

Fig. F-19 Population by Age and Sex, 1981

## (2) Education

Table F-9 NUMBER OF PUPILS AND TEACHERS IN ALL TYPES OF SCHOOLS

Level/Year		Government Schools	Mission Schools	Total	Of which Government Schools %
Pupils Primary Schools	1982	26 858	4 709	31 567	85.1
	1983	26 589	4 858	31 447	84.6
Intermediate Level	1982	7 347	1 561	8 908	82.5
	1983	7 208	1 435	8 643	83.4
Secondary Schools	1982	6 336	5 503	11 839	53.5
	1983	6 527	5 234	11 761	55.5
Secondary Vocationals	1982	211	-	211	100.0
	1983	200	-	200	100.0
Higher Education Vocations	1982	-	85	85	-
	1983	-	137	137	-
Primary Teacher Training	1982	243	-	243	100.0
	1983	219	-	219	100.0
Secondary Teacher Training	1982	61	-	61	100.0
	1983	95	-	95	100.0
Teachers Primary Schools - All Intermediate Levels are included	1982	1 268	192	1 460	86.9
	1983	1 288	214	1 502	85.8
Secondary Only	1982	262	233	495	52.9
	1983	267	253	520	51.4
Secondary Vocationals	1982	38	-	38	100.0
	1983	30	-	30	100.0
Higher Vocatioals	1982	-	6	6	-
	1983	-	8	8	-
Primary Teacher Training	1982	17	-	17	100.0
	1983	19	-	19	100.0
Secondary Teacher Training	1982	12	-	12	100.0
	1983	12	-	12	100.0

Source ; Annual Statistical Abstract 1983

Note ; Secondary Teacher Training was just started in 1978.  
Previous figures were for Primary Teacher Training only.

(3) The Present State of Labor

1 Number of workers in Western Samoa can be classified as follows,

Population more than 15 years old:	87,000
a. Employee	20,000
- Government and Private company	(14,000)
-Other wage worker	(6,000)
b. Farmer, Fisherman, Merchant, etc.	20,000
c. Non-worker	47,000

2 Minimum wage

\$0.55/hour

\$4.40/day (8 hour)

\$1,240/year

3 Total wage recorded in 1981

about \$40,000,000

Average payment per one person

$$\frac{\$40,000,000}{20,000} = \$2,000/\text{year}$$

4 Maximum payment of Government concerned

\$14,400/year

(4) WORKING POPULATION BY INDUSTRY  
IN THE MONETIZED SECTOR, 1971 AND 1976

Table F-10

<u>Industry</u>	1971		1976	
	<u>Number</u>	<u>%</u>	<u>Number</u>	<u>%</u>
1. Agriculture, forestry and fisheries	2,555	17.2	2,022	12.0
2. Manufacturing	819	5.5	712	4.2
3. Construction and quarrying	1,621	10.9	1,820	10.8
4. Electricity and water	252	1.7	468	2.8
5. Transport, storage and communications	1,248	8.4	2,058	12.2
6. Trade, hotels and restaurants	2,418	16.2	2,407	14.2
7. Financing, insurance, real estate and business services	223	1.5	322	1.9
8. Community, social and personal services	5,756	38.6	6,893	40.8
Activities not adequately defined	-	-	151	0.9
Not stated	-	-	45	0.2
<b>Total</b>	<b>14,892</b>	<b>100.0</b>	<b>16,898</b>	<b>100.0</b>

Source: Socio-economic Situation - Development Strategy and Assistance Strategy, December, 1982

(5) DEPARTURES BY OCCUPATION AND SEX

Table F-11 (Western Samoan Citizens)

Occupation	1979	1980	1981	1982	1983 <sup>1/</sup>
Total	22,034	39,248	45,735	39,141	39,821
Professional, technical and related workers	1,205	3,038	3,393	2,381	2,984
Administrative and managerial workers	245	524	712	397	750
Clerical and related workers	954	3,268	3,239	1,859	2,624
Sales workers	200	817	815	573	847
Service workers	2,034	4,120	4,424	3,879	3,936
Agricultural animal husbandry, forestry workers, fishermen and hunters	911	6,185	6,277	4,059	2,307
Production and related workers transport equipment operators and labourers	777	6,317	3,196	1,970	3,002
Not actively engaged includes students and retired	-	6,993	12,314	8,631	10,217
Not stated	15,708	7,986	11,365	15,392	13,154

Source: Annual Statistical Abstract 1983

<sup>1/</sup> Provisional figures

(6) NUMBER OF MOTOR VEHICLES REGISTERED

Table F-12

Year	Private Cars	Pick-ups	Trucks	Buses	Taxis	Motor Cycles	Tractors	All other Vehicles <sup>2/</sup>	Total
1977	989	1,599	315	149	397	131	79	12	3,671
1978	1,044	1,639	318	126	406	118	32	25	3,708
1979	1,146	1,564	287	131	427	114	81	26	3,776
1980	1,188	1,628	301	128	395	121	68	257	4,086
1981	1,242	1,889	378	139	573	133	59	58	4,471
1982	1,076	1,532	253	157	353	104	5	442	3,922
1983	1,258	1,800	358	193	264	105	15	23	4,016

Source: Annual Statistical Abstract

<sup>1/</sup> Provisional figures

<sup>2/</sup> Includes Landrovers, forklifts and Government vehicles of 1980 and 1982

## 3-2 Economic Condition

## (1) GDP

Table F-13 GDP by Main Sectors at Producers' Prices, 1972 and 1978

(\$000)

Sector	1972	1978		Average Annual % real growth 1972 - 1978
		Current	In 1972 Prices 1/	
Agriculture	13,570.2	29,254.0	15,399.2	2.1
Forestry and logging	1,107.5	2,250.0	1,222.8	1.7
Fishing	272.0	960.0	521.7	11.5
Manufacturing	1,025.6	2,600.0	1,413.0	5.5
Quarrying and construction	2,376.1	4,200.0	2,282.6	(-0.7)
Electricity and water	212.8	362.0	196.7	(-1.3)
Wholesale and retail trade, restaurants and hotels	3,210.3	6,055.0	3,290.7	0.4
Transportation and communication	1,232.3	3,341.0	1,815.7	6.7
Financial, insurance, real estate and business services	2,117.2	3,841.0	2,087.5	(-0.2)
Government services	3,115.0	8,257.0	4,487.5	6.3
Other services	1,457.0	2,178.0	1,183.6	(-3.4)
Less: Imputed bank service charge	241.5	460.0	250.0	0.5
<b>Total GDP</b>	<b>29,454.5</b>	<b>62,838.0</b>	<b>34,151.0</b>	<b>2.5</b>

1/ Deflated by the Consumer Price Index

Source: Western Samoa's Fourth Five Year Development Plan 1980 - 1984

Table F-14 GDP by Main Sectors at Producers' Prices, 1979  
and Projected 1980 and 1984  
(\$000 real)

Sector	1979	1980	1984	Average % increase per year
Agriculture, forestry and fisheries	39,600	34,200	38,900	3.2
Manufacturing	3,000	3,600	5,650	12.0
Quarrying and construction	5,200	5,560	7,280	7.0
Electricity and water	410	600	1,000	13.5
Wholesale and retail trade, restaurants and hotels	6,900	7,170	8,380	4.0
Transportation and communication	3,700	3,900	4,700	5.0
Government services	10,200	10,500	11,860	3.0
Other services	2,000	2,060	2,320	3.0
GDP Total	75,610	72,370	85,680	4.2

Note: Allowing for an average inflation rate of 11% in 1979 over 1978, the 1979 estimates imply a real growth of 9%.

