ABBREVIATIONS

AMTA	Arab Maritime Training Academy
APL	American President Line
BOO	Build-Own-Operate
BOT	Build-Operate-Transfer
CEO	Chief Executive Officer
CMA	Capital Market Authority
DGPMA	Directorate General of Ports and Maritime Affairs
DPA	Dubai Port Authority
DPI	Dubai Port International
DPS	Detailed Plan of Study
DWT	Dead Weight Ton
EDI	Electronic Data Interchange
EIA	Environmental Impact Assessment
EPZ	Export Processing Zone
FTZ	Free Trade Zone
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GNVQ	General National Vocational Qualification
GRT	Gross Registered Ton
GSO	the Government of the Sultanate of Oman
GWT	Gross Weight Ton
IBRD	International Bank of Reconstruction and Development
IMO	International Maritime Organization
IRR	Internal Rate of Return
ISPS	International Ship and Port Facility Security
IT	Information Technology
JICA	Japan International Cooperation Agency
LNG	Liquefied Natural Gas
MOAF	Ministry of Agriculture and Fisheries
MOCI	Ministry of Commerce and Industry
MOF	Ministry of Finance
MONE	Ministry of National Economy
MOOG	Ministry of Oil and Gas
MOTC	Ministry of Transport and Communications
MOU	Minute of Understanding
MRMEWR	Ministry of Regional Municipality, Environment and Water Resource
NVQ	National Vocational Qualification
OR.	Omani Rial

PEIE	Public Establishment for Industrial Estates
PPC	Port Planning Committee
PPRC	Port Planning and Regulatory Committee
PSA	Port of Singapore Authority
PSC	Port Services Corporation
R.O.	Rial Omani
RO/RO	Roll-on Roll-off
RPA	Port of Rotterdam Authority
RTG	Rubber Tired Gantry
SAOC	Societe Anonyme Omani Closed
SAOG	Societe Anonyme Omani General
SIPC	Sohar Industrial Port Company
SOLAS	Safety of Life at Sea
SPS	Salalah Port Services Company
SW	Scope of Work
TEU	Twenty feet Equivalent Unit
TOR	Terms of Reference
UAE	United Arab Emirates
UK	United Kingdom
WB	World Bank
WTO	World Trade Organization

EXECUTIVE SUMMARY

1 Background of the Study

The government's current long-term strategies aim both to double per capita income in real terms by 2020 and to decrease dependence on oil exports. Port development is expected to act as an impetus for the development of new industries and to promote private sector development.

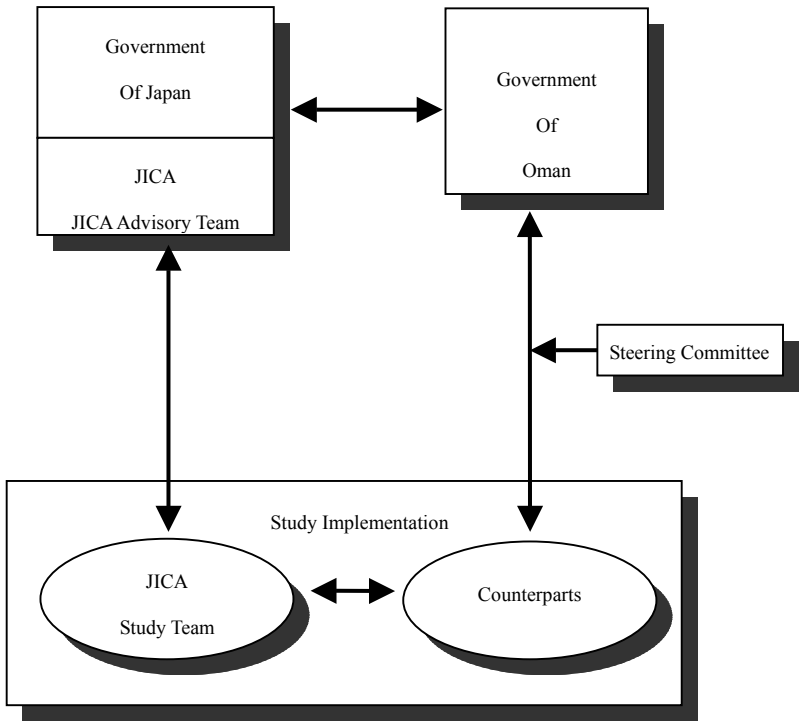
There are six major commercial ports in the Sultanate; namely Sultan Qaboos Port, Salalah Port, Sohar Port, Khasab Port, Duqm Port, and Shinas Port. Although increased importance of the port sector has been recognized for achieving the long-term economic goals of Oman, clear vision on the roles and functions among these ports has not been established. Effective coordination system of these developments as well as integrated and efficient management and operation system of national ports has not been formulated yet.

