

12.2 Development Scenario, and Prospective Industries

12.2.1 Development Scenario

The most prospective industry, in view of Salalah's geographically advantageous location combined with the call of international major container lines, will be redistribution businesses. The development of redistribution businesses will lead to increase in local production of these goods, if appropriate encouraging measures are taken. The currently proposed development scenario is making most of this potential as the key for development in Salalah. Namely,

- 1) Put the primary focus on development of redistribution industry.
- 2) Establish Free Zone as the major and most effective promotion measure for the redistribution businesses, and under the free zone, provide the promotional conditions and supporting measures for the potential investors, for their investment and operation.
- 3) Formulate linkages among the related zones in and adjacent to Oman, to strengthen the position of Salalah not only as the regional redistribution center, but also as the access point to the international market from the region.
- 4) Encourage local production, taking advantage of business experiences accumulated through the redistribution businesses.

The expected development scale will depend on the competitive position of Salalah compared particularly with Dubai. The competitive position of Salalah in the future is hard to predict at this stage. It depends on success of introduction of major international container lines, and development of feeder networks.

Following scenarios are assumed for the projection of development scale. Both scenarios assume the promotion of local production at the same level.

1) Projection Scenario (1): Low risk scenario

This is a relatively low-risk scenario and assumes the moderate penetration of Salalah in to the markets of various competitive position of Salalah. Nevertheless, the market share assumed here is much higher compared with the Salalah's actual performance until now.

2) Projection Scenario (2): High risk scenario

This is a very optimistic scenario and assumes quite aggressive market penetration by Salalah even for the markets where the competitive position of Salalah will not be advantageous in terms of freight costs between the market and Salalah. The scenario assumes the leading position of Salalah as the redistribution center in the region with various conditions become favorable for Salalah. Nevertheless, no body can deny the possibility of this scenario when considering the historical performance of JAFZ.

It is recommended in planning that:

- 1) Assume the level of Projection Scenario (1) as the basis for the master plan,
- 2) Use the level of Projection Scenario (2) for future consideration. The land should be reserved for the possible development in the future, until there will be the need to allocate them to a specific use objective.
- 3) Review the progress of development every 3 years of activities, and update the projection scenarios, to decide the actual needs for implementation.

12.2.2 Prospective Industries

The prospective industries discussed in the following sections are the industries, which have high potential of local production because of certain factors, except for the case of redistribution businesses. In other words, these industries are worthy for promotion in view of local production.

In fact, in terms of potentiality of local production, there will be various products apart from the above, which are handled by the redistribution businesses, and expected to be viable for local production. These include various kinds of chemicals and chemical products, plastics products, paper products, metal products, etc., which are mostly related to construction and building materials, daily necessities, and foods. These products, or industries to produce these products, are not discussed here. Rather, the growth of these industries is already assumed as a natural tendency.

(1) Redistribution Businesses

There will be two types of industries. Both of them play a role of distributors, namely, collection of goods, and distribution to the customers, together with the functions of simple processing, packaging, and sub-packaging.

1. Import of goods to meet the demand in Yemen, East African countries, and other markets prospective to Salalah by container in an economic lot size, store, sub-packaging if necessary, and export (distribute) to the customers at their demand in a size they require. The products, which might be categorized under this, include, for example, food, pharmaceuticals, clothes, construction materials, plastics products, electrical products and parts, and automotive parts, etc.
2. Import (collect) of materials in a small lot size from Yemen, East African countries, and other countries, which regard Salalah as their access point to international market, store, and export to the markets in Europe, US, and Southeastern Asia with container. Salalah should not only play a role of distribution point, but also function to refine, process, repack and improve the quality to meet the demand in the markets. These include, for example, spices, tea, etc. The fish or marine products from Yemen are also categorized under this,

though it requires establishment of a system of strict quality control.

Table 12.2.1 shows the import in Yemen. The major imported products in value are vegetable products, followed by electrical equipment. Other major ones are various kinds of consumers' products, like prepared food, mineral products, chemical products, base metal and products, vehicles and parts, etc. Tables 12.2.2 and 12.2.3 show the export of Dubai to Yemen and East African countries. These products may be regarded as prospective products to be handled by Salalah in replace of Dubai in the future.

For promotion of the redistribution businesses, establishment of Free Zone, and formulation of linkage with other zones are the basic assumptions, but at the same, following considerations should be made appropriately:

- 1) Provide various supporting measures in free zone, such as a testing institute to certify the product quality, and machine maintenance workshops, etc.
- 2) Development of system to link sea and air transportation should be taken into account, with possibility of future development of cargo transportation mode in-between sea to air.
- 3) Taking into consideration of the fact that the export to Yemen and Some African countries may be undertaken by Dhow ship trading, provision of exhibition and trading space will be useful to support these types of trading.

(2) Local Production Capitalizing on the Salalah's Geographical Advantage

The redistribution business may cover a wide range of goods, which demand can be found in the markets prospective to Salalah. These include various kinds of foods, chemicals, plastics goods, garments, building materials, and so forth. These redistribution businesses will provide a good opportunity to encourage local production with adequate promotion measures.

In addition to the industries, thus converted to local production, following is an example of prospective industries, which are still under the redistribution business concept, but indicate the possibility to expand it to the wider concept.

Development of Food Industries based on Imported Grain and Oil Crops

Development of food industries constructing grain silos at the port side, together with flourmill, oil mill, and animal feed processing as core processing facilities. The operation is based on the grains and oil crops imported in a large scale, storing, processing and distribute (re-export) mainly to Yemen, East African countries, and further to the countries on the Indian Ocean Rim, as well as the Central Asian Republics. There is no large-scale receiving storage of grain in the region.

The project should also consider the possibility of down stream development of, for example,

snack foods, noodles, and cakes, which can be exported to markets in Southeastern Asia, taking advantage of cheap freights of return container. These processing factories can be located in a part of the existing Raysut Industrial Estate, where required facilities specific to the food industries will be established. These include testing laboratory for quality control, water supply, and maintenance shop of food processing and packaging machineries, etc.

Table 12.2.4 shows the import of selected cereals and vegetable oils in Yemen and East African countries as well as Iran, Iraq, and Pakistan. The import of wheat flour by Yemen and East African countries alone will be big enough to justify this kind of operation.

Further, Salalah has the base of this kind of development with existing operations. There are two factories handling grain in Salalah. One is a flourmill exporting most of their products, and another is an animal feed manufacturing factory importing large amount of grain.

For this operation, the scale of economy plays an important role in its competitiveness, particularly in importing raw material grains. If they can import in a larger lot size, it will help strengthen the competitiveness of these industries. Salalah is a good location, which can provide sufficient space to develop such integrated project.

(3) Local Production Capitalizing on the Salalah's Advantageous Position and the Industrial Experiences in Oman

Development of Quick Response and High Quality Garment Industry targeting EU Markets

The existing garment industry is exporting their products mainly to the US market. The industry has a competitive edge of reputable quality control and reliable delivery, meeting the client's demand. The operation is based on the imported skilled labor and imported management expertise in this field. All of the enterprises are located in the North (Muscat area and Al Braymi area), and no enterprise is located in Salalah.

However, Salalah became the ideal location for the industry if it is newly established, in that the time required for transportation to the US market is shorter than the North in Oman, and also time required for import of raw materials is shorter than the North.

The existing industry has already established in the North regions, the transfer of them to Salalah will not be viable unless enough incentives are offered. Further, new investment on this type of industry is not expected in a large scale in the near future, since the export volume to the US market will almost remain unchanged with quota.

However, there is another potential of developing garment industry in Salalah, taking advantage of the container port. It is the garment industry operated on the basis of export to EU market.

The short delivery time (or short lead-time) is one of the key factors for the successful operation of this industry, and the call of the major container line can make it feasible.

Garment industry is the labor-intensive industry, and has high potential of absorbing surplus labor. In the initial stage of operation, it is essential to use skilled labors, which can be obtained from such countries as Sri Lanka.

Further, Oman is excellent communication system with international connection, which will be one of the advantages to establish this kind of operation, since one of the key factor for successful operation is quick response to the orders from buyers.

There are various factors to overcome to be successful in this field attracting the buyers. These include the need to upgrade the technology particularly in cost effectiveness, shorten lead-time by improving efficiency of design and preparation process, and to ensure marketing channels. An industrial estate specialized in the garment industry will be recommended to help upgrading the industry. The industrial estate should include some supporting facilities for the industry to upgrade their technology and operation efficiency. Regarding the number of enterprises, it is expected that the existing enterprises, which are located in the North, will be relocate themselves to Salalah in the future, if the supporting facilities are well established and a certain level of industrial accumulation is attained.

Promotion of Industries to meet the Import Demand in the Markets in Southeastern Asia

The industries includes various types of industries, which export their products by container to the markets in Southeastern Asia, taking advantage of the cheap freights with use of return container. Some examples are as follows:

1. Construction material manufacturing industry, such as gypsum board, marbles, wall tiles, etc. They can utilize such local mineral resources as gypsum, marble and limestone, etc., as the raw materials. However, it should be noted that the cheap costs alone would not meet their demand. Rather, cheap priced quality products are their requirement.
2. Various kinds of industrial and consumer products. At present there is a flood of import from China particularly for price-conscious consumers. If Oman can export the products with quality at competitive prices, they can find out the niche markets in these countries. These include, for example, quality paper products, printed materials, etc.

(4) Resource-based Industry

As discussed in the foregoing sections, most of the resource-based industry seem to have some limitations, and need some device for their utilization, such as the case for fishery resource and tourism resource industries.

Tourism Development with Link to that of Dubai

As already discussed, promotion of tourism with linkage with Dubai's tourism is recommended. There were 1,790,000 hotel guests in Dubai in 1997. Among the guests, 1,060,000 were those from Asia, Europe, US and Australia. They spent 115 R.O. equivalent a stay. If Oman can attract 10% of these tourists to Salalah, there will be a significant increase not only in the earning but also foreign exchange earning.

Development of Fish Processing Industry Targeting European Markets

As discussed already, the fish processing industry may be regarded as one of the potential industries suitable for promotion in Salalah area. At present the existing (under construction) industry is for fish canning, but with the call of container lines, frozen fish can be exported. If the air cargo can be handled efficiently, the export of fresh fish will be more profitable.

12.2.3 Projection of Local Production and Export/ Re-export in Salalah

In estimating the development scale, two scenarios were assumed as explained in 12.2.1. These scenarios reflect the difference in the size of redistribution business (therefore, re-export¹), according to the competitive position of Salalah in the different markets. Regarding the local production and export, the level of production and export were assumed same for both scenarios, while cases are set for with and without the development effort.

(1) Local Production and Export

Tables 12.2.5 through 12.2.10 estimate the local production and export in Salalah, in line with the development scenario described in the foregoing sections.

In the projection **Case-without** is defined as follows:

- 1) The transshipment of containers will be continued with the similar conditions as it is. The number of container lines calling Salalah port will be limited to one or a few. Handling of loading and unloading containers directly to Salalah might suffer from inconvenience, to put priority on optimization of transshipment operation.
- 2) Loading and unloading facilities and operation of general cargo will remain as it is, including bulk cargo such as cement, cereals, and animal feed, etc.
- 3) Promotion and expansion of the existing Raysut Industrial Estate will be continued.
- 4) Policy measures to attract foreign investment will be effective as it is.

¹ It is impossible at present to predict which products are classified as export, or re-export, since it will be defined on the basis of extent of processing in Oman. Therefore, all the exports through redistribution businesses are defined re-export in this Study.

5) Promotion and expansion of the existing Mazuyunah Free Trade Zone will be continued.

The local production and export in "Case – with" assumes the promotion measures as follows:

- 1) Establishment of Port Salalah Free Zone
- 2) Preferential treatment for re-export business (or transit trade)
- 3) Facilities and systems convenient for Dhow ship trade
- 4) Formulation of the master plan for promotion of fishery industry on the basis of a comprehensive marine fishery resource study
- 5) Permission of fish import while maintaining strict quality control
- 6) Promotion of fish processing industry with provision of supporting system and facilities
- 7) Formulation of tourism master plan, and promotion of the plan, together with development of facilities attractive for the tourists
- 8) Construction of port silo for storing of raw material grains and oil seeds, together with various food processing plants including flour mill, an oil mill, and a feed processing plant, etc., adjacent to the silo, as well as loading and unloading facilities, which required for an integrated grain and vegetable oil processing complex
- 9) Promotion of industrial estate (as a part of the expansion of the existing industrial estate) specialized in food processing in conjunction with the above food processing complex
- 10) Promotion of industrial estates (as a part of the expansion of the existing industrial estate) specialized in garment fabrication
- 11) Assistance for feasibility study on use of mineral resources available around the Hinterland
- 12) Establishment of supporting functions for the garment industry to upgrade their products to be able to penetrate into the medium-high grade markets in European countries
- 13) Promotion measures for local assembly of electric and electronic parts, and automotive

The detailed notes and assumptions are attached to the respective tables.