Source: Western Samoa's Fourth Five Year Development Plan 1980 - 1984



(2) Foreign Trade (Import and Export)

Table F-15 FOREIGN TRADE BALANCE  
( '000 WS \$ )

Year	Total Imports	Total Exports	Trade Balance	Exports as % of Imports
1973	14,433	4,001	-10,432	27.7
1974	15,909	7,672	-8,237	48.2
1975	23,160	4,540	-18,620	19.6
1976	23,627	5,447	-18,180	19.6
1977	32,225	11,577	-20,648	35.9
1978	38,567	8,171	-30,396	21.1
1979	60,946	14,981	-45,965	24.6
1980	57,438	15,828	-41,600	27.6
1981	58,355	11,149	-47,206	19.1
1982 <sup>1/</sup>	58,000	14,000	-44,000	24.1

<sup>1/</sup> Provisional Figures

Source: Socio-Economic Situation Development Strategy and Needs

Table F-16 VALUE OF EXPORTS BY SELECTED COUNTRIES 1983<sup>1/</sup>

(Thousands of Tala)

Countries	Copra	Cocoa	Banana	Taro	Timber	Other Food	Other Non-Food	Beverages & Tobacco	Total
Total	1,398	4,617	407	2,372	541	13,647	2,488	1,944	27,414
American Samoa	-	-	16	384	67	38	115	818	1,436
Australia	-	59	-	94	20	2,649	496	161	3,479
Fiji	-	-	-	-	-	0	0	6	6
Japan	976	-	-	-	-	-	1	-	977
Netherlands	-	-	-	-	-	5	-	-	5
New Zealand	325	50	387	1,604	154	3,863	230	347	6,960
United States	-	1,788	2	271	46	6,456	1	23	8,587
United Kingdom	-	532	-	-	-	-	-	-	532
West Germany	97	2,134	-	-	-	548	-	-	2,779
Others	-	54	2	19	254	88	1,645	589	2,651

Source: 1/ Provisional figures

Table F-17 Export Earnings and Volumes Traditional Export 1973 - 1983

	1960 - 64 Average	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983*
Copra	'000 Tara ( 14,162)	822 ( 13,946)	4,658 (12,336)	2,603 (19,341)	1,874 (11,921)	4,608 (17,776)	3,536 (13,316)	8,018 (16,943)	8,405 (25,317)	3,924 (14,258)	2,760 (11,820)	1,398 ( 4,787)
Cocoa	'000 Tara ( 4,377)	808 ( 1,228)	1,871 ( 1,816)	1,180 ( 1,459)	2,221 ( 1,634)	5,875 ( 2,149)	2,638 ( 1,169)	3,468 ( 1,473)	3,013 ( 1,503)	1,436 ( 888)	985 ( 770)	4,617 ( 2,123)
Taro	'000 Tara (41,930)	356 (88,091)	318 (88,091)	95 (18,853)	363 (77,405)	337 (57,824)	994 (112,105)	1,512 (130,664)	1,048 (86,085)	2,136 (150,901)	2,126 (139,592)	2,371 (121,879)
Banana	'000 Tara (644,000)	763 (39,285)	127 (51,720)	53 (18,948)	144 (52,880)	61 (18,091)	108 (12,903)	266 (34,343)	440 (70,427)	241 (47,285)	597 (83,802)	407 (57,721)
Timber	'000 Tara ( 4,021)	404 ( 4,021)	375 ( 3,425)	150 ( 1,214)	65 ( 447)	125 ( 1,393)	143 ( 1,254)	291 ( 1,602)	324 ( 1,288)	289 ( 941)	1,208 ( 2,627)	541 ( 1,049)
Total	'000 Tara	3,554	7,349	4,081	4,667	11,066	7,418	13,556	13,230	8,025	7,739	9,334

Source: Socio-economic Situation - Development Strategy and Assistance Needs, December 1982/Annual Statistical Abstract 1983

Note: Provisional figures

A Banana Case contains 56 lbs net of banana; a taro case contains 72 lbs of taro

Table F-18 Value of Other Exports

(Unit: 1,000 Tera)

	1978	1979	1980	1981	1982	1983
<b>Total</b>	<b>768</b>	<b>1,425</b>	<b>2,598</b>	<b>3,123</b>	<b>8,508</b>	<b>18,077</b>
<b>Food</b>	<b>422</b>	<b>713</b>	<b>1,177</b>	<b>1,138</b>	<b>5,773</b>	<b>13,646</b>
Coconut Cream	251	427	581	636	937	1,198
Coconut Oil			89	12	3,640	11,075
Coconut			234	301	518	417
Others	171	286	273	189	678	956
<b>Beverages</b>	<b>10</b>	<b>258</b>	<b>363</b>	<b>524</b>	<b>792</b>	<b>1,438</b>
Soft Drinks		3	11	53	121	561
Beer		252	341	455	651	841
Others	10	3	11	16	20	36
<b>Non-Food</b>	<b>337</b>	<b>454</b>	<b>1,059</b>	<b>1,262</b>	<b>1,943</b>	<b>2,993</b>
Handicrafts	35	49	60	38	19	10
Soap	55	46	46	62	30	11
Textile Pieces	31	21	23	44	23	26
Cigarettes			153	300	384	506
Others	216	338	777	818	1,487	2,440

Source: Annual Statistical Abstract, 1983

Table F-19 Value of Imports by SITC

(Unit: 1,000 HS\$)

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982*
Total	14,433	15,909	23,160	23,627	32,253	38,567	60,946	57,438	69,659	60,117
Food and Live Animal	3,969	4,946	6,714	6,158	9,027	8,545	12,414	12,353	13,236	13,270
Beverages and Tobacco	868	1,184	1,241	1,754	1,563	2,188	1,728	1,481	1,272	1,133
Crude Material	116	107	123	226	760	829	925	1,575	629	1,502
Mineral Fuel and Lubricants	634	480	1,913	1,670	2,902	2,865	5,758	9,561	12,576	9,214
Animal and Vegetable Fats	33	49	73	239	200	308	412	423	396	2,230
Chemicals	803	1,094	1,129	1,283	1,439	2,370	2,715	3,450	3,078	3,503
Manufactured Goods	3,090	3,858	4,996	4,371	6,763	8,043	11,239	13,067	12,467	13,917
Machinery and Transportation Equipment	3,253	2,696	5,160	3,730	7,446	9,872	21,918	11,708	22,837	10,955
Miscellaneous Manufactured articles	1,668	1,358	1,741	2,523	2,123	3,545	3,613	3,808	3,113	4,294
Others	—	138	49	1,673	30	1	225	12	56	100

(Source) : Annual Statistical Abstract 1983, and Socio-economic Situation, Development Strategy and Assistance Needs, December 1982.