2 Objectives of the Study

1) To formulate the master plan for the strategic development of the national port system to the target year of 2025
   - Long-term strategy of development of ports
   - Long-term strategy of administration, management and operation of ports
2) To formulate the guideline for the Seventh Five-Year Development Plan (2006-2010) of the port sector
3) To pursue technology transfer to the counterpart personnel in the course of the Study

3 Organization of the Study

(1) Relationship among the Organizations Concerned with the Study



(2) Counterpart

Directorate General of Ports and Maritime Affairs

(3) Steering Committee Members

Directorate General of Ports and Maritime Affairs (DGPMA/MOTC)
Directorate General of Roads (DGR/MOTC)
Ministry of National Economy (MONE)
Ministry of Regional Municipalities, Environment and Water Resources (MRMEWR)
Ministry of Commerce and Industry (MOCI)
Ministry of Agriculture and Fisheries (MOAF)
Ministry of Housing, Electricity and Water (MHEW)
Supreme Committee for Town Planning (SCTP)

(4) JICA Advisory Team

Mr. Hidehiko KURODA	Leader
Mr. Yoshihisa TATENO	Port Operation
Mr. Tokuro MASUDOME	Economic and Financial Analysis
Mr. Satoshi KAWAMURA	Port Planning

(5) Study Team

Mr. Yukio NISHIDA	Team Leader
Mr. Takao HIROTA	Port Administration 1
Mr. Hiroshi KATO	Port Planning 1
Mr. Takaaki KURODA	Port Administration 2
Mr. Hideaki SAGARA	Port Management・Operation
Mr. Nobuyuki IINUMA	Port Facility Design・Cost Estimation
Mr. Mitsuo SATO	Regional Development Planning
Mr. Tomoo AMANO	Demand Forecast /Port Planning 2
Mr. Toshiaki NAGAYA	Economic Analysis・Financial Analysis
Mr. Takashi SATO	Environmental and Social Consideration
Mr. Nobuhide MIYAWAKI	Coordination

4. Conclusions of the Study

(1) Basic Policy on Port Sector Development

1) Basic Direction of Port Reform

i. Objectives

Basic objectives in developing the port sector are to enhance the national development strategy as stipulated in the basic national policy by activating non-oil sectors and activating private resources. The port sector plays a key role for activation of non-oil sector by attracting industry to areas behind ports, facilitating trade and attracting world wide cruise business.

ii. Promotion of Port Utilization

Presently more than half of non-oil foreign trade uses UAE ports rather than Omani ports. Not only do UAE routes entail less overall transport cost and offer better accessibility to the international market, Omani ports have insufficient capacity as well as a relatively poor business environment.

In order to promote use of Omani ports by cargo owners, improvement of the business environment through streamlining administrative procedures and coordination among related Ministries & Agencies is necessary. Sufficient capacity can be secured by increasing operational efficiency as well as by increasing facilities both infrastructures and superstructures. To achieve the former, in particular, management reform and employee training is required.

iii. Development of Adequate Port Facilities

To attract customers to Omani ports, the ports must have sufficient capacity. Improvement of cargo handling efficiency will partly ease present port congestion. Nevertheless, absolute shortage of facilities has to be solved by capital investment for infrastructures as well as superstructures.