(2) Redistribution

Table 12.2.11 summarizes the projected volume and value of re-export in Salalah, in accordance with the three scenarios. Total volume of re-export from Salalah is estimated 790,000tons in 2020 in Projection Scenario (1), while it goes up to 1,740,000tons in Projection Scenario (2). The re-export in Case-without is assumed none². The assumed market shares of Salalah in the respective markets in each scenario are shown in Table 12.2.12. Table 12.2.13 gives the base data used for the projection of re-export.

² Actually, there will be some re-export even in Case-without. However, the re-export in this case was included in export.

Table 12.2.1 Import in Yemen, 1998

HS Code	Total Import Value ¹⁾			Export from Dubai ²⁾	Export from Oman ³⁾
	'000 Rial	'000 US\$	'000 R.O.		
1 Live animals, animal products	23,186,213	179,340	68,956		80,832
2 Vegetable products	47,422,055	366,800	141,034	391.99	1,117,771
3 Animal or vegetable fats & oils	11,274,045	87,202	33,529		44,070
4 Prepared food, beverages	20,929,756	161,887	62,246	156.52	2,522,846
5 Mineral products	20,841,393	161,204	61,983	2,842.53	139,918
6 Chemicals and Products	21,910,251	169,471	65,162	679.69	2,736,643
7 Plastics, rubbers	9,900,703	76,580	29,445	578.03	2,165,428
8 Leather and products	215,091	1,664	640	1.68	157,516
9 Wood and products	6,156,527	47,619	18,310		2,172
10 Pulp, paper and products	6,707,068	51,878	19,947	119.88	395,985
11 Textiles and articles	9,099,947	70,386	27,063	29.84	15,874,048
12 Footwear and other articles	1,514,606	11,715	4,504	1.99	739,200
13 Stone, cement, glass, etc.	5,987,558	46,313	17,807	60.72	1,058,355
14 Precious articles				1.26	3,060
15 Base metal and articles	25,956,456	200,768	77,195	1,672.95	1,298,074
16 Machinery, electrical equipment	53,549,089	414,191	159,256	7,282.94	9,722,708
17 Vehicles, transportation equipment	17,807,894	137,740	52,961	71.93	12,442,362
18 Optical, photographic instruments	3,893,034	30,112	11,578	322.57	117,797
19 Arms & ammunition					
20 Miscellaneous manufactured	6,617,742	51,187	19,681	87.42	801,242
21 Works of art, antiques	1,540,320	11,914	4,581		1,035,913
Total	294,509,748	2,277,971	875,880	14,301.94	52,455,940

Note: 1 Rial = 0.002974 R.O.

Source: 1) Statistical Year-Book 1998 (Yemen)

2) Jebel Ali Free Zone

3) ROP, "Foreign Trade Statistics, 1998"

Table 12.2.2 Export of Dubai to Yemen, Egypt and Libya in 1996

HS Code	Yemen		Egypt		Libya		Total	
	Tons	'000 Dirhams	Tons	'000 Dirhams	Tons	'000 Dirhams	Tons	'000 Dirhams
1 Live animals, animal products							0	0
2 Vegetable products	3,033	3,744					3,033	3,744
3 Animal or vegetable fats & oils			5	37			5	37
4 Prepared food, beverages	346	1,495	790	2,222	39	181	1,175	3,898
5 Mineral products	14,106	27,150	201	528			14,307	27,678
6 Chemicals and Products	756	6,492	5,733	24,618	140	1,211	6,629	32,321
7 Plastics, rubbers	1,376	5,521	185	1,814	30	186	1,591	7,521
8 Leather and products	0	16	0	111	6	37	6	164
9 Wood and products							0	0
10 Pulp, paper and products	306	1,145	18	713	31	104	355	1,962
11 Textiles and articles	10	285	376	5,999	87	3,239	473	9,523
12 Footwear and other articles	0	19	39	1,870			39	1,889
13 Stone, cement, glass, etc.	78	580	1,111	8,550	0	0	1,189	9,130
14 Precious articles	0	12	0	47			0	59
15 Base metal and articles	8,086	15,979	288	4,439	60	3,829	8,434	24,247
16 Machinery, electrical equipment	1,021	69,562	2,675	175,239	793	27,110	4,489	271,911
17 Vehicles, transportation equipment	15	687	139	4,542	406	8,955	560	14,184
18 Optical, photographic instruments	6	3,081	131	38,524	21	4,334	158	45,939
19 Arms & ammunition							0	0
20 Miscellaneous manufactured	27	835	55	2,514	66	718	148	4,067
21 Works of art, antiques							0	0
Total	29,166	136,603	11,746	271,767	1,679	49,904	42,591	458,274

Source: Jebel Ali Free Zone

Table 12.2.3 Export of Dubai to East Africa In 1996

HS Code	Djibouti		Ethiopia		Kenya		Somalia		Sudan		Tanzania	
	Tons	'000 Dirhams	Tons	'000 Dirhams	Tons	'000 Dirhams	Tons	'000 Dirhams	Tons	'000 Dirhams	Tons	'000 Dirhams
1 Live animals, animal products											0	0
2 Vegetable products	0	3									0	0
3 Animal or vegetable fats & oils											14	55
4 Prepared food, beverages	14	178			435	7,288	59	1,197	158	428	4	74
5 Mineral products	66	103			7,028	5,248	497	1,191	12,842	9,805	4,481	3,291
6 Chemicals and Products	14	25	3	77	2,054	7,709			1,063	6,656	373	2,755
7 Plastics, rubbers	7	102	52	264	1,429	4,397	0	15	13	139	709	3,474
8 Leather and products			0	0	0	2						
9 Wood and products												
10 Pulp, paper and products	28	120	354	1,177	63	559			42	212	171	683
11 Textiles and articles	2	37			9	91	2	16	14	240	2	37
12 Footwear and other articles									0	1	0	2
13 Stone, cement, glass, etc.					1	54			22	194	40	335
14 Precious articles												
15 Base metal and articles	18	48	712	1,276	35	519			215	2,472	350	6,924
16 Machinery, electrical equipment	66	1,279	366	18,032	992	50,748	7	401	180	8,513	726	28,780
17 Vehicles, transportation equipment	6	24	10	179	21	268	1	42	2	129	82	1,152
18 Optical, photographic instruments	0	1	6	326		669			1	180	13	2,554
19 Arms & ammunition												
20 Miscellaneous manufactured			1	64	12	302			0	2	67	793
21 Works of art, antiques												
Total	221	1,920	1,504	21,395	12,084	77,854	566	2,862	14,552	28,971	7,032	50,909

Source: Jebel Ali Free Zone

Table 12.2.4 Import of Selected Cereals and Vegetable Oils in 1998

Import by:		Wheat flour	Barley	Maize	Soyabean oil	Rape + mustard oils
World	'000MT	10,178	18,909	71,696	7,345	3,081
	1,000\$	2,666,742	2,786,719	10,121,440	4,894,223	2,147,018
Iran	'000MT	12	750	804	830	
	1,000\$	3,500	71,000	52,000	494,000	
Iraq	'000MT	21	100		127	
	1,000\$	7,000	17,500		176,000	
Pakistan	'000MT	3	23	2	245	2
	1,000\$	632	3,516	2,540	172,799	1,929
Egypt	'000MT	139	12	3,043	97	
	1,000\$	25,312	1,377	388,070	67,934	
Libya	'000MT	800	335	179	2	
	1,000\$	162,000	19,000	23,000	1,900	
Sudan	'000MT	208		44	1	2
	1,000\$	45,000		6,500	730	2,200
Yemen	'000MT	790	1	143	2	0
	1,000\$	134,000	392	23,000	1,300	110
Djibouti	'000MT	24		4	2	
	1,000\$	7,100		900	1,200	
Ethiopia	'000MT	27	2	27	5	2
	1,000\$	6,000	700	3,500	5,000	2,600
Kenya	'000MT	15		369	6	0
	1,000\$	5,278	1	90,400	4,841	534
Mozambique	'000MT	43		110	5	
	1,000\$	2,100		15,500	4,000	
Saudi Arabia	'000MT	22	4,954	1,302	2	0
	1,000\$	7,500	783,561	130,000	1,800	380
Somalia	'000MT	23		13	1	1
	1,000\$	5,200		19,000	850	400
Tanzania	'000MT	34		90	13	0
	1,000\$	6,221	1	27,000	12,400	250

Source: FAO, UN, "1998 FAO Trade Yearbook"

**Table 12.2.5 Detail of Projected Local Production and Export in Salah
- Food Industry -**

	Production	Market	Case - Without						Case - With: Projection Scenario (1)					
			Ton			Mn RO			Ton			Mn RO		
			2003	2010	2020	2003	2010	2020	2003	2010	2020	2003	2010	2020
Food industry total			207,600	293,700	406,700	125.0	139.3	164.9	297,400	836,700	985,200	150.6	236.3	293.9
Existing industry other than those in below			9,600	11,700	15,700	9.6	11.7	15.7	9,600	12,100	16,600	9.6	12.1	16.6
1 For export ^{*1)}	L	E	2,600	3,100	4,200	2.6	3.1	4.2	2,600	3,100	4,200	2.6	3.1	4.2
2 For export (expansion) ^{*2)}	L	E							0	400	900	0.0	0.4	0.9
3 For local market ^{*1)*3)}	L	L	7,000	8,600	11,500	7.0	8.6	11.5	7,000	8,600	11,500	7.0	8.6	11.5
Fish processing for export ^{*4)}			26,000	41,000	76,000	11.0	17.2	31.9	26,000	56,000	84,000	11.0	23.5	35.3
1 Canning by the existing plant ^{*5)}	L	E	18,000	21,000	30,000	7.6	8.8	12.6	18,000	21,000	30,000	7.6	8.8	12.6
2 Canning using imported fish ^{*6)}	L	E							0	15,000	8,000	0.0	6.3	3.4
3 Frozen ^{*7)}	L	E	8,000	20,000	46,000	3.4	8.4	19.3	8,000	20,000	46,000	3.4	8.4	19.3
Vegetable oil			27,000	27,000	27,000	90.5	90.5	90.5	27,000	32,600	44,600	90.5	109.3	149.5
1 For export by the existing plant ^{*8)}	L	E	20,000	20,000	20,000	67.0	67.0	67.0	20,000	20,000	20,000	67.0	67.0	67.0
2 For export assuming operation of food-processing complex ^{*6)}	L	E							0	4,000	13,000	0.0	13.4	43.6
3 For local market ^{*9)}	L	L	7,000	7,000	7,000	23.5	23.5	23.5	7,000	7,000	7,000	23.5	23.5	23.5
4 For local market assuming operation of food-processing complex ^{*1)}	L	L							0	1,600	4,600	0.0	5.4	15.4
Animal feed			70,000	122,000	164,000	5.6	9.8	13.1	70,000	290,000	390,000	5.6	23.2	31.2
1 For export by the existing plant ^{*10)}	L	E	12,000	51,000	68,000	1.0	4.1	5.4	12,000	51,000	68,000	1.0	4.1	5.4
2 For export assuming operation of food-processing complex ^{*11)}	L	E							0	168,000	226,000	0.0	13.4	18.1
3 For local market ^{*1)*12)}	L	L	58,000	71,000	96,000	4.6	5.7	7.7	58,000	71,000	96,000	4.6	5.7	7.7

... to be continued

**Table 12.2.5 Detail of Projected Local Production and Export in Salalah
- Food Industry -**

	Production	Market	Case - Without						Case - With: Projection Scenario (1)					
			Ton			Mn RO			Ton			Mn RO		
			2003	2010	2020	2003	2010	2020	2003	2010	2020	2003	2010	2020
Cereals			75,000	92,000	124,000	8.3	10.1	13.7	75,000	336,000	398,000	8.3	36.9	43.8
1 For export by the existing plant	L E		40,000	49,000	66,000	4.4	5.4	7.3	40,000	49,000	66,000	4.4	5.4	7.3
2 For export assuming operation of food-processing complex	L E								0	244,000	274,000	0.0	26.8	30.1
3 For local market ¹⁾	L L		35,000	43,000	58,000	3.9	4.7	6.4	35,000	43,000	58,000	3.9	4.7	6.4
Re-export (General foods)	NL E								89,800	110,000	52,000	25.6	31.3	17.5

Notes/Assumptions:

Production: (L) Local production, (NL) Non-local production, (LO) Local production outside of the Study area