Table F-20 Value of Imports by SITC and Selected Countries, 1982

(Unit '000 WS\$)

	Food	Beverages and Tobacco	Crude Material	Mineral Fuel and Lubricants	Animal and Vegetable Fats	Chemicals	Manufac- tured Goods	Machinery	Miscel- laneous articles	Others	Total
Total	13,267	1,144	1,491	9,214	2,230	3,504	13,916	10,955	4,296	100	60,117
Australia	2,878	15	405	4,567	530	556	1,092	2,488	288	49	12,868
Fiji	1,788	-	1	1,084	103	130	106	28	88	2	3,330
New Zealand	4,550	987	341	433	917	1,773	6,315	2,098	1,220	12	18,646
U. S. A.	1,780	49	82	6	315	483	953	1,514	640	0	5,822
Canada	-	-	-	-	2	1	15	5	30	-	53
United Kingdom	33	7	6	-	30	44	244	411	218	-	993
West Germany	231	13	91	3	10	178	84	570	81	-	1,261
China	232	-	151	-	33	92	3,179	298	228	-	4,213
Hong Kong <sup>a</sup>	20	-	-	-	20	48	191	7	221	-	507
Japan	1,209	1	397	1	179	129	1,072	3,381	775	0	7,144
Singapore	20	6	6	3,120	4	2	143	13	69	37	3,420
Taiwan	152	-	1	-	58	23	65	18	368	-	685
Others	374	66	10	-	29	45	457	124	70	-	1,175

(3) Gargo Handled at Port of Apia

Table F-21. (tons)

Year	Gargo Landed	Cargo Shipped
1975	52,063	22,557
1976	54,204	27,185
1977	92,923	23,596
1978	92,123	33,102
1979	72,351	28,955
1980	107,369	36,853
1981	79,978	30,957
1982	102,011	39,764
1983	105,144	37,564

Source: Annual Statistical Abstract  
1983

(4) CAPITAL GRANT AID BY DONORS

Table F-22 (Unit: '000 WSS)

Donors	1 9 8 0	1 9 8 1	1 9 8 2
Australia	4.7 8 0	1.9 0 2	5.2 0 0
Japan	1.7 6 5	3.6 3 6	2.8 3 0
Germany FRG	1.7 7 3	1.0 0 0	3 5 0
New Zealand	4.0 0 4	4.1 7 1	4.2 0 0
U N D P	1.0 0 0	1.4 6 9	1.5 0 0
E D F	1.8 3 2	7 9 6	1.3 5 0
Others	5 1 1	7 4 9	6 0 0
Total	1 5.6 6 5	1 3.7 2 3	1 6.0 3 0

Source : Socio-economic Situation: Development Strategy  
and Assistance Needs, December 1982.

(5) WESTERN SAMOA: SOFT TERM LOAN DISBURSEMENT 1978-1982

Table F-23

(Unit '000 WS\$)

		1978	1979	1980	1981	1982 <sup>1/</sup>
<u>ASIAN DEVELOPMENT BANK</u>		<u>3,161</u>	<u>3,312</u>	<u>3,327</u>	<u>3,713</u>	<u>2,600</u>
Telecom.	1972	119	67	-	-	-
Electric Power	1973	1,085	-	-	-	-
Electric Power (Suppl.)	1975	657	143	-	-	-
Development Bank	1975	58	-	-	-	-
Electric Power	1979	-	-	1,160	1,389	320
Coconut Oil Mill	1977	-	26	376	1,279	550
WSTEC	1977	56	907	803	353	250
Forestry	1980	-	-	-	-	795
Development Bank	1977	1,186	625	143	103	-
Development Bank	1978	-	1,544	845	589	345
Development Bank	1981	-	-	-	-	250
Agriculture Loan	1980	-	-	-	-	90
<u>IDA</u>		<u>696</u>	<u>65</u>	<u>1,891</u>	<u>1,077</u>	<u>1,925</u>
Highway	1975	696	65	112	-	-
Savaii Agr. Dev.	1979	-	-	1,778	1,077	1,725
Second Agr. Dev.	1981	-	-	-	-	200
<u>WEST GERMANY</u>						
KFW Loan	1978	<u>1,700</u>	<u>1,750</u>	-	-	-
<u>NEW ZEALAND</u>						
NZ. Govt. Loan	1978	<u>950</u>	-	-	-	-
<u>E.E.C.</u>						
E.C. Telecom.	1979	-	-	<u>1,458</u>	<u>1,325</u>	-
E.C. Hydro Power <sup>2/</sup>		-	-	-	-	-
E.C. Special Credit	1979	-	-	<u>274</u>	-	-
<u>CHINA</u>						
China Loan	1981	-	-	-	<u>513</u>	<u>2,700</u>
<u>IFAD</u>						
Livestock	1981	-	-	-	-	<u>50</u>
<u>OTHER</u>						
Eurodollar Loan	1978	<u>1,426</u>	-	-	-	-
IMF		<u>561</u>	<u>638</u>	<u>611</u>	<u>9</u>	-
OPEC Fund		<u>365</u>	<u>367</u>	<u>690</u>	<u>1,040</u>	<u>1,000</u>
Rofin	1979	-	<u>815</u>	-	-	-
Total		8,586	6,947	8,251	7,677	8,275

<sup>1/</sup> Provisional Figures<sup>2/</sup> Government Guaranteed Loan

Source: Socio-economic Situation; Development Strategy and Assistance Needs, December 1982



(6) Development Expenditure by Sectors

Table F-24

(Unit: Percentages)

	First Plan 1966-70		Second Plan 1971-75		Third Plan 1975-79		Fourth Plan 1980-84	
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
Agriculture	61.8	23.9	20.7	21.9	28.3	24.1	32.4	30.7
Infrastructure	21.1	64.3	56.1	60.0	42.8	54.5	51.2	40.4
Other Economic Development	11.6	-	0.7	-	10.7	10.2	5.8	10.0
Education and Health	2.5	0.8	11.9	12.3	12.9	7.8	5.7	12.4
Other	3.0	12.0	10.6	5.8	5.3	3.4	4.9	6.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Socio-economic Situation; Development Strategy and Assistance Needs, December 1982

3-3 Natural Conditions

(1) Temperature

Table P-25 Mean Temperature 1971 - 1984

(°C)

Month Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Mean
1971	26.5	26.5	26.4	26.6	26.5	26.0	25.6	25.6	25.6	26.4	26.5	26.7	26.2
1972	26.2	26.6	26.6	27.2	26.7	26.9	26.1	26.1	26.4	26.8	26.5	27.2	26.6
1973	27.0	27.7	27.9	27.9	26.9	26.3	25.6	25.6	26.4	25.3	25.9	26.1	26.5
1974	26.4	25.8	26.0	26.2	25.8	25.7	25.6	25.3	25.7	25.8	25.8	26.2	25.9
1975	26.4	26.5	26.8	26.6	26.5	26.0	25.8	25.9	26.2	26.2	26.2	26.2	26.2
1976	25.9	26.3	26.7	26.8	26.4	26.2	25.9	25.7	25.6	26.9	27.0	26.7	26.3
1977	27.0	27.3	26.7	27.0	26.5	26.2	25.7	25.7	26.1	26.8	26.9	27.2	26.6
1978	26.8	27.4	26.7	26.9	26.8	26.4	25.9	26.1	26.2	26.6	26.4	27.1	26.6
1979	27.2	27.2	27.1	27.0	26.9	27.2	26.1	26.1	26.8	26.8	26.8	26.7	26.8
1980	27.2	27.6	27.7	27.5	26.7	26.8	26.4	26.5	26.6	26.6	27.1	27.2	27.0
1981	27.2	27.2	27.0	-	-	-	25.5	26.5	26.7	26.7	27.0	27.1	26.8
1982	27.0	26.6	27.9	27.7	27.2	26.9	26.6	26.2	26.6	26.0	26.8	26.8	26.9
1983	27.5	28.4	27.7	27.0	27.4	26.7	26.0	25.6	26.7	27.1	27.1	26.1	26.9
1984	26.9	27.3	27.3	27.1	27.3	-	-	-	-	-	-	-	-

Source: Apia Meteorological Office

Table F-26 Monthly Means of Max. and Min. Temperature

(°C)