Considering the Government’s relatively strong financial position and Oman's advantageous geopolitical position, now is a good opportunity to develop port facilities of a sufficient scale. The port development is required not only for domestic demand but to attract or maintain other traffic which otherwise might go somewhere else.

iv. Activation of Private Resources

Expected capital investment may exceed the financial capacity of GSO. Therefore, introduction of private capital for port sector should be encouraged. However, considering the competitive environment in this region where most port infrastructures have been funded by the government, introduction of private investment to port development may have certain limitations.

v. Need for Appropriate System to Introduce Private Resources

Introduction of private finance will relieve the financial burden of the government. However, government does not always receive financial advantages in the long run. Therefore, prior to private investment in port infrastructures, MOTC and the port authorities must have sufficient management skills to safeguard the interests of the country.

2) Basic Direction of Port Infrastructure Development

i. Provision of sufficient port capacity

Long term national development strategy up to 2020 strives to double per capita income in real terms. Ports in Oman have to meet the maritime transportation requirements in the target year. Cargo throughput at ports has a high correlation with economic activities, and could become three or four times larger than the present level. Ports should not become obstacles to achieving the national goal but promote the policy by providing sufficient capacities and services for the future needs.

ii. Added roles and functions of ports

Ports can fulfill a variety of roles and functions such as transition points between different transportation modes, industrial sites to minimize transportation costs, and recreation areas for citizens and tourists. These roles and functions reflect the socioeconomic fruits of the country, and will change from one era to another. The government's policy to shift from being dependent on oil and find more diversified sources of national income. Therefore, ports in Oman are required to add an industrial function and a tourism promotion function in addition to their traditional.

iii. Balanced development of the nation

Population of the Sultanate is heavily concentrated along the coastal area facing the Gulf of Oman, especially from the capital Muscat to the Northwest forward. Rest of the national land area is scarcely populated or deserted. Ports should function as development centers by providing competitive maritime transportation means and opportunities for value added activities. Development axis should extend to the Southeast and to the South. It is worth noting that there are no commercial port facilities in Sur, and Al Wusta Region, centrally located in the Sultanate, awaits development.

iv. Allocation of roles and functions

Gateway function for the nation has been resided at Sultan Qaboos Port since the commissioning of this port, and should remain here for the foreseeable future. As Salalah Port is in close proximity to a major international sea lane, it should maintain and strengthen its international transshipment hub function. Sohar Port meets requirements for industrial port development and other locations such as Salalah, Sur and Duqm also cover considerable portions of the requirements if not all.

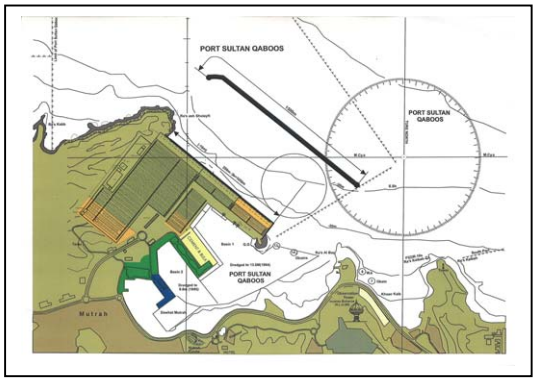
v. Coordinated development with urbanization

Port planning should be well coordinated with city planning, especially in the urbanized areas. Port surrounding area is likely to become focal point where commercial, recreational and industrial activities take place. Port itself is a mode in the transportation chain, but it usually has multi functions as suggested above. Functions of a specific port can also change as time passes. Therefore port's roles and functions should be periodically reviewed.

(2) Long-term Plan of Port Infrastructure Development

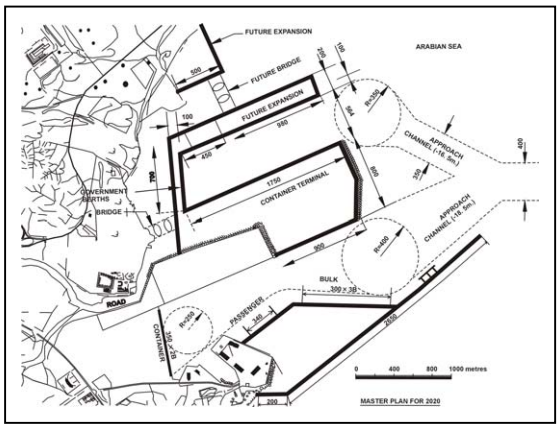
After formulating possible alternatives to meet the future needs, best alternative for long-term infrastructure development plan of each port for 2025 was selected as follows;