Market: (L) Local market, (E) Export

- 1) Assuming 3% p.a. of increase in demand
- 2) Export expansion replacing those from Dubai and Other Oman by 20% in 2010 and 40% in 2020. This demand is also assumed to increase by 3%p.a.
- 3) Balance of total existing production after subtracting that for export.
- 4) Fish catch in Oman has remained at around 120,000tons/year for the past 5 years. The maximum capacity of traditional fishermen is assumed 95,000tons, while commercial fishing is assumed to increase by 7% p.a.
- 5) Assumed 35% operation in 2003, with further increase by 3% p.a.
- 6) The import is assumed to be decreased due to increase in local fish catch.
- 7) The current export of frozen fish is at around 50,000tons. All the export expansion is assumed in Salalah, while export demand increase by 3%p.a.
- 8) Assuming 25% replacement of current corn oil import by N&E African countries.
- 9) The local production does not supply to all the demand in Oman. Corn oil is imported by 7,000 to 8,000 tons/year.
- 10) Assuming the increase in export of Maize to Yemen, replacing 25% of the current import of Yemen
- 11) Export development to E. Africa taking 25% of the market share of Maize imported to these countries
- 12) Oman is importing 10,000tons of animal feed/year

Table 12.2.6 Detail of Projected Local Production and Export in Salalah - Mineral Products -

	Production	Market	Case - Without						Case - With: Projection Scenario (1)					
			Ton			Mn RO			Ton			Mn RO		
			2003	2010	2020	2003	2010	2020	2003	2010	2020	2003	2010	2020
Mineral products total			749,300	953,300	1,275,500	27.9	35.5	47.8	1,032,900	1,902,100	2,568,200	53.0	78.0	118.7
Cement			740,000	900,000	1,200,000	19.2	23.4	31.2	740,000	900,000	1,200,000	19.2	23.4	31.2
1 For local market *1)	L	L	370,000	450,000	600,000	9.6	11.7	15.6	370,000	450,000	600,000	9.6	11.7	15.6
2 For export *1)	L	E	370,000	450,000	600,000	9.6	11.7	15.6	370,000	450,000	600,000	9.6	11.7	15.6
Gypsum for export *2)	LO	E							0	600,000	800,000	0.0	2.4	3.2
Calcined gypsum for export *3)	L	E	0	21,000	30,000	0.0	0.7	1.1	0	21,000	30,000	0.0	0.7	1.1
High purity lime stone for export *3)	L	E	0	21,000	30,000	0.0	0.7	1.1	0	21,000	30,000	0.0	0.7	1.1
Other mineral products in general			9,300	11,300	15,500	8.7	10.7	14.4	292,900	360,100	508,200	33.8	50.8	82.1
1 For local market *1)*4)	L	L	7,800	9,500	13,000	7.3	9.0	12.1	7,800	9,500	13,000	7.3	9.0	12.1
2 For export *1)	L	E	1,500	1,800	2,500	1.4	1.7	2.3	1,500	1,800	2,500	1.4	1.7	2.3
3 For export with market development *5)	L	E							0	11,100	30,000	0.0	10.2	27.7
4 Re-export	NL	E							283,600	337,700	462,700	25.1	29.9	40.0

Notes/Assumptions:

Production: (L) Local production, (NL) Non-local production, (LO) Local production outside of the Study area

Market: (L) Local market, (E) Export

1) Annual increase in demand by 3% p.a.

2) Export directly from the quarrying site. The quarrying operation is assumed to be 60% in 2010, and 80% in 2020 of the capacity, which is the minimum economic level of operation.

3) Operation at 70% of capacity in 2010 and 100% in 2020, assuming the capacity at 30,000 tons, respectively.

4) Gross output of the non-metal mineral subsector was 14.0 Mn RO in 1998, of which cement industry accounted for 6.5 Mn RO (or 250,000 tons at 26 RO/ton). Balance subtracted the export from this value was regarded as the local demand.

5) Export from Dubai and other Oman is assumed to be replaced by Salalah by 20% in 2010, and 40% in 2020. The demand itself is also assumed to increase by 3% p.a.

Table 12.2.7 Detail of Projected Local Production and Export in Salalah - Base Metal Products; Chemicals, Plastics and Rubbers, Pulp and Paper, and their Products; Other Products Not Elsewhere Tabulated -

	Production	Market	Case - Without						Case - With: Projection Scenario (1)					
			Ton			Mn RO			Ton			Mn RO		
			2003	2010	2020	2003	2010	2020	2003	2010	2020	2003	2010	2020
Total			18,000	22,200	29,700	17.6	21.7	29.4	108,700	137,600	172,300	112.1	144.1	155.3
Base metal and articles			9,500	11,700	15,700	4.3	5.3	7.2	9,500	14,400	22,900	4.3	6.5	10.5
1 For export ¹⁾	L	E	2,300	2,900	3,800	1.0	1.3	1.7	2,300	2,900	3,800	1.0	1.3	1.7
2 For local consumption ¹⁾ ²⁾	L	L	7,200	8,800	11,900	3.3	4.0	5.5	7,200	8,800	11,900	3.3	4.0	5.5
3 Local production with development of new markets ³⁾	L	E							0	2,700	7,200	0.0	1.2	3.3
Chemicals and Products			1,200	1,500	2,000	3.2	4.0	5.4	1,200	2,700	5,200	3.2	7.2	13.9
1 Local production ⁴⁾	L	L	1,200	1,500	2,000	3.2	4.0	5.4	1,200	1,500	2,000	3.2	4.0	5.4
2 Local production with export market expansion ³⁾	L	E							0	1,200	3,200	0.0	3.2	8.5
Plastics, rubbers			200	300	400	0.2	0.3	0.4	200	1,400	3,200	0.2	1.4	3.2
1 Local production ⁴⁾	L	L	200	300	400	0.2	0.3	0.4	200	300	400	0.2	0.3	0.4
2 Local production with export market expansion ³⁾	L	E							0	1,100	2,800	0.0	1.1	2.8

...to be continued

Table 12.2.7 Detail of Projected Local Production and Export in Salalah - Base Metal Products; Chemicals, Plastics and Rubbers, Pulp and Paper, and their Products; Other Products Not Elsewhere Tabulated -

	Production	Market	Case - Without						Case - With: Projection Scenario (1)					
			Ton			Mn RO			Ton			Mn RO		
			2003	2010	2020	2003	2010	2020	2003	2010	2020	2003	2010	2020
Pulp, paper and products			2,100	2,600	3,500	2.1	2.6	3.5	2,100	2,900	4,300	2.1	2.9	4.3
1 Local production ⁴⁾	L	L	2,100	2,600	3,500	2.1	2.6	3.5	2,100	2,600	3,500	2.1	2.6	3.5
2 Local production with export market expansion ³⁾	L	E							0	300	800	0.0	0.3	0.8
Other industrial products			0	0	0	0.0	0.0	0.0	0	300	800	0.0	0.4	1.1
Conversion to local production ²⁾	L	E	0	0	0	0.0	0.0	0.0	0	300	800	0.0	0.4	1.1
Re-export	NL	E	5,000	6,100	8,100	7.8	9.5	12.9	95,700	115,900	135,900	102.3	125.7	122.3

Notes/Assumptions:

Production: (L) Local production, (NL) Non-local production, (LO) Local production outside of the Study area

Market: (L) Local market, (E) Export

- 1) Increase by 3%p.a.
- 2) Local production less import.
- 3) Export from Dubai and other Oman is assumed to be replaced by Salalah by 20% in 2010, and 40% in 2020. The demand itself is also assumed to increase by 3% p.a.
- 4) Annual increase in demand by 3% p.a.

**Table 12.2.8 Detail of Projected Local Production and Export in Salalah
- Textile and Its Articles -**

	Production	Market	Case - Without						Case - With: Projection Scenario (1)					
			Ton			Mn RO			Ton			Mn RO		
			2003	2010	2020	2003	2010	2020	2003	2010	2020	2003	2010	2020
Textiles and articles total			7,500	9,150	11,600	25.1	30.3	38.3	25,400	40,250	88,800	42.3	80.5	171.9
For export to USA			2,000	2,300	2,300	7.0	8.1	8.1	2,000	8,500	14,600	7.0	29.8	51.2
1 Transhipment *1) *2)	NL	E	2,000	2,300	2,300	7.0	8.1	8.1	2,000	2,300	2,300	7.0	8.1	8.1
2 Local production *3)	L	E							0	6,200	12,300	0.0	21.7	43.1
For export to EU *4)			500	750	1,000	0.6	0.8	1.1	500	3,650	9,300	0.6	8.1	24.2
1 Transhipment *2)	NL	E	500	750	1,000	0.6	0.8	1.1	500	750	1,000	0.6	0.8	1.1
2 Local production *5)	L	E							0	1,200	2,500	0.0	1.3	2.8
3 Local production (high quality products)	L	E							0	1,700	5,800	0.0	6.0	20.3
For export to Yemen			5,000	6,100	8,300	17.5	21.4	29.1	5,000	6,100	8,300	17.5	21.4	29.1
1 Transhipment *2) *6)	NL	E	5,000	6,100	8,300	17.5	21.4	29.1	5,000	3,700	3,300	17.5	13.0	17.5
2 Local production *7)	L	E							0	2,400	5,000	0.0	8.4	11.6
Re-export	NL	E							17,900	22,000	56,600	17.2	21.2	67.4

Notes/Assumptions:

Production: (L) Local production, (NL) Non-local production, (LO) Local production outside of the Study area

Market: (L) Local market, (E) Export

- 20% of total export to US market by the factories in Oman other than those in Salalah, is assumed to be transhipped at Salalah in 2003. The transhipment ratio is assumed to increase to 40% in 2010, 60% in 2020.
- Transhipment from North of Oman for export
- 20% of increase in export to US is assumed to be manufactured in Salalah in 2010, and 40% in 2020. The total export to US market is assumed to increase by 3% p.a.
- Total export to EU market is assumed to be equivalent to 20% of that of US market in 2010, and 40% in 2020.
- 40% of export to EU market is assumed to be manufactured in Salalah.
- Annual increase by 3% p.a.
- 40% of export to Yemen market is assumed to be manufactured in Salalah.

Table 12.2.9 Detail of Projected Local Production and Export in Salalah - Machinery -

	Production	Market	Case - Without						Case - With: Projection Scenario (1)					
			Ton			Mn RO			Ton			Mn RO		
			2003	2010	2020	2003	2010	2020	2003	2010	2020	2003	2010	2020
Total machinery			7,300	9,000	12,100	20.0	24.6	33.0	33,800	42,300	63,200	164.1	202.8	326.0
Machinery, electrical equipment			3,100	3,900	5,200	11.3	13.9	18.6	3,100	4,100	5,800	11.3	14.6	20.8
1 Export to Yemen (transhipment) ^{*1)}	NL	E	3,100	3,900	5,200	11.3	13.9	18.6	3,100	3,500	4,200	11.3	12.5	14.9
2 Local production for export to Yemen ^{*2)}	L	E							0	400	1,000	0.0	1.4	3.7
3 Local production for export with export market development ^{*3)}	L	E							0	200	600	0.0	0.7	2.2
Vehicles, transportation equipment			4,200	5,100	6,900	8.7	10.7	14.4	4,200	5,200	7,200	8.7	10.8	15.0
1 Export to Yemen (transhipment) ^{*1)}	NL	E	4,200	5,100	6,900	8.7	10.7	14.4	4,200	4,600	5,500	8.7	9.6	11.5
2 Local production for export to Yemen ^{*2)}	L	E							0	500	1,400	0.0	1.0	2.9
3 Local production for export with export market development ^{*3)}	L	E							0	100	300	0.0	0.2	0.6
Re-export	NL	E							26,500	33,000	50,200	144.1	177.4	290.2

Notes/Assumptions:

Production: (L) Local production, (NL) Non-local production, (LO) Local production outside of the Study area

Market: (L) Local market, (E) Export

- 1) Increase by 3% p.a.
- 2) 10% of the above export is assumed to be manufactured in Salalah in 2010, and 20% in 2020.
- 3) 20% of export to Yemen by Dubai/Other part of Oman is assumed to be manufactured in Salalah in 2010, and 40% in 2020.