		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Mean
1973	Mean Max.	30.0	30.7	31.2	30.8	30.4	29.8	29.4	29.1	29.7	28.9	28.9	29.3	29.9°C
	Mean Min.	24.0	24.7	24.6	24.0	23.4	22.8	22.7	22.1	23.1	21.6	22.9	22.9	23.2°C
1974	Mean Max.	29.7	29.2	29.3	29.8	29.6	29.2	29.1	29.2	29.5	29.4	29.1	29.5	29.4°C
	Mean Min.	23.1	22.4	22.7	22.6	22.1	22.2	22.1	21.4	21.8	22.2	22.6	22.8	22.3°C
1975	Mean Max.	29.6	29.8	30.6	29.8	29.6	29.3	29.2	29.1	29.3	29.6	29.4	29.3	29.5°C
	Mean Min.	22.4	23.2	23.7	23.3	23.1	22.7	22.6	22.7	23.1	22.9	23.0	23.0	23.0°C
1976	Mean Max.	29.2	29.4	30.1	30.0	29.7	29.6	29.2	29.3	29.5	30.6	30.3	30.0	29.7°C
	Mean Min.	22.7	23.0	23.3	23.5	23.0	22.7	22.5	22.0	21.8	23.2	23.7	23.6	22.9°C
1977	Mean Max.	30.6	30.6	29.9	30.9	30.3	29.9	29.1	29.2	29.6	30.0	30.2	30.6	30.1°C
	Mean Min.	23.3	24.0	23.5	23.1	22.7	22.5	22.2	22.2	22.6	23.6	23.7	23.8	23.1°C
1978	Mean Max.	29.6	30.7	29.6	30.3	30.3	30.0	29.7	29.4	30.0	30.0	29.8	30.6	30.0°C
	Mean Min.	24.1	24.1	23.8	23.4	23.4	22.9	22.1	22.7	22.5	23.2	22.9	23.7	23.2°C
1979	Mean Max.	30.3	30.7	30.6	30.9	30.7	30.5	29.8	30.1	30.3	30.3	30.1	30.1	30.4°C
	Mean Min.	24.0	23.7	23.6	23.0	23.1	23.9	22.5	22.2	23.2	23.3	23.2	23.3	23.3°C
1980	Mean Max.	30.7	31.0	30.9	31.0	30.0	30.3	29.7	29.8	29.7	29.7	30.5	30.6	30.3°C
	Mean Min.	23.7	24.1	24.3	24.0	23.4	23.2	23.0	23.1	23.5	23.4	23.6	23.7	23.6°C
1981	Mean Max.	30.6	30.7	30.4	-	-	-	29.5	29.9	30.2	29.8	30.5	30.2	30.2°C
	Mean Min.	24.1	22.6	23.6	-	-	-	21.5	23.1	23.3	23.6	23.4	23.9	23.2°C
1982	Mean Max.	30.1	29.7	31.4	31.2	31.0	32.2	30.3	29.5	29.9	30.8	30.2	30.7	30.6°C
	Mean Min.	23.9	23.4	24.3	24.2	23.5	23.0	22.8	23.0	22.9	23.1	23.4	22.9	23.4°C
1983	Mean Max.	30.7	31.9	31.0	31.0	31.0	30.3	29.7	29.5	30.1	30.7	30.9	30.2	30.6°C
	Mean Min.	24.2	24.9	24.4	23.0	23.7	23.0	22.2	21.6	23.3	23.5	23.4	23.9	23.4°C
1984	Mean Max.	30.3	30.6	30.2	30.9	31.2	-	-	-	-	-	-	-	-
	Mean Min.	23.5	23.9	24.3	24.1	23.4	-	-	-	-	-	-	-	-

Source: Apia Meteorological Office

## (2) Rainfall

Table F-27 Number of Raindays per Month

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1971	30	24	26	23	14	16	11	17	21	24	20	25	251
1972	24	24	19	24	13	13	11	11	21	18	15	21	214
1973	21	23	21	19	14	14	17	20	25	26	28	28	256
1974	25	24	25	22	15	18	16	7	15	19	21	20	256
1975	26	19	22	19	23	20	16	14	24	25	16	27	227
1976	27	23	23	19	17	17	25	10	4	13	21	21	251
1977	19	21	23	15	15	11	9	8	9	15	20	17	220
1978	30	18	28	17	19	15	4	17	12	22	24	22	182
1979	25	24	20	17	17	20	13	8	13	18	12	19	228
1980	24	19	25	17	18	18	13	18	26	24	19	18	239
1981	22	21	24	-	-	-	10	18	18	22	22	26	183
1982	27	24	25	12	15	9	12	18	9	11	14	8	184
1983	19	13	16	11	15	12	8	6	12	17	11	24	164
1984	21	22	25	21	5	-	-	-	-	-	-	-	-
Mean	24	21	23	18	15	15	13	13	16	20	19	21	220

Table F-28 Total Monthly Rainfall

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1971	392.7	357.9	240.5	389.6	238.0	120.7	59.5	64.0	268.5	142.6	266.8	277.2	2,818.0
1972	545.0	197.1	364.8	269.7	70.2	55.1	110.6	129.8	465.9	354.0	203.8	721.1	3,487.0
1973	472.2	312.8	135.7	434.1	129.8	94.0	131.1	303.2	179.5	579.0	727.3	585.1	4,083.8
1974	331.8	428.3	381.5	201.2	130.9	327.3	35.7	18.7	103.8	406.4	567.7	511.5	3,444.8
1975	924.0	321.0	260.7	238.0	291.5	114.8	278.7	91.6	171.9	209.4	159.5	364.0	3,425.1
1976	620.6	421.6	211.3	242.2	241.3	137.5	186.9	35.7	4.4	49.9	183.4	602.2	2,937.0
1977	366.9	261.9	454.9	61.9	97.9	85.6	59.4	44.1	57.1	132.7	149.5	134.0	1,905.9
1978	959.7	197.1	640.9	100.5	141.6	125.7	130.0	267.7	70.1	281.6	513.3	412.9	3,841.1
1979	209.3	270.4	332.0	100.3	244.3	119.9	208.7	51.7	236.2	348.9	247.8	391.6	2,761.1
1980	372.2	310.2	464.4	302.7	216.1	161.2	162.4	161.9	593.1	488.0	208.8	180.1	3,621.1
1981	259.3	361.3	634.9	-	-	-	67.5	75.2	198.6	350.3	438.2	596.6	2,981.9
1982	481.1	947.1	132.6	33.9	289.3	51.5	71.6	276.3	63.1	100.9	125.4	63.1	2,635.9
1983	228.5	141.1	256.5	130.9	75.8	113.8	14.5	105.2	23.6	82.6	202.4	573.7	1,948.6
1984	274.1	260.2	277.0	131.0	59.4	-	-	-	-	-	-	-	-
Mean	459.8	342.0	342.0	202.8	171.2	125.6	116.7	125.0	187.4	271.3	307.2	416.4	3,068.6

Source: Apia Meteorological Office

Fig. F-20 RAINFALL FOR APIA

STATION	PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
APIA	1990-1990	436.0	361.0	358.0	244.0	171.0	135.0	101.0	105.0	147.0	209.0	266.0	374.0

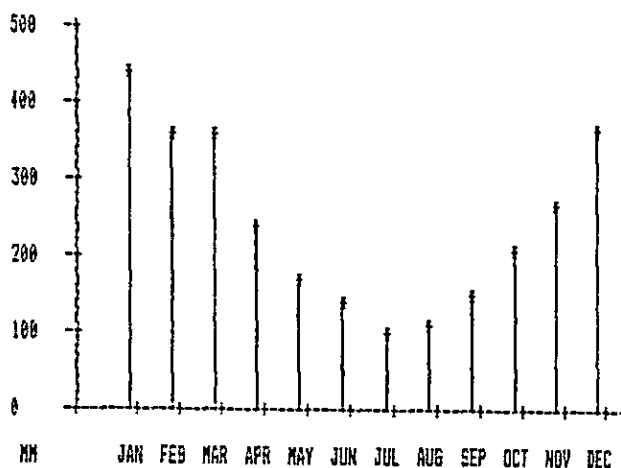


Fig. F-21 RAINFALL FOR ASAU

STATION	PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
ASAU 2	1985-1981	637.6	341.7	298.6	275.3	111.5	56.0	60.7	84.5	62.1	178.3	203.3	393.6