1) Sultan Qaboos Port



Container traffic at SQP is estimated at close to 1 miliion TEUs for 2025. Expansion of container handling capacity is proposed. Development plan provides quay wall of 1,050m with water depth of 16m to handle containers in front of the present Shutaify Bay storage area. Construction of a breakwater of 1,500m in length is required to secure the basin. Development of a New Port is also suggested to accommodate overflowing conventional cargoes

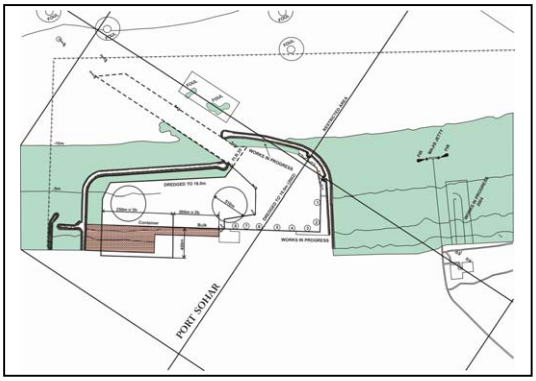
2) Salalah Port



Cargo demand of Salalah Port for 2025 is estimated at 6.6 million TEUs and 3.3 million tons of conventional cargoes. The development of the Free Trade Zone has helped to achieved regional economies.

After completing the on-going project, conversion of No.30 and No.31 bulk berths to container berths is proposed and new bulk berths should be built at the reclamation area where a cruise terminal and an oil jetty are also planned. Additional 1,750m long quay walls with 16m water depth are also required to accommodate the future container traffic.

3) Sohar Port

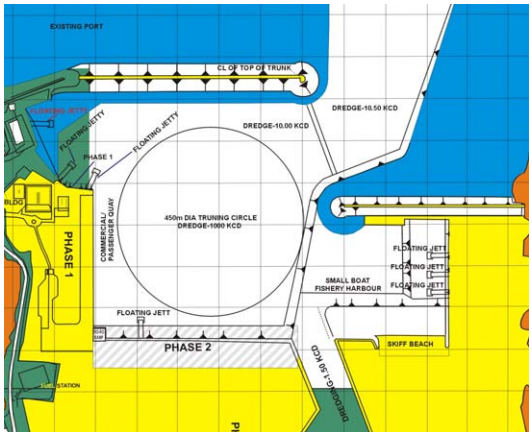


Cargo demand of Sohar Port for 2025 is estimated at 672,000 TEUs, 1 million tons of break bulk cargoes, 6.4 million tons of dry bulk cargo, and 9.3 million tons of liquid bulk cargoes.

To meet the future demand for 2025, two bulk berths with a total length of 600m and three container berths with a total length of 1,050m should be built. Both berths require 16m water depth. Regarding the location, container terminal should be positioned at the northernmost end of the shore protected by breakwaters

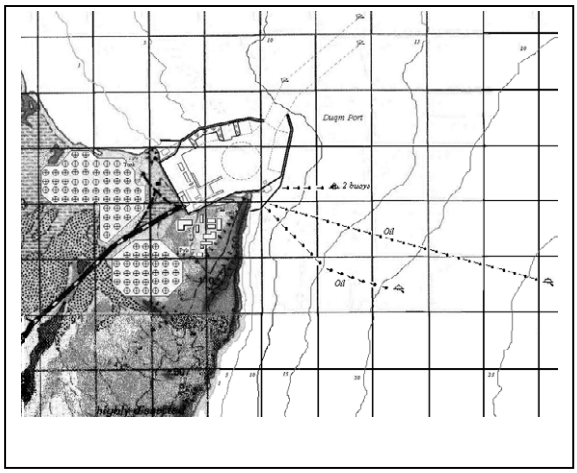
in consideration of possible expansion of the terminal and operational efficiency in the future.