**Table 12.2.10 Detail of Projected Local Production and Export in Salalah
- Agriculture, Fishery and Mining/Quarrying Sector -**

	Production	Market	Case - Without						Case - With: Projection Scenario (1)								
			Ton			Mn RO			Ton			Mn RO					
			2003	2010	2020	2003	2010	2020	2003	2010	2020	2003	2010	2020			
Agriculture																	
1 For local consumption *1)	LO	L	82,100	111,100	159,800	28.3	37.1	54.2	82,100	111,300	160,100	28.3	37.2	54.3			
2 For export *2)	LO	E	78,000	106,000	153,000	26.9	35.4	51.9	78,000	106,000	153,000	26.9	35.4	51.9			
3 Expansion of export *3)	LO	E	4,100	5,100	6,800	1.4	1.7	2.3	4,100	5,100	6,800	1.4	1.7	2.3			
	LO	E							0	200	300	0.0	0.1	0.1			
Fishery																	
1 Existing *4)	LO	L/E				11.9	18.2	40.8				11.9	20.5	42.1			
2 For fish processing operation	LO	L				7.8	14.0	29.0				7.8	14.0	29.0			
	LO	L				4.1	4.2	11.8				4.1	6.5	13.1			
Mining & Quarrying *5)																	
1 For cement production	LO	L				6.7	8.5	11.5				6.7	11.0	18.2			
2 For calcined gypsum production	LO	L				4.6	5.6	7.5				4.6	5.7	7.5			
3 For high purity lime production	LO	L				0.0	0.1	0.3				0.0	0.1	0.3			
4 For other mineral products production	LO	L				0.0	0.2	0.3				0.0	0.2	0.3			
	LO	L				2.1	2.6	3.5				2.1	5.0	10.2			

Notes/Assumptions:

Production: (L) Local production, (NL) Non-local production, (LO) Local production outside of the Study area

Market: (L) Local market, (E) Export

1) Balance of gross value added in the agricultural sector, after extracting the export. The gross value added in the agriculture sector is estimated using the GRDP projected in the Study. The weight was estimated assuming the prices of agricultural produce for local market is the same as export prices. The local consumption is assumed to increase by 3% p.a.

2) Assumed 3% p.a. of increase.

3) 5% of the agricultural produce exported from Dubai to Yemen was assumed to be replaced by the export from Salalah. The market is assumed to grow by 3% p.a.

4) GRDP projected in the Study.

5) Non-metal minerals consumed for production of industrial products in Salalah only.

Table 12.2.11 Projected Re-export Volume and Value

	1,000 Tons			Million RO		
	2003	2010	2020	2003	2010	2020
Projection Scenario (1)						
Live animal & agricultural produce	22.1	27.2	16.4	8.2	10.1	5.6
Food industry (General processing)	89.8	110.1	52.0	25.6	31.3	17.5
Mineral products (General)	283.6	337.7	462.7	25.1	29.9	40.0
Textiles and articles	17.9	22.0	56.6	17.2	21.2	67.4
Other industrial products, incl. Chemicals, Plastics	95.7	115.9	135.9	102.4	125.7	122.3
Machinery, electrical, transp incl. Parts	33.8	41.2	59.9	164.1	199.5	316.6
Total	543.0	654.2	783.4	342.6	417.8	569.4
Projection Scenario (2)						
Live animal & agricultural produce	42.1	51.7	52.9	15.4	18.9	18.6
Food industry (General processing)	166.7	204.6	191.1	47.8	58.7	57.8
Mineral products (General)	568.1	687.5	962.4	50.5	61.1	84.5
Textiles and articles	38.7	47.7	90.7	39.6	48.6	110.0
Other industrial products, incl. Chemicals, Plastics	194.6	237.6	314.6	205.7	252.8	310.1
Machinery, electrical, transp incl. Parts	64.7	79.6	117.8	333.2	408.7	639.0
Total	1,074.9	1,308.8	1,729.5	692.1	848.8	1,220.1

Source: Projection by the Study Team

Table 12.2.12 Percent Share Assumed in Projection of Re-export Volume and Value

(Unit: % share)

Competitive position of Salalah compared with JAFZ	Markets	Projection Scenario (1)	Projection Scenario (2)
Advantageous	E.African Countries, Yemen	60	90
Equal	Pakistan, Europe, USA, SE Asia	40	60
Inferior	Iran, Central Asian Republics, India	10	40

Note: The percent shares on the above are as of 2020. In 2003, the realization of share is assumed 5% of the above, while it is 45% in 2010.

Table 12.2.13 Base Data for Projection of Re-export Volume and Value (Re-export in JAFZ in 1996)

Destination	Total	By industry										Other industrial products					
		Live animal & agricultural produce	Food industry	Mineral products	Chemicals & products	Plastics & rubbers	Textiles & articles	Base metal & articles	Machinery, electrical equipment	Vehicles, transportation equipment							
Value in 1,000 R.O.																	
Total	1,221,548	21,785	67,539	82,697	108,034	32,817	95,370	94,008	591,628	27,597						100,073	
GCC	422,107	15,065	56,404	25,599	66,534	14,009	11,127	34,915	136,429	13,078						48,948	
Yemen	14,343	393	157	2,851	682	580	30	1,678	7,304	72						597	
Oth. Arab & C. Asia	164,264	4,092	3,318	1,969	14,945	3,319	761	7,142	113,066	5,833						9,820	
Africa	75,202	0	1,266	5,098	5,203	1,797	1,379	2,294	48,190	2,072						7,903	
Pakistan	33,394	46	315	5,576	3,237	2,047	3,092	2,000	12,608	667						3,805	
Indian Sub. Ex. Pakistan	126,539	994	2,155	18,100	3,962	2,538	5,698	23,942	58,910	412						9,829	
SE/E Asia	104,016	184	1,571	16,584	4,094	2,002	21,411	10,847	42,931	379						4,014	
EU, AU & US	281,682	1,011	2,353	6,919	9,379	6,524	51,872	11,192	172,191	5,084						15,157	
Volume in Tons																	
Total	1,744,614	60,498	230,386	942,658	93,148	60,429	77,686	136,614	102,985	9,019						31,191	
GCC	627,443	39,359	198,121	246,030	51,899	22,058	3,866	30,040	22,421	3,330						10,319	
Yemen	29,166	3,033	346	14,106	756	1,376	10	8,086	1,021	15						417	
Oth. Arab & C. Asia	89,279	7,441	13,046	13,117	19,500	5,667	323	2,484	20,474	2,306						4,921	
Africa	91,789	0	1,569	60,469	10,701	3,307	934	2,261	9,085	887						2,576	
Pakistan	95,331	223	456	63,084	3,500	6,617	6,897	10,523	3,509	243						279	
Indian Sub. Ex. Pakistan	340,174	9,059	10,505	239,604	2,319	9,276	7,263	43,644	14,158	93						4,253	
SE/E Asia	296,560	194	4,945	217,709	2,049	7,533	35,224	16,830	9,106	82						2,888	
EU, AU & US	174,872	1,189	1,398	88,539	2,424	4,595	23,169	22,746	23,211	2,063						5,538	

Source: JAFZ Authority

13.1 Evolution of International Shipping

13.1.1 Alliances—How will this tendency develop?

There is a rumor that P&O-N will merge with Hapag Lloyd. There are also reports that a new alliance will be formed through a realignment of existing alliances, dramatically changing the landscape of the world shipping business. New Maersk is actively working to further expand. In the coming five, ten, twenty years, how will this tendency develop?

This tendency towards greater alliances has its roots in the large changes that have taken place in the world economy. As explained in a report by OECD under the title “ The world in 2020, towards a new global age ”, the world has undergone impressive political and economic transformations in the past quarter century. The widely used term “ globalization ” is explained in the above report as follows:

“ Globalization describes the forces that have produced rapid growth in world trade (at twice the rate of world output), even faster expansion of international capital flows, the integration of the world’s financial markets, and the apparent acceleration in global diffusion of new technologies. Important policy and institutional changes, notably declining barriers to trade, the creation of a multilateral trade regime and the dismantling of capital controls, have been driving forces behind the globalization. Remarkable changes in technology which have sharply reduced costs of transport and communications have also promoted greater trade, financial integration, and transfer of technology. ”

Alliance is one type of global integration. The fact that a British shipping line with more than 150 years history merges with the oldest Dutch company to survive the battle in the world shipping business can only be understood in the context of “ globalization ”. This tendency can be expected to continue long into the future as long as it promotes “ globalization ”.

One natural product of the formation of greater alliances is the diminishing numbers of shipping lines. Take the case of Japan, for instance, where there were more than 20 shipping companies in 1961, operating both international liner and tramp services. In 1964, those companies were guided by the government to form six groups (six new companies) to be more competitive in world shipping. Only three out of those six companies remain in 2000. Each of the remaining three lines is a member of a different alliance but further changes are always imminent.

Carrying capacity of the international alliances at the end of 1999 is shown in Table 7.4.2. Of these alliances, a merger of any two alliances will have a great impact on the other alliances. For example, if New Maersk (Maersk/Sealand) were to merge with Evergreen, it would ignite a new chain movement in world shipping.

Alliances can also be characterized by their large scale of business. In the quite near future, say within three to five years, the scale of an alliance will become as shown below:

- i. Total TEU/Year 5,000,000
- ii. Number of Vessel Deployed 200
- iii. TEU onboard Vessel 500,000 to 700,000

Assuming that about 80 percent of Total TEU per year are transported through the East-West trunk line, a batch of container to use one terminal is considerably big and whether one alliance decides to use a terminal or not has a strong effect on terminal management.

In addition to “ globalization ”, alliances have emerged to take advantage of the economy of scale. It is a matter of “ ratio of net profit to capital or profit ratio of capital ”. The formation of alliances is inevitable in world shipping due to the very low profit ratio of capital. Containerization requires an enormous amount of investment: huge ships, gigantic container terminals, countless numbers of boxes, trucks, chassis, and EDI network. While the amount of capital needed to sustain a container transportation system is sky rocketing, matching earnings are unstable and in most cases don't correspond to investment level.

In fact, the average net profit ratio of major shipping lines in the world is barely 3 percent as of fiscal year of 1998, and some of them are even losing money. The financial performance of the leading carriers is shown in Table 13.1.1 below.

Table 13.1.1 Leading Carriers' Key Performance Indicators in 1998

	GPM (%)	NPM (%)	ROI (%)
MISC	19.10	19.10	7.90
Atlantic Container Line	16.60	10.00	22.30
Hoegh Line	16.30	-	-
Wilhelmsen Lines	14.20	8.40	-
Maersk Line	13.10	3.60	11.80
Safmarine	10.40	-	-
Wan Hai Line	10.00	11.10	13.10
Hyundai MM	9.60	1.10	7.80
Matson Navigation	9.10	-	7.40
NSCSA	8.34	1.81	2.79
Uniglory	7.42	1.82	6.10
Mitsui OSK Lines	6.60	0.90	4.60
CP Ships	6.10	5.70	9.10

Evergreen	6.10		2.05		3.60
TMM	5.70		-1.10	3.80	
United Arab SC	5.50		4.20	-	
CMA-CGM	4.70		3.30	6.80	
NYK	4.40		1.10	3.20	
Zim Israel	4.40		-0.33	-	
CSAV	3.50		5.00	5.00	
Sea-Land	3.40		-1.80	5.40	
Hanjin	3.30		0.50	3.10	
Regional Container	2.76		2.70	1.49	
P&O-N		2.40		-0.10	3.47
Hapag-Lloyd	2.40		-		
K Line	1.10		0.30	1.10	
OOCL	1.10		0.01	1.20	
NOL	-1.87		-6.75	-2.04	
Yangming	-5.70		1.50	-5.40	
Average	6.00		3.00	5.40	

Remarks:

GPM = Gross Profit Margin (Operating Profit / Total Revenue x 100)

NPM = Net Profit Margin (Net Profit / Revenue x 100)

ROI = Return On Investment (Operating Income / Assets x 100)

MISC: Malaysian International Shipping Corporation Bhd

NSCSA: National Shipping Corporation of Saudi Arabia

CP Ships: Canadian Pacific Ships

TMM: Transporatcion Maritima Mexicana SA de CV

CMA-CGM: Compagnie Maritima d' Affretement / Compagnie Generale Maritime

CSAV: Compania Sud Americana de Vapores

OOCL: Orient Overseas Container Line Ltd.

NOL: Neptune Orient Lines Ltd.

Source: Containerization International, JICA Study Team

This ratio is worse than that of almost all other major industries, and especially compared with high technology industries where the average profit ratio ranges from 15-20 percent. It is, therefore, quite understandable that capital in the world maritime industry tends to run away from the shipping business or to push board members of shipping lines to rationalize operation to improve profit ratios.

Under these circumstances, the formation of alliances is the only practical way of survival in the

world container business. This tendency will therefore continue in the near future and even accelerate towards 2020, until the average profit ratio of the industry becomes competitive with that of other major industries.

Finally, to survive in such a fiercely competitive environment, each alliance will have to act as if it were one huge company. Therefore, all ships have the same dimensions, all boxes and container handling equipment are manufactured under one policy, all container terminals are contracted under one strategy, and marketing policy is decided at its head-quarters.