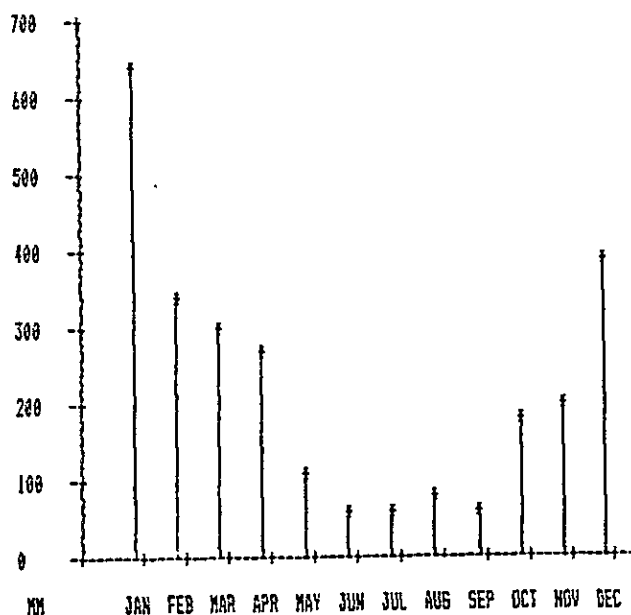


Fig. F-22 RAINFALL FOR SALELOLOGA

STATION	PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SALELOLOGA	1962-1972	291.4	239.3	239.1	249.1	177.2	191.9	111.3	188.0	222.0	297.7	193.8	320.3

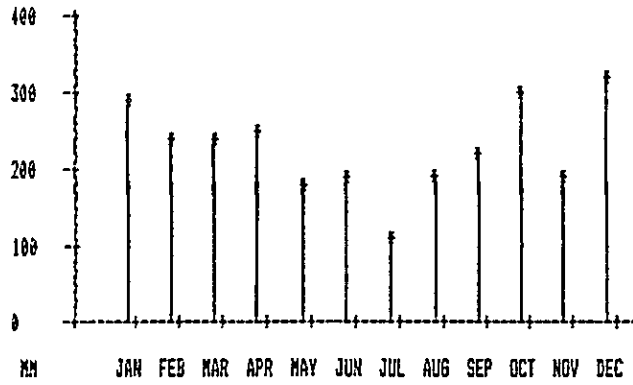
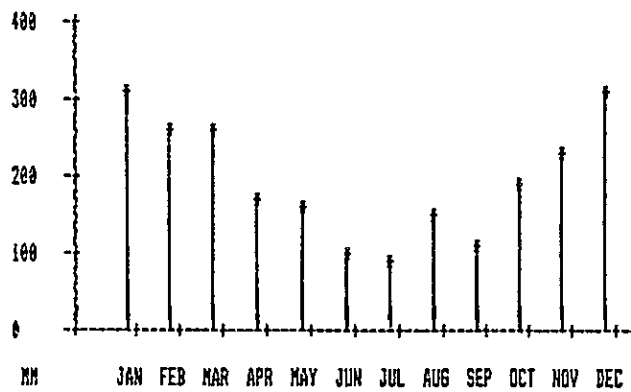


Fig. F-23 RAINFALL FOR FALEOLO

STATION	PERIOD	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
FALEOLO	1957-1981	314.0	261.9	262.9	172.8	158.7	100.1	93.8	146.9	110.7	189.8	229.3	310.2



Source: Apia Meteorological Office

## (3) Wind

Table F-29 ANNUAL PERCENTAGE FREQUENCY OF WINDSPEED  
AND DIRECTION - PERIOD 1951 - 1970

SPEED IN KNOTS	N	NE	E	SE	S	SW	W	NW	TOTAL
0 - 2									37.942
3 - 13	2.158	3.480	19.230	12.265	6.262	2.029	1.882	1.620	48.926
14 - 27	0.359	0.576	10.775	0.758	0.040	0.019	0.152	0.402	13.080
28 - 40	0.010	-	0.017	-	-	-	0.007	0.012	0.046
40 -	-	-	-	-	-	-	-	0.005	0.005
TOTAL	2.527	4.056	30.022	13.023	6.302	2.048	2.041	2.039	100.000

Table F-30 ANNUAL PERCENTAGE FREQUENCY OF WIND DIRECTION  
AT APIA 1951 - 1970

MONTH	N	NE	E	SE	S	SW	W	NW	CALM
Jan.	0.55	0.51	1.63	0.75	0.63	0.31	0.34	0.34	3.40
Feb.	0.43	0.35	1.32	0.60	0.55	0.31	0.42	0.46	2.95
Mar.	0.51	0.42	1.44	0.73	0.50	0.21	0.38	0.37	3.96
Apr.	0.15	0.31	1.67	0.82	0.31	0.15	0.17	0.23	4.38
May	0.09	0.28	2.47	1.15	0.40	0.07	0.04	0.05	3.99
Jun.	0.05	0.19	3.28	1.34	0.44	0.05	0.05	0.02	2.76
Jul.	0.04	0.20	3.21	1.67	0.69	0.11	0.04	0.04	2.56
Aug.	0.07	0.30	3.49	1.59	0.60	0.21	0.03	0.04	2.22
Sep.	0.03	0.30	3.56	1.34	0.37	0.07	0.03	0.02	2.54
Oct.	0.12	0.36	3.35	1.18	0.55	0.15	0.08	0.06	2.72
Nov.	0.21	0.40	2.60	0.95	0.54	0.13	0.17	0.15	3.12
Dec.	0.30	0.44	2.02	0.82	0.72	0.27	0.30	0.26	3.35
Total %	2.55	4.06	30.04	13.07	6.30	2.04	2.05	2.05	37.95