4) Khasab Port



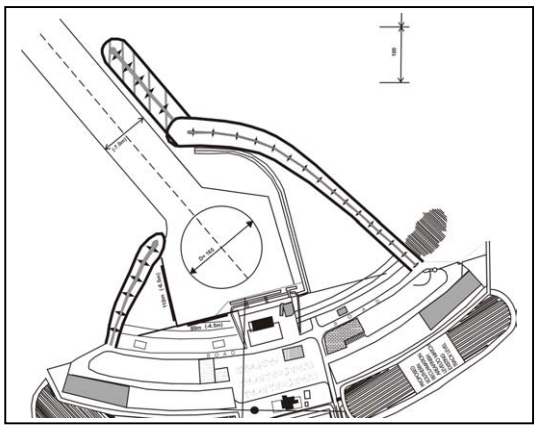
Port activities at Khasab are presently characterized by small boats coming from and going to Iranian territory. Construction works have been almost completed based on the approved development plan. Areas left for expanding berthing facilities within the planned harbor are considered enough to cope with unpredictable port activities in the future. Further expansion of Khasab Port should be based on the careful monitoring on the trend of the port activities.

5) Duqm Port



Though there exist no port facilities at Duqm presently, a new port and dry dock complex with maximum capacity of 100,000 DWT at Duqm has been proposed in order to foster economic activities in Al Wusta Region which is distinguished for having a great number of oil wells, and sparsely populated. One of the possible industries seems to be a space-oriented industry such as oil refinery and storage, which may be an added function to the original plan.

6) Shinas Port



Shinas Port currently handles small-sized Dhows which transport cargo between Iran and fish which is loaded on trucks for export to Europe via Dubai. Key concept of the future plan is to provide quays in the northern part of the port where commercial activities are expected. The fishery activities are planned in the opposite part of the port. Widening and deepening of the existing channel and extension of breakwater to secure the stopping distance are proposed.

In order to materialize the long-term master plan of each study port, a total of O.R. 380 million is required as capital cost for the public sector, and O.R. 226 million for the private sector. The former should provide principal facilities such as breakwaters and the latter is responsible for providing superstructure such as cargo handling machinery.

(3) Long-term Port Reform Plan for Port Administration and Management

1) Port Development and Management Scheme

Omani port policy has two fundamental components, namely;

- GSO provides basic infrastructure, while the concessionaire builds superstructure.
- Ports are privatized by long-term concession agreements with a SAOG, which functions as port authority.

This policy-mix is so far working well, and it can be reasonably assumed that the existing policy will remain in place future with some modification.

A large scale modification of above financial arrangement for port investment is not likely in near future, however, for a long-term period with port authorities' strengthened financial position and private sector's growing economic strength, extent of port authorities and other private sector's participation in port investment might become an agenda. When examining this issue, the seriousness of competition among the ports in the region should be taken into account.

The current management scheme is individual port management with a combination of specific legislation and concession agreements. Under the scheme, government has means to oversee the behaviors of port authorities through concession agreement, with flexible manner. Under the above circumstances, single and comprehensive port legislation has no advantage. The scheme should continue although some modifications will be needed on a case by case basis.

2) Requirement for Human Resources

Although major port authorities satisfy the Omanization target of 60%, due to the level of skill required, it would be difficult to exceed this ratio in future. It is therefore desirable that current target remains unchanged.

Since the effort of GSO and port authorities on education/training is not necessarily meet with the requirement of port industries, which increases with growing port activities, more training opportunities including those abroad should be available. In this respect, very recently two plans to create an educational organization for management, maritime officers, civil and maritime engineer, etc. have been proposed, and one is approved. Both proposals are justifiable, and GSO should support the establishment of such institutions. DGPMA may also send their staff to the institutions for short-term education and training.

3) Nationwide Port IT Network

Major port authorities have completed or are in the process of upgrading of IT application for management including data collection, however, an integrated IT network to connect major ports and related agencies by EDI is required not only for administrative activities but also port users as a next

generation of the port IT system. It is also desirable to further develop the usage of so-called "Single Window" system (one document with unified format for Agencies).

The IT system suitable for port in future is that an integrated EDI system connects each port at DGPMA Information Center, and all relevant agencies will have access to required information. MOTC should study the introduction of this system from an early stage.

4) Port Security and Other Maritime Aspects

Sultan Qaboos Port and Salalah Port submitted Port Facility Security Plans to the government, and some budgets have been allocated in order to tighten port security. While Sohar Port's security plan is yet to be submitted by 2005, GSO can claim complying 2002 SOLAS and ISPS code.