Today, alliances have not yet fully matured, as evidenced by the waste of business resources still often observed in world shipping. The selection and evaluation of a container terminal is one of the most important issues from this point of view. The operation costs of a container terminal should be evaluated from the total operation of the alliance, not separately counted as nominally high or low.

13.1.2 Vessel Size—Is 10,000 TEU ship the maximum vessel size?

The container industry has witnessed a seemingly never-ending increase in the size of vessels in recent years. Just less than fifteen years ago, tiny container ships of only 700 TEU were running on the trans-Pacific route, one of the main service routes in world shipping. Now, 6,000-6,600 TEU vessels are deployed on the same service, and there is a strong possibility that a huge vessel with a capacity of 8,000 TEU (marked as ? in Table 13.1.2) will be introduced in the quite near future, within three or four years. Further, by around 2010 to 2020, the maximum vessel size may grow even larger.

Table 13.1.2 shows how the size of the fleet of Maersk Line has been developed in these ten years. It is surprising that the container lifting capacity in TEU has almost doubled in the period, and the dead weight tons almost tripled, 2.76 times.

Table 13.1.2 Maersk Fleet Development in Last 10 Years

Type of Ship	A	L	M	K	S	?
LOA	239.26m	270.00m	294.12m	318.00m	346.98m	390.00m
BREADTH	30.50m	32.20m	32.20m	42.80m	42.80m	47.70m
DWT	37,872	53,690	60,640	90,456	104,696	115,000
BHP	35,000	43,000	49,000	75,640	82,792	91,100
TEUs	2,362	3,466	4,297	6,000	6,600	8,000
REEFERS	120	300	500	700	800	960
DRAFT	12.20m	13.00m	13.50m	14.00m	14.50m	16.00m

Source: Maersk Line, JICA Study Team

It was the introduction of the latest generation of super –sized container ship shown in the above table marked as S that first created the need for a Super post –Panamax crane. These vessels are built to carry upwards of 6,000 TEU by accommodating an 18-row (or 45m) width of containers across their beam, and cannot therefore be handled by cranes of standard post-Panamax size (which reach across a maximum of 16-17 rows). Today, super-sized ships are minor players (4 percent in number of ships, 15 percent in slots), but soon it will become a reality that any container terminal which is not equipped with Super post-Panamax crane will lack a basic condition to handle containers onboard super sized container ships.

As a matter of fact, many ports have since purchased cranes of Super post-Panamax size even though some are unlikely to receive calls from the largest container ships today or tomorrow. Those terminal operators may, therefore, never operate their cranes to maximum potential. As it is, the number of installations has accelerated. This is due to the competition between terminals. Table 13.1.3 shows the details of gantry cranes now operational and on order.

Table 13.1.3 World Fleet of Operational and Contracted Cranes by Outreach and Years Built

Built	Panamax	Post-Panamax	Super post-Panamax	Total
2001*	15	3	51	69
2000*	45	30	66	141
1999*	24	35	76	135
1998	55	37	68	160
1997	69	43	98	210
1996	71	41	59	171
Pre-1996	1,493	349	68	1,910
Total	1,772	538	486	2,796

* Remarks: includes all options/planned orders notified at August 1998

Source: Containerization International Yearbook 1999

It is noteworthy that 73 percent of the total gantry cranes contracted for 2001 delivery are Super post-Panamax notwithstanding the fact that 96 percent of the ships now in service can be served by post-Panamax cranes. In this case, Super post-Panamax is just like a mannequin in a show window for most terminals. The total operational count of Super post-Panamax has already reached 300, out of a global fleet of 2,500 cranes. Prior to 1996, only 68 of these Super post-Panamax had been delivered out of a total crane fleet of 1,910.

This is not the end of the “ gantry crane survival war ”. Maersk Line has reportedly ordered considerable numbers (14 to 16 cranes including two for their Daikoku-cho Terminal in Yokohama) of Super Super post-Panamax cranes which reach across a maximum of 22 rows. How long will the outreach of Super Super post-Panamax be? The following simple calculation shows the approximate breadth of a Super ship and the necessary outreach length:

$$2.44\text{m (8 feet)} \times 22 \text{ rows} = 53.68\text{m} \quad \text{plus } 4.00\text{m (both sides of ship)} = 57.68\text{m}$$

The Super Super post-Panamax crane, if realized, will be able to serve an extra super container carrier with a capacity of 10,000 TEU or more. This crane will make all foregoing cranes obsolete almost instantly.

According to the Suez Canal Authority, the Canal will be further deepened to reach 21.9 meters by 2010, allowing fully loaded tankers up to transit the main passageway of the Canal. If realized, the only bottleneck for the size of container ships will eventually be the Panama Canal.

A 18,000 TEU ship has reportedly been designed by a Netherlands ship designer. The ship will have a length of 411 meters, a width of 61 meters and a maximum draft of 21 meters. (Source: Liner Trade Review 1999, Dynamar Consultancy BV) and this ship can clear the deepened Suez Canal.

13.1.3 Imbalance of Boxes—Can it be improved? (Effect of Hub and Spoke System)

As mentioned earlier, imbalance of boxes is an issue that has long faced all container operators. It may well be called a fatal problem for shipping lines that handle ocean going containers connecting different countries in different economies. Why is this Imbalance a problem? What kind of situation does it produce? Why is the imbalance of containers responsible firstly “ transshipment operation ” and secondly for the “ Hub and Spoke System “? The situation in Australia offers some insight into these questions.

Down under is a term that describes perfectly the state of freight rates on direct liner services to both Australia and New Zealand. Rates to both countries have been heading south since early 1998. Marginal pricing by relay operators has even started to affect the integrity of some direct services. The plug has already been pulled since 1999 on one direct liner service , that of the Middle East

Gulf , and the gurgling has grown louder on key services to and from Europe, America and Asia. Marginal rating combined with the extensive tentacles of transshipment operators, particularly over the Singapore hub, has been largely to blame.(extraction from *Fairplay* of November 18, 1999)

According to reliable sources, transshipment operators have taken a quarter of 1998's southbound trade of 253,000 TEU (Australia 194,000 TEU; NZ 59,000 TEU). And rates fell dramatically in the two years of 1997 and 1998; from about \$ 1,800 to a paltry \$ 1,000 - \$ 1,200 per TEU. Perhaps spurred by the " Olympic factor ", southbound ships are now running full, and the rate restoration of \$ 150/ 20 ft, \$ 250/ 40 ft introduced in October 1999 is holding. But a key factor is that the rates of Australian and New Zealand trade are influenced by the economics of other trades, particularly the European eastbound trade to the Far East. The rationale of relay operators has been to use ships for cargo to Australia as part of container repositioning exercises.

Transshipment always involves a second carrier. Carriers from Singapore to Australia have imposed increases in August and October 1999 totaling \$ 400 per box. A strong cargo movement towards Australia backs up this scenario. A major trunk-line carrier explains that no space was available for some months during the latter half of 1999 for Australia business on its service from Europe to Singapore. It is clear from this example that the situation is tenuous for the direct operators.

For another instance, the trade imbalance between North America and Asia is some 2.5 M TEU, providing considerable potential for westbound Trans-Pacific ships to absorb all the 165,000 TEU of North America-Australia southbound trade by offering very low " first leg " rates, provided that the shipping services from transshipment ports like Kaohsiung, Hong Kong and Singapore can cope with the " second leg ". But it is not as easy as a desk calculation. North American inter-modal costs also have to be taken into consideration.

Almost the same tendency is observed in the Trans Atlantic trade. Since 1996, the westbound container trade from NorthWest Europe to direct in the U.S. grew by 35 percent but only a thin 5 percent in eastbound. Main cause is the booming U.S. economy and the strong dollar. Here too it created increasing imbalances. From balanced trades in 1996 and 1997, over 300,000 empty TEU had to be returned to NorthWest Europe from the U.S. The worldwide shipping imbalance is calculated on Table 13.1.4 below.

Table 13.1.4 The Worldwide Container Imbalance Ratio
(%)

Year	Filled (Revenue Generating)Boxes	Empties
1980	78.3	21.7
1985	76.6	23.4
1990	79.8	20.2
1995	81.7	18.3
1998	79.5	20.5

Source: Drewry Research, 1999

The following tables include details on the imbalance ratio by major routes of trade.

Table 13.1.5 Lifting of Containers: North West Europe/Far East by FEFC Members
(1000TEU)

Year	1993	1994	1995	1996	1997	1998
Eastbound A:	1,341	1,323	1,001	1,341	1,382	1,323
Westbound B	781	849	1,070	1,358	1,532	1,923
C	298	297	305	320	350	409
B + C	1,079	1,146	1,375	1,678	1,882	2,332
Grand Total	1,919	2,099	2,376	3,019	3,264	3,655
(B + C) - A= Imb	239	193	374	337	500	1,009

Remarks:

A-Eastbound Management Agreement (EMA)

B-Asia Westbound Rate Agreement (AWRA)

C-Japan/Europe Freight Conference

Sixty percent of the N.W. Europe-Far East trade is understood to be in the hands of members of the Far Eastern Freight Conference (FEFC). Remaining forty percent are non-FEFC carriers' lift.

Source: FEFC, JICA Study Team

Table 13.1.6 Lifting of Containers: Trans-Pacific

(1000 TEU)

Eastbound to US direct ports, from the Far East

Year	1996	1997	1998	1999
to East Coast	597	642	787	941
to Mexican Gulf	3	4	5	4
to West Coast	3,200	3,604	4,242	4,744
Total	3,800	4,250	5,034	5,689

Westbound from US direct ports, to the Far East

from East Coast	599	636	561	631
from M. Gulf	9	9	7	13
from West Coast	2,495	2,514	2,188	2,216
Total	3,103	3,159	2,756	2,860
E/W Imbalance	697	1,091	2,278	2,829

Source: PIERS US Global Container Reports, DYNAMAR, JICA Study Team

Table 13.1.7 Lifting of Containers: US-North Europe

(1000 TEU)

Westbound to US direct ports, from North West Europe

Year	1996	1997	1998	1999
to East Coast	772	835	976	1,056
to Mexican Gulf	122	134	155	179
to West Coast	93	101	109	120
Total	987	1,070	1,240	1,355

Eastbound from US direct ports, to North West Europe

from East Coast	699	790	838	748
from Mexican Gulf	184	187	190	185
from West Coast	99	109	118	96
Total	982	1,086	1,146	1,029
W/E Imbalance	5	+16	94	326

Source: PIERS US Global Container Reports, DYNAMAR, JICA Study Team

Table 13.1.8 Lifting of Containers: US-Mediterranean

(1000 TEU)

Westbound to US direct ports, from Mediterranean

Year	1996	1997	1998	1999
to East Coast	327	381	440	480
to Mexican Gulf	39	45	54	59
to West Coast	51	58	66	73
Total	417	484	560	612

Eastbound from US direct ports, to Mediterranean

from East Coast	165	182	200	205
from Mexican Gulf	34	41	47	42
from West Coast	16	18	18	16
Total	215	241	265	263
W/E Imbalance	202	243	295	349

Source: PIER'S US Global Container Reports, DYNAMAR, JICA Study Team

Generally speaking, three key factors will continue to influence the actions of transshipment or relay operators whose surplus capacity can, in certain circumstances, swamp minor volume trade such as Australia and New Zealand/Asia. They are 1:the size and timing of new buildings introduced on the main east-west trades, and 2:the state of Asian economies and 3:the attractiveness of rates to/from a region.

Economies of scale in global liner networks point to increasing use of hubs to sustain long and thin liner trades. But the pressure exerted by carriers' top management on their sales force to fill ships on the main east-west axial routes when capacity exceeds demand is what really matters. That's when a drop in rates begins. For Austrasia trade, concerned lines predict more mergers like Blue Star Line by P&O Nedlloyd, as well as fewer direct services and more goods routed via Asian hub ports, as the fight for the equilibrium continues.

The introduction of larger ships in the main east-west trades means lines have surplus tonnage, and the only way to make that work in thin trade such as Australia would be to make it part of a larger transshipment operation. A ship of 3,000 TEU on the Australia – Japan route, for example, would not be filled with trade cargo. It becomes necessary to rely on transshipment opportunities from America, China and other different destinations. Cascading down of 3,000 – 4,000 TEU ships to, say the Austrasia-Asia routes from the axial east-west trades when the latter are replaced by 5,000-7,000 TEU or larger vessels will certainly concentrate the mind to more transshipment opportunities.

To follow up the above tendency, there are similar forecasts that more trade is expected through hubs like Singapore, Hong Kong, Kaohsiung, Yokohama and Busan. It is also proposed to set up a responding hub at destination. Transshipment's growth rate, therefore, will depend on how quickly local shippers move away from the conventional and nostalgic feeling of direct end-to-end services.