Source: Apia Meteorological Office

Table F-31 MEAN HOURLY VALUES OF WINDSPEED IN KNOTS - PERIOD 1955-1974

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	MEAN
JAN	3.8	3.9	3.9	4.0	3.7	3.7	3.7	3.9	4.5	6.1	7.2	7.7	8.1	8.2	8.0	7.7	7.3	6.9	6.5	5.4	4.3	4.0	3.9	3.9	5.4
FEB	3.9	4.0	3.9	3.9	4.0	4.1	4.2	3.9	4.5	6.0	7.1	7.8	8.0	8.0	7.9	7.6	7.3	6.8	6.1	5.4	4.5	3.9	3.7	3.8	5.4
MAR	3.6	3.5	3.5	3.4	3.5	3.7	3.5	3.5	4.0	5.5	6.6	7.1	7.3	7.1	7.2	6.8	6.5	6.1	5.4	4.1	3.5	3.4	3.4	3.4	4.8
APR	2.7	2.8	2.7	2.7	2.7	2.8	3.0	2.8	3.3	5.5	6.6	7.2	7.4	7.5	7.4	7.0	6.5	6.0	5.1	3.4	2.7	2.7	2.6	2.7	4.4
MAY	2.9	3.0	2.8	2.9	2.9	3.0	3.0	3.1	3.5	5.5	7.1	8.0	8.4	8.6	8.3	8.2	7.6	7.0	5.5	3.7	3.2	2.9	2.9	3.1	4.9
JUN	4.5	4.3	4.3	4.3	4.1	4.2	4.3	4.4	5.0	7.8	9.7	10.6	11.1	11.3	11.3	10.9	10.4	9.6	7.6	5.6	4.9	4.8	4.5	4.7	6.8
JUL	4.7	4.5	4.5	4.4	4.4	4.3	4.4	4.6	5.4	7.8	9.2	10.2	10.6	11.0	11.0	10.8	10.4	9.5	7.9	6.0	5.3	5.0	5.0	4.8	6.9
AUG	5.5	5.3	5.2	5.1	4.9	4.9	4.9	5.3	6.8	9.4	10.8	11.6	12.1	12.4	12.4	12.2	11.6	10.7	9.1	7.4	6.2	5.8	5.7	5.6	8.0
SEP	5.2	5.1	4.8	4.9	4.9	4.9	5.0	5.3	7.6	10.2	11.4	12.1	12.4	12.4	12.3	12.1	11.7	11.0	9.6	7.5	6.3	5.8	5.8	5.3	8.1
OCT	4.6	4.4	4.2	4.3	4.4	4.5	4.7	5.4	7.4	9.4	10.5	11.2	11.2	11.2	10.9	10.6	10.1	9.3	8.2	6.6	5.5	5.2	4.8	4.7	7.2
NOV	3.5	3.2	3.3	3.1	3.1	3.1	3.1	3.6	5.5	7.5	8.5	9.2	9.4	9.2	8.9	8.6	8.2	7.6	6.6	5.3	4.3	3.9	3.6	3.5	5.7
DEC	3.5	3.4	3.4	3.3	3.4	3.8	3.7	3.7	4.9	6.7	7.9	8.8	9.1	9.0	8.6	8.3	7.8	7.8	6.4	5.1	3.9	3.6	3.5	3.6	5.6
MEAN	4.0	4.0	3.9	3.9	3.8	3.9	4.0	4.1	5.2	7.3	8.6	9.3	9.6	9.7	9.5	9.2	8.8	8.2	7.0	5.5	4.6	4.3	4.1	4.1	6.1

Source: Apia Meteorological Office



Table F-32  
Mean Hourly Wind Speed by Months (1955~1974)

(unit:knot)

		Daytime		Night	
			Ave.		Ave.
Rainy	JAN	3.7~ 8.2	6.0	3.8~ 5.4	4.6
	FEB	3.9~ 8.0	6.0	3.8~ 5.4	4.6
	MAR	3.5~ 7.2	5.4	3.4~ 4.1	3.8
	APR	2.8~ 7.5	5.2	2.6~ 3.4	3.0
Dry	MAY	3.0~ 8.6	5.8	2.9~ 3.7	3.3
	JUN	4.3~11.3	7.8	4.1~ 5.6	4.9
	JUL	4.4~11.0	7.7	4.3~ 6.0	5.2
	AUG	4.9~12.4	8.7	4.9~ 7.4	6.2
	SEP	5.0~12.4	8.7	4.8~ 7.5	6.2
	OCT	4.7~11.2	8.0	4.2~ 6.6	5.4
	NOV	3.1~ 9.4	6.3	3.1~ 5.3	4.2
Rainy	DEC	3.7~ 9.1	6.4	3.3~ 5.1	4.2

Table F-33  
Mean Hourly Wind Speed by Seasons (1955~1974)

(unit:knot)

	Daytime		Night	
		Ave.		Ave.
Rainy	2.8~ 9.1	6.0	2.6~ 5.4	4.0
Dry	3.0~12.4	7.7	2.9~ 7.5	5.2

## (4) Record of Storm

Table F-34 Record of Storm

Year	Month	Mean Wind Velocity (m/sec)	Time (hrs)	Wind Direction	Max Wind Velocity (m/sec)
1831   1888 1889	Storm: 3	Record only, there are no data for Wind direction and velocity 30	24 (Same wind direction 8 hrs)	W - S - SE	-
1923	3	25	12	NE - NW	-
1926	1	30	2	NSE - S	-
1930	12	20	-	N	-
1946	12	23.6	-	-	-
1952	1	19.4	3	-	-
1957	12	14.4	24	ESE	38
1958	3	15	1	ENE	24
1959	2	9.8	24	N	21
1960	1	19	5	NW	26
1961	3	11.8	72	NW	26
1963	3	15	14	NW	21
1964	1	5	24	NE	19
1965	3	4.5	24	E	18
1966	1	30	9	S	41
1967	12	10.5	24	NE	21
1968	2	28.3	1.25	NW	39
1969	1	10.3	24	NNE	21.5
1970	2	11.5	24	NNE	22.5
1972	1	10.5	24	NE	26
1974	1	10.5	24	NNE	19
1975	1	9	48	SSE	26

Source: Apia Meteorological Office

## (5) Tide

Table F-35 Record of Tide

Place	High Water		Low Water	
	Mean Springs	Mean Neaps	Mean Springs	Mean Neaps
Apia	0.98 <sup>m</sup>	0.76 <sup>m</sup>	0.0 <sup>m</sup>	0.21 <sup>m</sup>
Saluafata	1.34 <sup>m</sup>	1.13 <sup>m</sup>	0.30 <sup>m</sup>	0.52 <sup>m</sup>
Mulifanua	1.04 <sup>m</sup>	0.85 <sup>m</sup>	0.03 <sup>m</sup>	0.21 <sup>m</sup>

Source ; Chart-Apia Harbour  
Chart-Plans in Samoa

(6) Wave

Table F-36 Annual Assumed Deepwater Wave Height  
and Percentage Frequency  
(1951 - 1970)

Wind Velocity	Wave Height (m)	Period (sec)	Percentage Frequency (%)	
1.3(0 - 2 knot) = 0 - 1.3m/sec	0 - 0.2	0-2sec	37.9	87%
1.3(3 - 13 knot) = 2.0- 8.7m/sec	0.2-1.2	2-4.4sec	48.9	
1.3(14 - 27 knot) = 9.4-18.1m/sec	1.5-4.2	4.8-7.8sec	13.1	
1.3(28 - 40 knot) = 18.7-26.8m/sec	4.5-7.5	8.2-10.4sec	0.05	
1.3(40knot or more) = 26.8m/sec or more	7.5 or more	10.4sec	0.005	

Table F-37 Assumed Deepwater Wave Height  
(1955-1974)

	Day Time			Night Time		
	Wind Velocity	Wave Height(m)	Period (sec)	Wind Velocity	Wave Height(m)	Period (sec)
Rainy Season	1.3 (2.8- 9.1knot) =1.8- 6.1m/sec	0.2-0.7	3.4sec	1.3 (2.6-5.4knot) =1.3-3.6m/sec	0.2-0.3	2.5sec
Dry Season	1.3 (3.0-12.4knot) =2.0- 8.3m/sec	0.2-1.2	4.4sec	1.3 (2.9-7.5knot) =1.5-5.1m/sec	0.2-0.5	3.0sec

Note: Wave height was assumed using the wind velocity record according to the SMB method (wind duration = 12hr)

## **Appendix G**

### **Design of Slipway and Ship Repair Facilities ( for Reference )**



## 1. Site for Construction

The proposed location for the ship repair facilities was Apia according to the request of the Government of Western Samoa. However, confirmation during the survey indicated that there are considerable complexities involved in this choice of location, since Apia forms the administrative and economic center of the country of Western Samoa and hence has a concentration of population, industry and commerce. The Government maintains a policy of avoiding excessive concentration of population by locating industries in regional area. Therefore, the Salelologa region, Port Saluafata and the Asau region could provide viable alternative locations. However, during discussions between the Government of Western Samoa and the Survey Team, it was concluded that the Asau region would be inconvenient from the point of view of the supply of materials since it is located far from the ferry route. Excluding this area from consideration leaves the two sites and the addition of Mulifanua with its ferry berth, on the Upolu side of the island which gives the following three possible sites.