For the moment, port security, environmental protection and navigation safety in ports are in large part entrusted to major port authorities, however, considering the government has primary responsibility to enforce requirements of international legal instruments, GSO, in particular DGPMA should be more involved in the above issues.

5) Issues on Major Port

i. Sultan Qaboos Port

Cargo handling efficiency falls short of the international standards. The reasons are complex, however, one of the main reasons is delayed decision of port investments.

For the urgent investment, DGPMA and PSC should not wait until new concession agreement become effective. It is also desirable that accumulated financial resources be more positively utilized in upgrading the ports.

ii. Salalah Port

SPS generates less revenue for GSO than PSC. This is mainly due to its management fee payment and fairly large amount of volume discount of tariff. GSO has extended the initial exemption of income tax for a further 5 years. With the strengthened financial position of SPS in mind, it may be recommendable for GSO and SPS to review the excessive volume discount and income tax exemption.

iii. Sohar Port

GSO made clear its intention to cease the expenditure of infrastructure building after 2006, however, it may be difficult to pass all the cost of additional infrastructures to existing and new tenant.

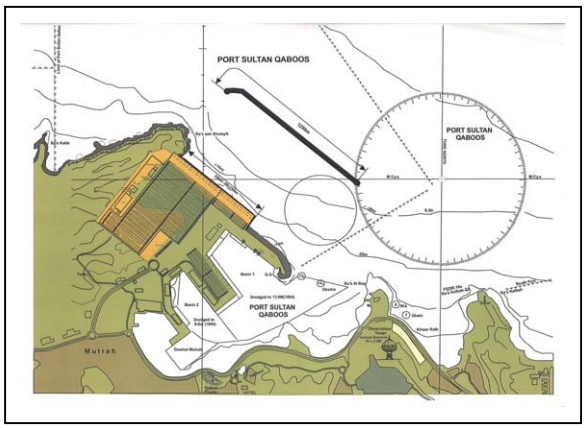
6) Issues on Other Commercial Ports

While GSO intends to find suitable concessionaires for these ports, because of their low profitability, GSO may have to bear a part of management cost for certain period.

(4) Priority Port Infrastructure Development Projects

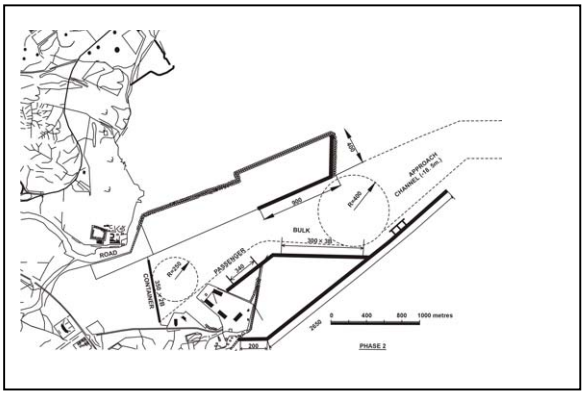
1) Phasing of the Long-term Development Plan

i. Sultan Qaboos Port



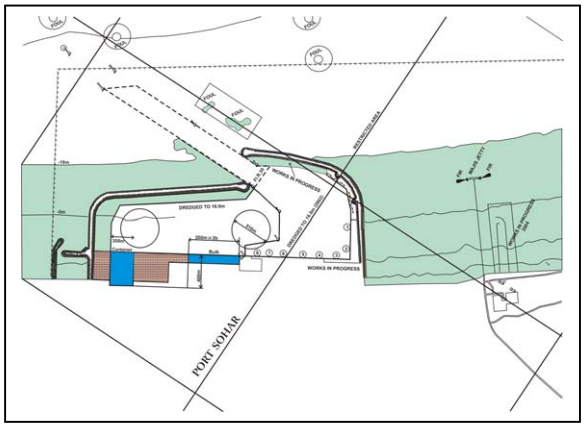
First phase is to expand container handling capacity by building a new terminal with two deep berths of 350m each. 2nd phase is rearrangement of storage areas to create an additional 100,000 TEUs capacity. Final phase is an extension of container berth by another one berth at the outer harbour. Civil works involve extension of the breakwater by 300m. Overall rearrangement of berth allocation can be done at this phase.