The size of feeder services employed in key Southeast Asian services has tripled this decade. Further it is widely predicted that a region like Australia and New Zealand will continue to be caught up in the struggle between east-west and north-south carriers.

There is a strong reason in thinking that the development of Australian liner services in the direction of being feeder service to the major Asian regional ports will accelerate. It is also predicted that many traditional point-to-point liner services historically offered by the conferences could collapse and be fundamentally restructured and some erosion of service levels and loss of direct services to some Australian export destinations would be likely. But if freight rates go down by transshipment operation, the inconvenience to shippers will be compensated.

If there is no trade imbalance for each container service route, the need for a hub will be greatly lessened. In that case, a hub will function only as a junction terminal of service routes. The reality is that there exists a big imbalance in every trade and therefore there is a need for a hub as a marshalling terminal. It is generally understood that a hub port is a center of many service routes and many feeder service lines are centered to a hub. This is partially right but it excludes a very important feature of a hub port. The most important function of a hub terminal is to present a yard to rearrange a group of containers classified for each destination or region. It is just like a Fedex operation in Memphis for worldwide air cargo. This is an established concept for a limited numbers of professional people in the container industry, but quite new to the general public.

If the Port of Salalah aims to become a hub port according to this latter concept, its future should be bright indeed.

13.2 Capacity of the Existing Port

13.2.1 Container Terminal

(1) Transshipment

Productivity of a container terminal varies widely depending on the composition of the cargo. Container terminals dedicated to transshipment show very high productivity, nearly 2,000 TEUs/m/year (See Table 13.2.1). Taking Singapore, where transshipment accounts for more than 90 % of the cargo, as an example, its container terminals handle 1,726 TEUs/m/year. If we apply this figure to a typical 350m quay with alongside depth of 15m, it yields roughly 600,000 TEUs/berth/year.

On the other hand, the per-crane productivity in Singapore is roughly 150,000 TEUs/year. If we apply this figure to a deep draft quay with three gantries, it yields 450,000 TEUs/year. Since Singapore achieves this high productivity with the quay depth ranging from 9.8m to 15m, SPS's target of 500,000 TEUs/berth/year with 16m quay will be attainable if the terminal is properly operated.

Latest productivity records indicate that the SPS terminal achieved the gross productivity of 25 - 26 moves/hour/crane, or 41 -- 42 TEUs/hour/crane. The quay crane productivity showed a remarkable increase in 2000, which well surpasses that of Singapore (See Table 13.2.1, 13.2.2).

Once five new quay cranes are operational in early 2001, the terminal will have 12 quay cranes, or three cranes per berth. Based on the above analysis, the Study Team concludes that the existing four berths can handle up to two million TEUs/year. When that target is achieved, the berth occupancy ratio of the present terminal will be 53% if we assume the same per-crane productivity (22 gross moves/hour). Operation schedule of November last year shows that the berth occupancy ratio was about 35% at that time.

Table. 13.2.1 Comparison of Productivity in Major Container Terminals

Port	Terminal	Number of container berths	Container quay length (m)	Quay-side depth (m)	Number of sea-shore gantries	Container throughput (TEUs in 1997)	Productivity	
							(TEUs /m/year)	(TEUs/ gantry/ year)
Hong Kong	Modern Terminals	5	1,822	12.2-15	19	2,037,185	1,118	107,220
	Sea-Land Orient Terminals	1	305	12.2	3	1,038,038	3,403	346,013
	Hong Kong International Terminals	10	3,292	12.2-14	23	5,087,286	1,545	221,186
	COSCO-HIT Terminals	2	640	15	9	1,271,887	1,987	141,321
	<i>Sub-total</i>	<i>18</i>	<i>6,059</i>		<i>54</i>	<i>9,434,396</i>	<i>1,557</i>	<i>174,711</i>
Singapore	Tanjong Pagar Terminal	8	2,307	11.0-14.6	29			
	Keppel Terminal	14	3,184	9.8-14.6	36			
	Brani Terminal	9	2,700	12.0-15.0	30			
	<i>Sub-total</i>	<i>31</i>	<i>8,191</i>		<i>95</i>	<i>14,135,300</i>	<i>1,726</i>	<i>148,793</i>
Rotterdam	Delta Terminal	1	1,650	15.9-16.6	8	1,835,000 (units)		
	Delta/Sea-Land Terminal	1	970	16.6	5			
	Delta Dedicated East Terminal	1	1,030	16.6	7			
	Home Terminal	1	1,700	10.0-13	12	682,000 (units)		
	Waalhaven Pier 7	1	800	13	4	124,000 (units)		
	Brittannie Terminal	5	1,240	12.6	1	118,000 (units)		
	Waalhaven Pier 5/6		1,500	13.5	4	167,782 (units)		
<i>Sub-total</i>		<i>8,890</i>		<i>41</i>	<i>5,494,655</i>	<i>618</i>	<i>134,016</i>	
Dubai	Jebel Ali	5	1,536	14	14			
	Port Rashid	5	1,402	11.5-13	11			
	<i>Sub-total</i>	<i>10</i>	<i>2,938</i>		<i>25</i>	<i>2,600,085</i>	<i>885</i>	<i>104,003</i>
Colombo	Queen Elizabeth Quay Container Terminal	3	425	9.5-10.5	3	303,082	713	101,027
	Jaye Container Terminal	5	1,474	9.0-14	14	1,384,102	939	98,864
	<i>Sub-total</i>	<i>8</i>	<i>1,899</i>		<i>17</i>	<i>1,687,184</i>	<i>888</i>	<i>99,246</i>

Source: JICA Study Team based on Containerlization International 1999 and PSA Corporation Annual Report 1998

Table 13.2.2 Productivity of Quay Cranes

Period	Jan-Jun, 1999	Jul-Dec, 1999	Jan-Jun, 2000	Average
Productivity (gross moves/hour)	20.3	19.8	25.5	21.9

Source: SPS

Rough capacity estimates indicate that the quay-side capacity and yard-side capacity are almost balanced even for export-import containers. Since transshipment accounts for most of the cargo, the yard-side capacity is much larger than the quay-side capacity in this terminal.

(Quay-side capacity)

$$22 \text{ moves/hour} \times 3 \text{ cranes/berth} \times 0.6 \text{ (berth occupancy ratio)} \times 4 \text{ berths} \times 1.64 \text{ TEU/box} \times 365 \text{ days} \times 24 \text{ hours} = 2,280,000 \text{ TEU/year}$$

(Yard-side capacity)

Transshipment: 0%

$$9,360 \text{ TEU(ground slots)} \times 365 \text{ days} \times 1/4 \text{ days(dwelling time)} \times 4 \text{ tiers(stacking height)} \times 0.6 \text{ (yard operation ratio)} = 2,050,000 \text{ TEU/year}$$

Transshipment: 80%

$$9,360 \text{ TEU(ground slots)} \times 365 \text{ days} \times 1/4 \text{ days(dwelling time)} \times 4 \text{ tiers(stacking height)} \times 0.6 \text{ (yard operation ratio)} \times 1/(0.2 + 0.4) = 3,410,000 \text{ TEU/year}$$

(2) Domestic cargo

Since the existing container terminal is operated to optimize the handling of transshipment cargo and is handling very little domestic cargo, it is impossible to analyze the present productivity for domestic cargo. Taking Dubai, where domestic cargo makes up half of the total volume, as an example, per-quay length productivity is about half of that in Singapore (See Table 13.2.1).

13.2.2 Conventional Terminal

(1) Berth No. 1-4

Eighty percent of the conventional cargo except fuel is currently made up of the following four main items: cement (load), wheat (discharge), cattle feed (discharge), and steel/pipes (discharge). Those cargoes are handled at berths 1-4. If average productivity for each cargo item observed in 1999 is applied to each cargo volume, total cargo handling time for the four main items is estimated to be roughly 8,000 hour/year. If we assume 24 hours service, the berth occupancy ratio for the four berths by main cargo item is 23%. On the other hand, the Study Team computed the berth occupancy ratio of berths 1-4 based on the vessel arrival records in 1999 (See Table 13.2.3). The ratio in Table 13.2.3 is based on a 24-hour service basis and higher than the ratio computed from the productivity of the main items. The reason is that about half of the calling vessels at berths 1-4 are either handling miscellaneous goods or are non-cargo handling vessels.

Table 13.2.3 Berth Occupancy Ratio of the Conventional Terminal (Oct. – Dec. 1999)

Berth	Occupancy Ratio (%)
No.1	61
No.2	16
No.3	52
No.4	29
Average	40

UNCTAD recommends that the maximum berth occupancy ratio be 60% for a four-berth group.

If the number of vessels handling miscellaneous goods and non-cargo handling vessels remains constant, berths 1-4 can additionally handle slightly less than the present volume of the four main items, or roughly 500,000t/year. Since the new bulk terminal is almost completed, bulk cargo will be handled in the new terminal, and the four berths will be allocated for general cargo and service. Capacity of the conventional terminal including the new bulk berths will be further examined taking into account the composition of the future demand.

(2) New bulk terminal

Productivity of a bulk terminal widely varies depending on the characteristics of the vessel and the cargo. Capacity of the new bulk terminal is therefore examined taking into account the demand forecast in a later section.

13.3 Demand Forecast of Transshipment Cargo

13.3.1 Regional Competition

(1) Competition with Aden

Port of Aden benefits from a huge, sheltered, deep-water harbor, a convenient location in relation to the Red Sea, Persian Gulf and East Africa, and used to be one of the world's busiest ports until the late 1960s. However, a civil war and low domestic demand kept container throughput at a very low level until recently. That all changed in March 1999, when the Aden Container Terminal (ACT) opened. The terminal, which is conceived primarily as a transshipment center, is operated by PSA (the Port of Singapore Corporation), on a 20-year contract. It is being developed by Yeminvest, in which PSA has a 60 percent stake, and Yemen Holdings, which is wholly owned by the Bin Mahfouz family of Saudi Arabia, with 40 percent.

The first mainline customer at the terminal was APL, part of the Singapore-based NOL group. The serving line now calling at Aden is REX (Red Sea Express) on a weekly basis, which is a feeder service to main trunk lines such as JEX (Japan Express), CEX (China Express), AEX (American Express) and MEX (Mediterranean Express). Now APL is reportedly considering increasing the numbers of Aden callings by starting direct calling with some of the trunk line vessels.

The terminal has two berths totaling 700m, draft of 16m and equipped with four super post-Panamax gantry cranes, able to handle 18 cell widths of containers. The possibility of further deepening to 18m has been incorporated in the design of the quay walls according to PSA. Further investment is planned to boost the quay to 1,700m, comprising six berths equipped with at least 12 gantry cranes and providing capacity to handle a minimum of 1.5million TEU/year, possibly 2.0 to 2.5 million. In the direct backland, 550ha has been cleared in preparation for the creation of a free trade zone and industrial area of which 70ha has been developed by Yeminvest as the first phase of FTZ.

Aden's strategic position gives it the following competitive advantages over Salalah:

Advantages:

1. competitive location to serve the Red Sea, the Arabian Sea, the Indian Ocean, the Gulf, South and East Africa
2. 4 km from the main East-West shipping route
3. 9days steaming from Europe and 7days from Singapore.
4. one of the world's best natural harbors.

5. historically renowned as a trading and transshipment port.
6. surrounding mountains provide shelter from harsh weather conditions such as storms.
7. excellent navigational conditions and a clear entrance channel

On the other hand, the following points are considered as the weak points of Aden:

Disadvantages:

1. political instability
2. insufficient public order and security
3. poor economic stability
4. poor quality of working force due to the lack of social training
5. poor infrastructure due to the civil war

Other than Aden, Hodeidah has been Yemen's chief gateway for containerized imports and exports, though volumes remain low, at an estimated 479,000 TEU in 1999 with a depth of 11m. The port serves the surrounding area, and the capital, Sana'a, via mountain roads. Currently, containers are handled at two berths-of 195m and 300m-each being equipped with a single gantry crane. The 195m berth can handle ro-ro vessels. It is observed that the development of Aden has little effect on the throughput of Hodeidah. Each port has an independent function in the national economy of Yemen. Table 13.3.1 shows historical changes in the container throughput at the ports.

Table 13.3.1 Container Throughput of Yemen (1000 TEU)

Year	1986	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Hodeidah	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	37.0	38.2	43.5	*47.9	*52.6
Aden	4.0	7.8	11.0	9.7	10.0	8.1	8.9	12.5	13.5	15.0	*80.0	*500.0
Total	-	-	-	-	-	-	-	49.5	51.7	68.5	127.9	552.6

*estimated/projected

Source: World Container Port Markets to 2012, JICA Study Team

In terms of competition with Salalah, the biggest drawback Aden is facing now and will continue to face in the near future is the lack of political and economic stability. If the political situation were to be improved significantly, then economic stability would soon follow, paving the way for a prosperous port of Aden.