- (1) Salelologa Port Area
- (2) Saluafata Bay
- (3) Mulifanua Port Area

A topographical survey, sounding, current survey, and rough soil survey was carried out for each of these sites. The results of these surveys are indicated in Appendix G, 2 (14). They show that there is practically no adverse influence of current at any of the ports, and that there may be no large wave action because of the coral reef which stretches 1.5 km out to sea. The size of the site required for the construction of the ship repair facilities is approximately 80m x 85m, and the water depth is approximately 4.5m to 5m. Comparison of these points at the three sites are described below.

- (1) Salelologa Port Area (West Area to the Port)

Rocks are exposed until the water depth reaches approximately 1m and there are sand piles in parts of the deeper area. There is a coral reef about 120m off the beach. The water depth is shallow,

at less than 1m around the bay, but deepens to 3.5m to 5.5m towards the ferry berth. The surrounding land is hilly and it would be necessary to reclaim the sea area in order to construct the ship repair yard.

(2) Saluafata Bay

The coast is sandy but there are exposed rocks out from the shoreline, with only partial sand coverage. The water depth is shallow at less than 0.5m up to a distance of about 100m off from the shore, and deepens gradually to a depth of 2.5m to 4.0m. The surrounding area has residences and the antional road runs close behind them. In order to secure the land area sufficient to allow the construction of the dock, and to obtain a water depth sufficient for the ferry to dock, it would be necessary to reclaim land to a distance of 100m toward the offshore area.

(3) Mulifanua Port Area (West Area to the Port)

The area is composed of coral reefs and rocks. The water depth up to a distance of 200m from the shore is between 1.5m to 2.0m. However, the site is close to the ferry channel and the turning basin (both of which have a depth of about 4.0m) and so this can be used for ships entering and leaving the dock. The surrounding areas have been filled partially and is -0.5m to -1.5m in elevation. This area can be used as ship repair yard after reclamation.

The survey results described above shows that there will be no difficulties to construct ship repair yard at these sites from the natural condition point of view, and that reclamation will be required to construct the ship repair yard at all of the sites.

Final determination of the site for ship repair dock should be made by reflecting the Government's Development Plan, related industries in surrounding area and ease of operation and maintenance.



## 2. Basic Design

### (1) Scale of Ship Repair Facilities

The scale of ship repair facilities should be planned to provide the repair services without repair work being performed abroad.

The subject vessel will be a 700GT class ferry boat. For reference, dimensions of the Queen Salamasina are shown below.

Vessel: "Queen Salamasina" class

Gross tonnage: 700 ton

Length: 41 m

Width: 11 m

Draft: 2.10 m

#### Facilities Required:

Mechanical work shop, carpenters work shop, electrical work shop, Repair yard, crane and machines.

(2) Drawing of Basic Design

Drawing of basic design is shown in Fig.G-1 attached herein.

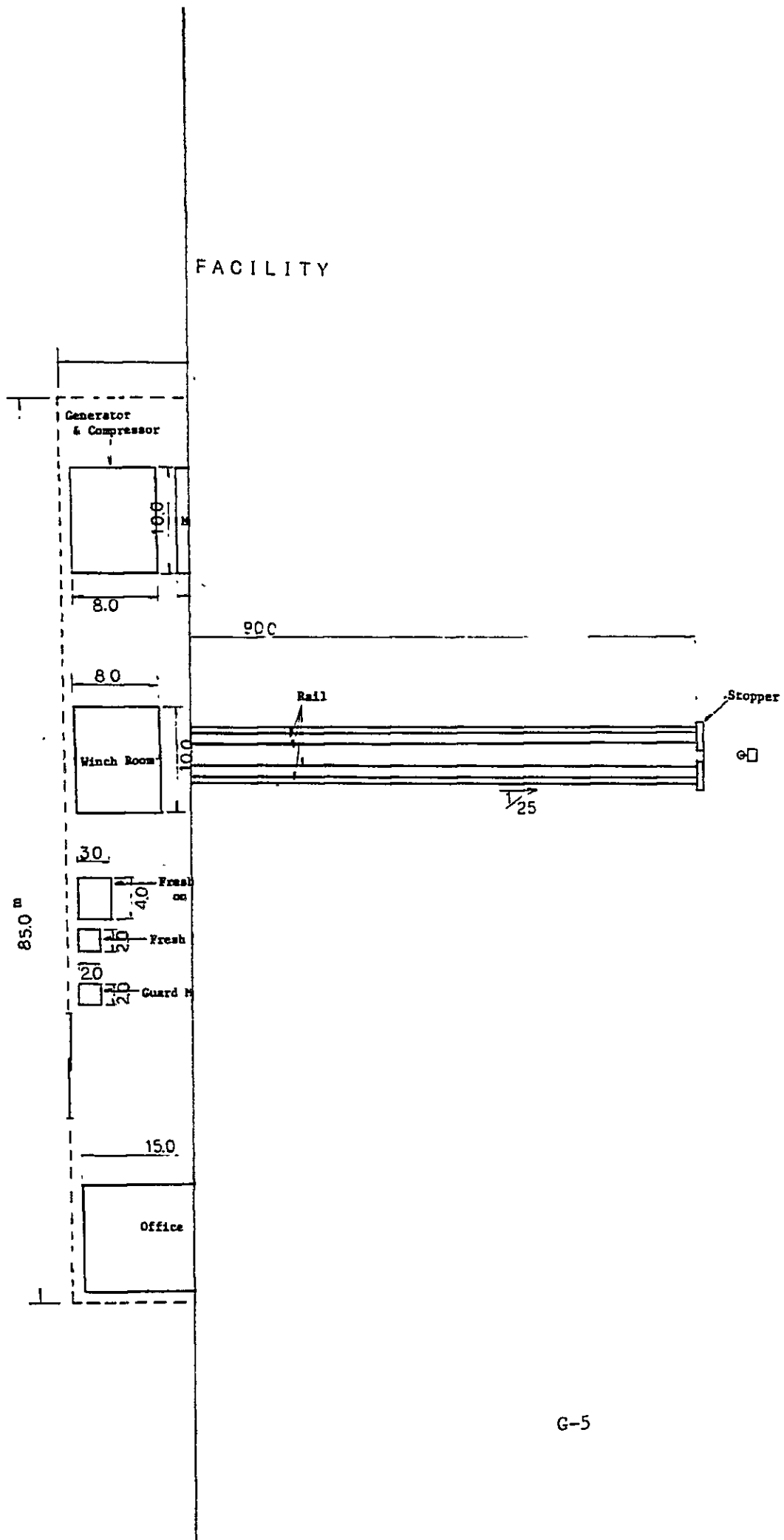
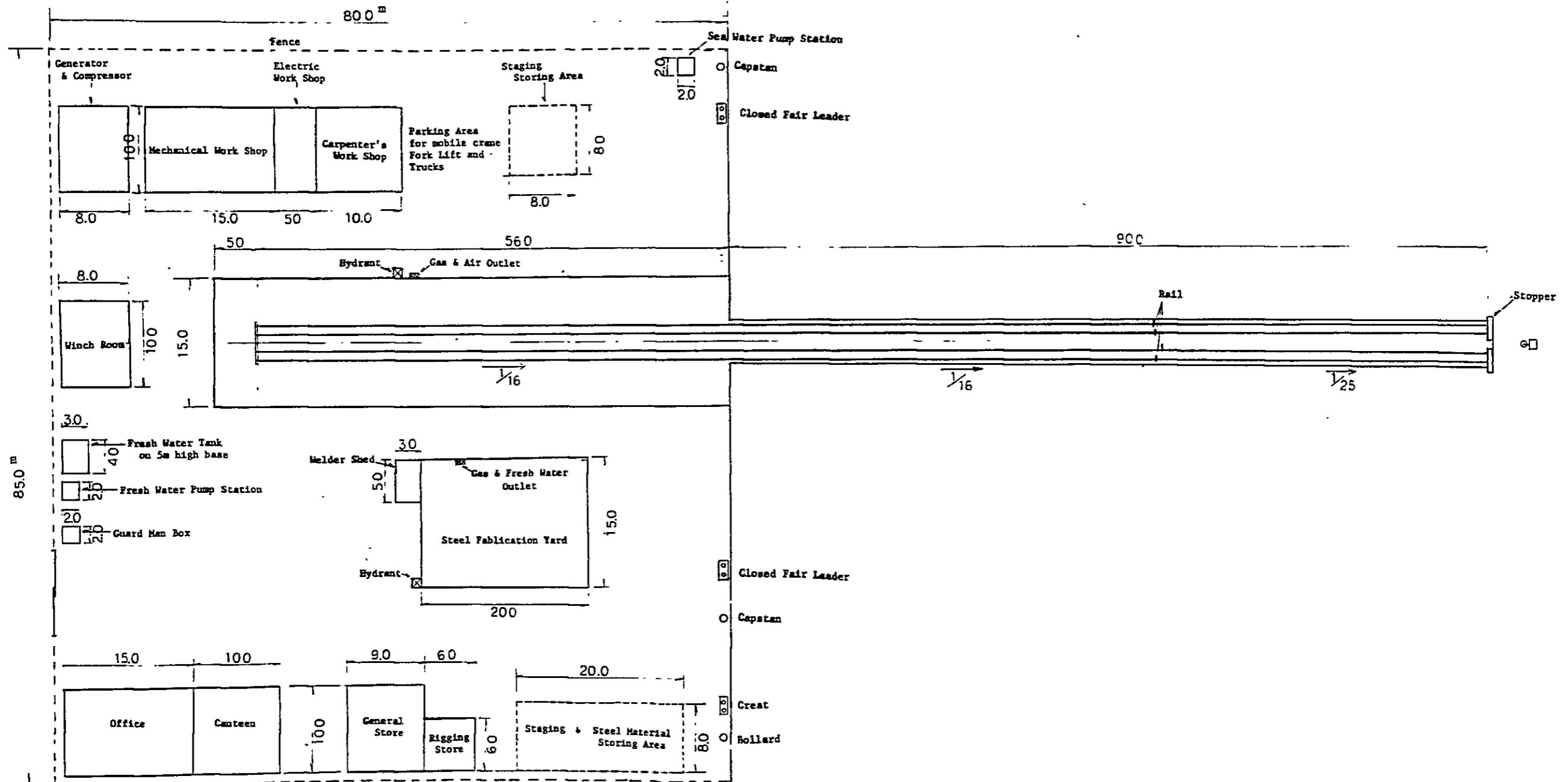


