Number of Passenger	Cargo volume(ton)
Apia – Pagopago	56	9,992	3,516
Pagopago – Apia	61	8,867	3,642
Total	117	18,859	7,157

Table 1.3.1-3 Domestic Ferry Service of Mulifanua — Salelologa Route

Year	Number of Passenger	Number of Vehicle
1996	419,873 persons	35,439 vehicles

1.3.2 Air Transport

Faleolo International Airport, about 33 km from Apia, is located in the main island of Upolu. The aircraft movements, passenger and freight of Faleolo International Airport are shown in Table 1.3.2-1.

Table 1.3.2-1 Aircraft Movement, Passenger and Freight

	1994	1995	1996	1997
Aircraft movement	3,968	3,072	2,896	3,526
Passenger	163,131	121,310	126,310	147,910
Freight, tons	n/a	1,255	1,774	2,247

Source : Statistics of MOT

Now, Polynesian Airline managed by the Government, Air Pacific and New Zealand Airway have the direct flights to Hawaii, Auckland, Wellington, Sydney, Melbourne, Fiji, Tonga and American Samoa from Faleolo International Airport.

Maota Airport is located in the southwest part of Savaii Island. Polynesian Airlines and Air Samoa operate scheduled and non-scheduled flights from the airport to Pago Pago with Twin Otters and Islanders.

Asau Airport, built along a reef was destroyed by cyclone Ofa in January 1990. The new airport at a different site was opened officially on 12 July 1997. The runway is 640 meters long of compacted gravel with a good terminal building.

Fagalii Airport completed in 1969 has 560 meter long strip. Ideally sited on the outskirts of Apia, this is the major airport for flights to and from Pago Pago.

1.3.3 Land Transport

Samoa has about 2,100km of roads including some 900 km of primary roads already sealed and the remainder is access roads to villages or plantations. The road infrastructure has been improved, and the road network have also been upgraded to international standards by donor-supported post cyclone restoration effort.

The motor vehicle population in Samoa is high. Number of Motor Vehicles Registered is shown in Table 1.3.3-1. According to the table, imported vehicles increase every year. The land passenger transport rely on 202 buses, 807 taxis and 3,418 private cars in 1997, while the land cargo transport rely on 3,880 trucks etc.

Public Service vehicles are available on both islands same as rental vehicles. These vehicles are licensed and inspected twice a year.

Table 1.3.3-1 Number of Motor Vehicles Registered

year	Private Cars	Buses	Taxis	Pick-ups etc.	Total
1992	2,240	381	1,099	3,549	7,269
1993	1,269	334	936	2,566	5,105
1994	2,134	209	1,057	4,080	7,480
1995	3,316	206	800	3,271	7,539
1996	3,380	211	708	3,600	7,899
1997	3,418	202	807	3,880	8,407

Source : Statistics of MOT