It is fair to say that Aden will become the stiffest competitor for Salalah in every aspect when stability is achieved.

(2) Competition with Gulf Ports

To have a clear picture of the (Arabian) Gulf in the Middle East, it is necessary to define the range of Middle East in terms of container shipping and port. The Middle East container port market comprises the (Arabian) Gulf and Red Sea ports in the main, but is also developing on the Arabian Sea. Container ports throughput for these ports is summarized in Table 13.3.2.

Table 13.3.2 Middle East Container Throughput by Countries (1000 TEU)

Year	1986	1990	1991	1992	1993	1994	1995	1996	1997	1998
Arabian Gulf & Gulf of Oman										
U A E	921.0	1563.2	2072.7	2506.4	2853.3	3202.5	3511.6	3750.3	4121.6	4449.0
East S. Arabia	218.9	244.5	355.7	316.0	313.4	300.7	293.7	320.9	371.7	409.8
Iran	n.a.	n.a.	83.3	112.6	91.2	110.9	174.1	244.4	254.4	325.9
Kuwait	200.6	124.5	65.0	71.0	201.8	214.5	224.0	235.4	240.0	245.0
Oman	112.7	168.5	156.4	115.7	91.1	88.2	96.3	101.1	109.2	118.0
Bahrain	80.4	75.1	84.3	90.5	102.1	103.2	105.2	104.3	111.7	117.0
Qatar	15.2	21.8	29.8	38.7	38.2	37.4	45.4	57.3	79.1	102.8
Total	1548.8	2197.6	2847.2	3250.9	3691.1	4057.4	4450.3	4813.7	5288.2	5767.5
Red Sea and Gulf of Aden										
West S. Arabia	605.0	556.1	728.2	850.5	943.3	882.4	928.0	827.2	922.1	976.5
Djibouti	17.2	36.3	91.8	62.5	74.2	75.4	84.1	110.0	148.9	170.0
Jordan	121.6	83.3	72.7	99.6	109.0	111.3	108.8	139.3	161.0	150.0
Yemen	4.0	7.8	11.0	9.7	10.0	8.1	8.9	49.5	51.7	58.5
Ethiop./Eritoria	5.4	13.6	5.5	4.0	3.0	10.8	15.4	32.7	38.0	44.0
Eastern Israel	33.5	50.0	50.7	33.5	15.7	11.9	18.5	19.6	19.1	19.0
Total	786.7	747.1	959.9	1059.8	1155.2	1099.9	1163.7	1178.3	1340.8	1418.0
Grand Total	2335.5	2944.7	3807.1	4310.7	4846.3	5157.3	5614.0	5992.0	6629.0	7185.5

Source: World Container Port Markets to 2012 by Ocean Shipping Consultants

Ports in the Gulf have been increasing their share in the Middle East, while Red Sea Ports is losing ground. The rapid growth of the Gulf Ports was due to the establishment of transshipment hubs such as Dubai. The cargo generated from Free Trade Zones further enhanced the growth. Among Gulf ports, Dubai (Port Rashid and Jebel Ali) is dominant.

Among UAE ports, Dubai accounts for 62 percent of the total in 1998. In 1991, Port Rashid was merged with Jebel Ali under the Dubai Port Authority (DPA). Jebel Ali has been a major transshipment point in the region and has a good reputation as a productive facility positioned to service the Gulf, Pakistan and North India markets.

Transshipment forms a major part of the business of UAE ports, accounting for nearly 50 percent of Dubai's container throughput as is shown in Table 13.3.3, over 80 percent at Khorfakkan and Fujairah, and a significant portion in Abu Dhabi. Since 1998, two major players, Salalah and Aden, have entered into the transshipment market, bringing about fierce

competition. The emergence of Salalah and Aden, therefore, has particular impact on these ports' business.

In 1998, Dubai moved about 2.80m TEU, more than three times the 1990 level. Jebel Ali, which has more space to expand, has taken over from Port Rashid as Dubai's main container port, and two ports are run as a single entity by Dubai Port Authority (DPA) Most major lines call at the port , and on-carriage feeder service is available to the rest of the Middle East, East Africa and the Indian subcontinent.

Maersk and Sea-Land (now New Maersk) were contributing a considerable portion of the port's throughput and a large part of those boxes has already transferred to Salalah. DPA was fearing that the portion to be transferred would reach the level of 300,000 TEU but the number of boxes actually transferred has turned out to be about 170,000 TEU, thus the influence of the transferring is observed minimal.

Table 13.3.3 Container Traffic at Dubai

(1000 TEU)

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	*90/98	97/98
Inbound	252	337	389	435	465	516	600	686	768	15%	12%
Outbound	214	269	319	301	343	516	457	514	596	14%	16%
T'shipment	450	650	774	923	1074	1042	1190	1400	1439	16%	3%
Total	916	1255	1482	1659	1882	2073	2247	2600	2804	15%	8%
T'shipment	49%	52%	52%	56%	57%	50%	53%	54%	51%	-	-

*Compounded Annual Growth Rate 1990 to 1998

In 1999, Dubai handled about 3.5m TEU, 60 percent by Jebel Ali and 40 percent by Port Rashid. Transshipment containers were about 1.2m TEU in Jebel Ali (about 57 percent). The principal common feeder operator is Sea-Consortium's X-Press Feeder, which serves the Gulf and India, hubbing at Dubai, Colombo and Singapore.

Dubai's advantages/disadvantages in terms of competition with Salalah are summarized as follows:

Advantages:

1. established fame as No.1 Gulf port with a convenient feeder network
2. strong historical support by eastbound shipping lines
3. various incentives in FTZ
4. good reputation as a productive port for quick dispatch for both sea side and land side
5. competitive level of container handling charge
6. large and growing local market

Disadvantages

1. approximately 3.5 day deviation from the main East-West trunk route
2. potential difficulty in dredging due to gas residue in the soil that may cause environmental problems
3. no major future expansion plan to receive larger scale vessels exceeding 5,000 TEU with draft of more than 14m

In evaluating the above merit and demerit of Dubai in competition with Salalah, Dubai is at its peak now and its competitive power will gradually decrease as the surrounding situation changes. Especially, the increasing number of larger vessels will surely have a negative effect on the port.

(3) Competition with Indian/Sri-Lankan Ports

Out of the total container throughput in 1998, India accounted for 42 percent and Sri-Lanka shared 36 percent. Ports in India, Pakistan and Bangladesh are mainly catered for by feeder vessels, while Colombo is a major transshipment hub in the region.

Table 13.3.4 Indian Subcontinent Container Throughput by Countries

(1000 TEU)

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998
India	745.8	705.6	802.0	1016.9	1255.0	1447.4	1695.5	1882.6	1983.3
Sri-Lanka	596.4	669.5	675.8	859.4	972.6	1049.0	1356.3	1687.2	1716.0
Pakistan	390.4	469.7	507.1	509.9	513.0	550.7	555.3	558.1	660.0
B'desh	113.0	120.9	140.0	164.3	191.1	227.2	263.8	300.5	353.5
Total	1845.6	1965.7	2124.9	2550.5	2931.7	3274.3	3870.9	4428.4	4712.8

Source: Ocean Shipping Consultants

(India)

Among the ports in India, only Jawarharlal Nehru (JN) can currently cater for trunk line vessels. India has a great potential for economic development and port expansion. Consequently, many renowned terminal operators are offering to undertake port development on a BOT basis.

Infrastructure, especially hinterland transport links are another area demanding development, with huge distances to cover, and both rail and road facilities being underdeveloped, overloaded and old-fashioned. Container Corporation of India (Concor) began container transportation service by rail in 1988 with seven inland container depots taken over from Indian Railways.

Table 13.3.5 Container Throughput by Major Indian Ports

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998
JN*1	54.6	109.5	142.7	173.1	244.1	399.1	423.1	504.1	669.1
Mumbai	324.2	279.6	315.4	427.6	487.0	517.5	583.4	601.3	509.3
Madras*2	110.4	127.4	126.4	162.1	200.5	227.5	256.5	292.1	300.0
Calcutta*3	116.5	66.8	80.9	102.0	117.8	125.2	141.5	164.5	169.1
(Haldia)	n.a.	8.9	7.3	6.0	5.7	3.8	8.8	23.1	28.2
Cochin	50.0	55.9	58.0	66.8	86.9	96.0	112.1	121.5	121.7
Tuticorin	15.1	27.7	35.0	48.1	57.0	68.6	88.8	102.5	115.0
Kandla	75.0	28.3	35.0	28.5	51.0	65.0	77.0	84.0	86.0
Visakh.*4	-	10.4	8.6	8.7	11.1	8.5	13.1	12.6	13.1
Total	745.8	705.6	802.0	1016.9	1255.0	1447.4	1695.5	1882.6	1983.3

Remarks: *1 Jawaharlal Nehru
 *2 same to Chennai
 *3 Calcutta figure includes Haldia

Source: Ocean Shipping Consultants, JICA Study Team

JN's major customers include Shipping Corporation of India (SCI) and Maersk, followed by the Epic consortium of Contship, CMB-CMA, Andrew Weir and P&O-N. JN's container terminal consists of 680m quay with the depth of 13.5m.

A new container terminal, Nhava Sheva International Container Terminal, started the operation in 1999 in Mumbai. Two 300m berths are currently operational, equipped with super post-Panamax cranes. The new terminal is managed by P&O Ports on a 30-year contract since 1997. Maersk has already transferred its service from JN. The port of Mumbai is situated in the center of the city and relies on a lock operation. The lock operation limits the dimensions of the vessels which can enter the inner harbor. The Mumbai Port Trust is undertaking to create another container terminal consisting of 800m quay with the depth of 13m.

In short, JN and Mumbai are two giants in the Indian container terminal business field, JN new and Mumbai old. At present, neither of these ports is competitive with Salalah but in the near future, JN will become a strong contender and a little later Mumbai will be also. In terms of competition with Salalah, any development plans of these ports are worth watching very carefully.

(Sri-Lanka)

The port of Colombo handled 1.72m TEU in 1998 compared with 1.69m TEU in 1997, despite losing some Maersk-Sealand traffic to Salalah, and most of APL's transshipment business to Singapore. To make the matters worse, from April 1999 Maersk-Sealand almost completely

transferred its transshipment business to Salalah and APL shifted its remaining cargo to Aden. Jaya Terminal, the main container terminal of Colombo, has 1292m quays with a depth of 12 to 14m.

Table 13.3.6 Colombo Container Throughput

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998
Colombo	596.4	669.5	675.8	859.4	972.6	1049.0	1356.3	1687.2	1716.0

(1000 TEU)

Source: Ocean Shipping Consultants

The trade between India and Sri-lanka is expected to grow due to the Free Trade Agreement aimed at the elimination of the tariffs against each other's products. Colombo has experienced a remarkable growth in container throughput during the last decade. Nearly 70% of the throughput is transshipment targeted to the Indian market.

Colombo's strategic location has attracted a growing number of customers, but it has some weak points as well. Among them, relatively low productivity and security concerns are easily noticeable.

On the other hand, P&O Ports has signed a new contract to upgrade, modernize and operate three container berths on the Queen Elizabeth Quay on a BOT basis for a 30 years concession. The refurbishment of the Quay, which is to be completed by 2003, will almost double the Colombo's existing container handling capacity. Phase one will see refurbishment and extension of existing berth to 940m, bringing its throughput up to one million TEU at a cost of US\$ 240m. Phase two will involve construction of a US\$ 350m, 300m break water to replace the current one. On completion of Phase two, there will be 6 post-Panamax gantries and 28 RTGs in use in the terminal. Assuming all the planned improvement are realized, the advantages/disadvantages in terms of competition with Salalah are listed as follows:

Advantages:

1. strategic location between international sea lanes and Indian subcontinent
2. major expansion plans

Disadvantages:

1. the port has limited draft and is continually affected by the south-west monsoon and rains, which necessitates more work-stops than in Salalah
2. political and civil strife caused by Tamil Tigers
3. a number of holidays throughout the year during which the port is closed
4. low production ratio ranges from 15 to 20 moves per hour per gantry

In summing up, Colombo and JN are twins or sisters helping and affecting each other in container terminal business in the region where Colombo is an elder sister and JN is a younger one. As long as JN's development is slow, neither of the two ports can not compete with Salalah efficiently. However, in case there emerges a modern super hub with about the same capability with Salalah in the Indian subcontinent, the competition situation will drastically change, and the Sisters will become a strong contender to Salalah.