FIG. G-1 PLAN OF SLIPWAY AND REPAIRING FACILITY





(3) Equipment List for Ship Repair Facilities

Table G-1

	Equipment	Capacity	Unit	Q'ty
Slipway	Winch · Wire Reel	45kw x 20ton x 10 <sup>m</sup> /min	Set	1
	Wire	30mmφ, 25mmφ	m	1550
	Pully Block	600mm (5sheev, 2sheev)	Set	2
	Cradle	4mL x 5mW	Set	5
	Others			
Mooring Facility	Electric Capstan	5ton x 9 <sup>m</sup> /min	Set	2
	Closed-Fair-Leader Bitt & Creat	5ton	Set	1
Machinery Room	Main Generator	160kw	Set	1
	Aux Generator	40kw	Set	1
	Switch Board		Set	1
	Air Compressor	8kg/cm <sup>2</sup> x 10 <sup>m</sup> <sup>3</sup> /min	Set	1
	Others			
Mechanical Workshop	Over Head Crane	5ton	Set	1
	Lathe Machine		Set	1
	Milling Machine		Set	1
	Drilling Machine		Set	1
	Pipe Bender	165 <sup>mm</sup> φ	Set	1
	Pipe Cutter	165 <sup>mm</sup> φ	Set	1
	Electric Hydraulic Press	2000 <sup>mm</sup> x 70ton	Set	1
	Small Size Equipment			
	Equipment, Gauges and Measures for repair of Engine and Pump			
Carpenter's Workshop	Trolley Hoist	2ton	Set	1
	Electric Machine for Wooden Work			
	Hand Machine for Wooden Work			

	Equipment	Capacity	Unit	Q'ty
Repair Yard	Trolley Hoist	5ton	Set	1
	Travelling Roof	150m <sup>2</sup>	Set	1
	Welder			
	Equipment for Steel Work			
	Sand Blasting Equipment		Set	2
	Painting Machine			
	Hydro-jet Cleaner		Set	1
	Staging			
	Truck Crane	35 ton	Set	1
	Fork Lift		Set	1
Pump Room	Fresh Water Pump	30 <sup>m<sup>3</sup></sup> /h x 30m	Set	1
	Fresh Water Tank	24 <sup>m<sup>3</sup></sup>	Set	1
	Sea Water Pump	60 <sup>m<sup>3</sup></sup> /h x 100m	Set	1
Office	Public Announcement System			
	Desk, Chair, Drafting Board			
	Utensil for Kitchen and Lavatory			

### 3. Management Programme

At present, there is no group or organization in Western Samoa which could perform the management and administration required for the ferry repair dock facility. The Government of Western Samoa has a general plan to form a corporate body for the management administration, but this plan is not a particularly detailed one.

The following forms are envisaged for the management:

- (1) Direct management by the Government
- (2) Trust management by the Western Samoa Shipping Corporation which is managing the present ferries
- (3) The establishment of a 100% Government financed corporation and trust management by this body

All of these forms require that an organization be found for the management administration of the dock facility, and that suitable personnel be secured. As one example of the management organization, there could be:

- (1) Office Management Section
- (2) Design Section
- (3) Repair Section

The work to be performed in each of these sections, the personnel and technicians attached to them and the numbers of positions and skilled processes will vary greatly according to the level of techniques and skills, the degree of development of the related industries, and the type, frequency and period of repair. However, it is envisaged that the following personnel will be required to manage and operate a facility of this scale.



Table G-2 Section and Staff for Ship Repairing Facilities

Section	Contens of Work	Staff
Management Section	Management Administration Control of Outside  Purchase and Control of Equipment and Material	General Manager Administrator Clerk in charge of Outside Clerk in charge of
Design Section		Hull Designer Engine Designer Electric Designer Draftsmen
Repair Yard	Entering and Leaving Work to Dock  Repair and Paint on Hull	Yard Master  Painter  Welder Gas Cutter Sheet Metal Worker Crew Operator
Mechanical Workshop	Check and Repair of Engine, Propeller and Shaft etc.  Maintenance of Machines in the Yard	Mechanical Engineer Pipe Fitter  Engine Fitter Mechanic
Carpenter's Workshop	Outfit of Ship	Carpenter Ship Wright Joiner Plasterer Plumber
Electrical Workshop	Wiring, Check and Repair of Radio and Electric Equipment	Electrical Engineer Radio Engineer Electrician







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