(4) Competition with Singapore

Despite the emergence of competitive ports elsewhere in South East Asia, transshipment has remained central to Singapore's role. Although some direct long-haul services to other regional ports have been established (and are increasing in number) only Singapore can provide the abundance of connecting services to qualify as a truly regional hub. For instance, NYK reorganized its AGS (Asian/Gulf Service) in July 1999. NYK's Australia and New Zealand/Indian subcontinent/Gulf services were reorganized into a weekly service via transshipment at Singapore from its Australia-Gulf direct service.

Between Australia and Singapore, the weekly Australia Asia Express (AAX) had been operated and the service remained unchanged. Between New Zealand and Singapore, a new weekly service, the New Zealand Australia Asia Express (NZX), commenced with five containerships of 1,000 TEU capacity. The vessels on this route call at Singapore, Brisbane, Auckland and major ports in both North and South islands and back to Brisbane again and to Port Klang and Singapore (served fortnightly). Both AAX and NZX services carry northbound cargoes to Singapore for connection with two other weekly services-the Gulf Kuwait Express (GKX) and the South Asia Express (SAX). Following this reorganization, GKX commenced calling to Kuwait, double calls to Jebel Ali, with SAX undertaking double calls to Nhava Sheva (JN). The new port of calls are:

GKX – Port Klang, Singapore, Jebel Ali, Damman, Bahrain, Kuwait, Jebel Ali, Bandar Abbas, Colombo and Port Klang

SAX – Singapore, Colombo, Nhava Sheva, Karachi, Nhava Sheva, Colombo and Singapore

As is clearly shown in the above example, Singapore has benefited not only from the expansion of its domestic economy, but also from the generally dynamic pace of surrounding regional growth. Nevertheless, Singapore is facing increasing competition as well as boosted transshipment traffic from other ports, with Tanjung Priok, Port Klang, Penag and Laem Chabang all handling containers as their principal cargoes. Salalah and Aden will join to these ports as powerful competitors to Singapore if the East-West trunk line covers Gulf and India

subcontinent containers through Salala or Aden as a transshipment hub.

Table 13.3.7 shows the 194 percent increase in container throughput at Singapore over 1990/98, with total volumes reaching 15.1m TEU in 1998 (in 1999 total volume exceeded 16m). Of this total, more than 90 percent was transshipment traffic. Volumes increased by 9.1 percent in 1997 and by 6.9 percent in 1998, despite a drop in GDP growth and the financial crisis in the region from the second half of 1997.

Table 13.3.7 Singapore Container Throughput

(1000 TEU)

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998
Throughput	5134	6245	7399	8877	10400	11846	12945	14120	15100

Source: Ocean Shipping Consultants, JICA Study Team

Singapore's feeder hinterland stretches from the Indian subcontinent through South-East Asia to Australia, New Zealand and the Gulf. It provides a unique crossing point and link between east-west and north-south trades. The port claims that a typical third-generation vessel discharges around 1,000 TEU and loads a similar volume, which involves transshipment to/from some 70-80 feeder vessels monthly.

In 1996, PSA signed a ten year terminal agreement with the Global Alliance (now New World Alliance). This was followed, over 1996-97, by long-term terminal service agreements with Maersk (now Maersk-Sealand), Cosco, Hyundai (now a member of New World Alliance), Yangming, Hanjin, DSR-Senator. These agreements are designed to cater to the requirements of individual lines, whilst maintaining the high berth usage rates possible in a common-user port. In October 1997, the Port of Singapore Authority (PSA) was transformed from a government agency into a commercial enterprise, with the government as sole shareholder. A Maritime and Port Authority (MPA) had already been created in early 1996, to take over the statutory function of the PSA.

One of the most effective strategic arrangements of PSA to communicate with its customers is " International Advisory Council " which consists of chairmen or presidents of major shipping lines calling PSA. At the end of February, 2000, the Council members are: Chairman of COSCO, President of Hanjin, President of Maersk-Sealand Singapore, President of Mitsui O.S.K. Lines, President of NYK Line, Group President of Neptune Orient Line and APL, Chairman of Samudera Shipping Lines of Indonesia, Group President of Regional Container Lines, and Chairman of PSA. Through this channel, PSA is able to give all users an impression that the port is neutral and treating them equally in any service. This measure is effective to show the shipping world that Singapore is a multi-user terminal and any user, large or small, can enjoy its service with equal treatment condition, though it is difficult to verify.

To show the strategic location of Singapore from the view point of the inter-relation of Salalah to South Asia, the distance table of Karachi (one of the most closely connected ports in South Asia) to the major ports in South East and Far East Asia is shown in Table 13.3.8. For reference the average distance between Salalah and Singapore is 3,198 nautical miles and about 6.7 steaming days by 20 knotter. Salalah/Karachi is 892 nautical miles and 1.9 days at the same speed .

Table 13.3.8 Distance Table of Karachi in South/Far East Asia Major Ports

(in nautical miles)

	KHI	CLM	CAL	SIN	JKA	MNL	HKG	KAO	SHA	BUS	TKY	VLD
KHI		1341	2564	2887	3160	4224	4343	4504	5120	5386	5787	5890
CLM	1341		1244	1341	1840	2904	3023	3184	3800	4066	4467	4570
CAL	2564	1244		1650	2140	2987	3106	3267	3883	4149	4550	4653
SIN	2887	1567	1650		525	1341	1460	1621	2237	2503	2904	3007
JKA	3160	1840	2140	525		1562	1789	1957	2523	2839	3234	3338
MNL	4224	2904	2987	1341	1562		632	543	1128	1410	1770	1909
HKG	4343	3023	3106	1460	1789	632		342	845	1140	1596	1639
KAO	4504	3184	3267	1621	1957	543	342		600	908	1349	1413
SHA	5120	3800	3883	2237	2523	1128	845	600		492	1048	991
BUS	5386	4066	4149	2503	2839	1410	1140	908	492		669	509
TKY	5787	4467	4550	2904	3234	1770	1596	1349	1048	669		949
VLD	5890	4570	4653	3007	3338	1909	1639	1413	991	509	949	

Remarks: KHI-Karachi, CLM-Colombo, CAL-Calcutta, SIN-Singapore, JKA-Jakarta, MNL-Manila, HKG-Hong Kong, KAO-Kaohsiung, SHA-Shanghai, BUS-Busan, TKY-Tokyo, VLD-Vladivostok

PSA has a bold expansion plan in Pasir Pajang area consisting of 16 berths in total, which would gear the port up to handle some 35m TEU per year by 2010.

Singapore might be thought to be out of the range of competition with Salalah, however, it is a strong contender port as a matter of fact. A lot of containers are flowing in and out of the Gulf with transshipment at Singapore. Number of direct callers to Australia and New Zealand are fewer than ever in the trade. The port is also conveniently located in the region of India subcontinent. New Indian container ports, such as JN and Karachi, and Colombo are just around the corner compared with Salalah.

Assuming that Singapore's handling capacity continues growing and that it is able to maintain its low handling charge level, the port will become a powerful competitor to Salalah, because it is imperative to any transshipment hub to grab containers out from East-West trunk line and Singapore is a forerunner in this business.

13.3.2 Salalah Port Proper Elements

(1) Feeder Service Network

To become a successful transshipment hub port, a hub must be served by a sufficient feeder service network. For the case of Singapore, the port is the center of about fifty feeder service networks and the number of feeder vessels exceeds 80 every month. The current trunk and feeder services serving Salalah were researched with the cooperation of SPS and are listed in Table 13.3.9.

Table 13.3.9 Regular Calling Vessels to Port of Salalah

No.	Service/Schedule	Trunk/Feeder	Average Moves Vessels in Service	Ports of Call (Rotation)
1	Asia Express 3(WB) Tue.0500-1900	Trunk Line (Weekly)	1300 (6 Vessels for both WB & EB)	Salalah-Jeddah-Algeciras-Felixtowe-Rotterdam-Salalah
2	Asia Express 3 (EB) Fri. 0001-1400	Trunk Line (Weekly)	1000	Salalah-Jebel Ali-Nhava Shiva-Salalah
3	Asia Express 5 (EB) Wed. 0600-1200	Trunk Line (Weekly)	1400 (13 Vessels)	Salalah-Singapore-Yantian-Hong Kong-Long Beach-Tacoma-Yokohama-Kobe-Kaohsiung-Hong Kong-Yantian-Singapore-Algeciras-Felixstow-Rotterdam-Gothenburg-Bremerhaven-Felixstow-Rotterdam-Algeciras-Salalah
4	Asian Express 4 (WB) Thu. 1400-Fri. 0600	Trunk Line (Weekly)	1050 (14 Vessels for both WB & EB)	Salalah-Gioia Tauro-Algeciras-Halifax-Newask-Norfolk-Charleston-Algeciras-Gioia Tauro-Jeddah-Salalah
5	Asian Express 4 (EB) Thu. 0600-2359	Trunk Line (Weekly)	1300	Salalah-Port Klang-Singapore-Hong Kong-Kaohsiung-Yokohama-Long Beach-Oakland-Kwangyang-Kaohsiung-Hong Kong-Singapore-Port Klang-Colombo-Salalah
6	East Africa Sat. 0200-Sun. 0200	Feeder (Alternate Weekly)	850 (Two Vessels)	Salalah-Zanzibar-Dar es Salaam-Mombasa-Salalah

7	Indian Ocean/Islands -1 Fri. 0200-Sat.1200	Feeder (Alternate Weekly)	800 (Two Vessels for Service-1 & 2)	Salalah-Port Reunion-Port Louis-Toamasina-Durban-Maputo-Beira-Nacara-Victoria-Salalah
8	Indian Ocean/Islands -2 Fri. 0200-Sat. 1200	Feeder (Weekly)	800	Salalah-Port Reunion-Port Louis-Toamasina-Durban-Maputo-Beira-Nacara-Victoria-Salalah
9	Arabian& Persian Gulf -1 Wed. 1900-Fri. 2100	Feeder (Weekly)	1150 (Two Vessels for Service-1 & 2)	Salalah-Jebel Ali-Kuwait-Bahrain-Jebel Ali-Salalah
10	Arabian& Persian Gulf-2 Mon. 1300-Tue. 0600	Feeder (Weekly)	1200	Salalah-Pipavav-PortQasim-Salalah
11	South India Wed. 1600-Thu. 1200	Feeder (Weekly)	650 (Four Vessels for South India and Lower Gulf)	Salalah-Colombo-Tuticorin-Cochin-Marmagao-Salalah
12	Lower Gulf Sat. 1200-2200	Feeder (Weekly)	850	Salalah-Muscat-Jebe Ali-Damman-Jebel Ali-Muscat-Salalah
13	Red Sea-1 Sat. 1200-Sun. 0100	Feeder (Alternate Weekly)	350 (Three Vessels for Service-1 & 2)	Salalah-Jeddah-Aqaba-Port Suez-Salalah
14	Red Sea-2 Mon. 1100-Tue.0400	Feeder (Alternate Weekly)	375	Salalah-Aden-Djibouti-Hodeidah-Port Sudan-Jeddah-Hodeidah-Djibouti-Salalah
15	Kandla Mon. 1400-Tue. 0200	Feeder (Weekly)	100 (Two Vessels)	Salalah-Kandla-Salalah

Source: SPS, JICA Study Team

The following is a summary of the above table in terms of vessel callings by trunk/feeder:

Trunk Line

Five weekly-service callings which consist of the following types of fleet

Asian Express-3 WB/EB	3,000 TEU TYPE x 6
Asian Express-4 WB/EB	4,000 TEU TYPE x 14
Asian Express-5 E	7,250 TEU TYPE x 13

Feeder Line

Six weekly-service callings which consist of the following types of fleet

East Africa-Mombasa	600 TEU x 2
Arabian & Persian Gulf	1,400 TEU x 3
South India and Lower Gulf	1,000 TEU x 4
Kandia-Salalah Direct	350 TEU x 2

Two alternate weekly-service callings which consist of the following types of fleet

Indian Ocean/Islands	500 TEU x 3
Red Sea	450 TEU x 3

In total, Salalah port receives five trunk line vessels, six weekly feeder vessels and two alternate weekly service feeder vessels every week as of the end of February 2000. The average monthly callings by type of service in 1999 was 21 trunk line callings, 25 weekly feeder callings and 9 alternate weekly feeder callings. By comparison, the number of all feeder service ships calling Salalah is less than half of the figure of Singapore.

Table 13.3.10 is a distance table of Salalah to and from main feeder ports within a serviceable range on the East-West route. Singapore (3,198 nautical miles from Salalah) and Aden (520) are excluded. These ports are located on or near the major routes of either Trunk Line or its feeder line and form the major business field of Salalah.