ii. Salalah Port



1st phase of Salalah Port is conversion of No. 30 and 31 berths into a container terminal. New bulk terminal with 3 berths and a new passenger terminal will be built at the reclaimed area. 2nd phase is the widening of the existing container terminal to the north and construction of 5 berths in total. The final phase development is construction of a dedicated government berth and break bulk berths, if required.

iii. Sohar Port



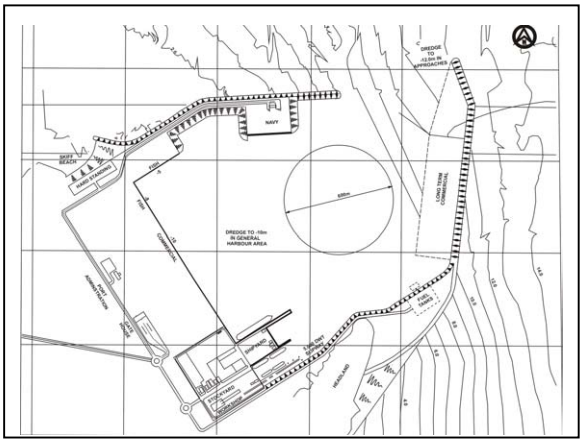
Taking into consideration both the forecast demand and terminal capacity, two berths for bulk cargoes with a total length of 600m and one dedicated container berth are required in 2010. The 2nd container berth will be needed around in 2015, and the 3rd one by 2025. The port demands for years after 2015 include input and output cargoes to/from industrial activities which may be taken place at inland area for future expansion.

iv. Khasab Port

In light of the existence of sufficient port capacity and wide unutilized reclamation area, it is not likely that Khasab Port will encounter a shortage of port capacity within the foreseeable future. Khasab Port

Development Plan for 2025 does not need to be further phased out.

v. Duqm Port



The 1st phase is to develop port facilities and dry dock facilities for ship repairing. The sub-breakwater can be extended if necessary after monitoring the calmness of the basin and sediment movement. The 2nd phase project is to construct oil refinery and storage. Once national or/and international consensus is reached, project should be proceeded as quickly as possible. Careful studies and evaluation on natural and environmental conditions have to be implemented.

vi Shinas Port

As small scale development is proposed for Shinas Port, phasing is not necessary for the implementation. The project should be implemented at a time as early as possible because the project can be considered as provision of basic infrastructure to the local people.

2) Priority Projects

First phase development projects of the long-term plan and possible carried-over projects were evaluated and assessed to select priority projects, which are to be incorporated in the Seventh Five-Year Development Plan. These projects were evaluated from the view points of policy consistency and economic justification as well as environmental considerations. Following 4 projects are selected as the priority projects:

- 1st Phase Project of Sultan Qaboos Port Development
- 1st Phase Project of Salalah Port Development
- 1st Phase Project of Sohar Port Development
- 1st Phase Project of Duqm Port Development

3) Project Evaluation

Preliminary evaluation of the priority projects was conducted. In most projects such as Qaboos, Salalah and Sohar, government will receive a return which exceeds the hurdle rate, but Duqm will not have sufficient return. Although Duqm port is financially weak, the economic effect is expected to be large, therefore the project is justified to receive continuous support of the government.

4) Preliminary Environmental and Social Consideration

Environmental impacts of the priority projects were assessed in terms of the environmental capacity of the project area. In most cases impacts are likely within environmental capacity with appropriate control. For Sultan Qaboos Port project, noise and vibration during construction works should be further reduced.

(5) Draft Guideline for 7th Five-Year Development for Port Sector

1) Draft Objectives of the Port Sector in the 7th Five-Year Plan

After evaluating the past performances of the port sector and forecasting the future trends of this sector, following are proposed, among others, as draft objectives;

1. Creating within MOTC the Port Planning Council consisting of representatives from relevant government agencies and private sector.
2. Establishing information and data collection/processing system of port and maritime sector by extensively utilizing the Information Technology.
3. Streamlining decision-making procedures in the administration, as well as in the port authorities, so as to respond to the challenge of global maritime market.
4. Reviewing the demarcation of investment between the government and the private sector for future development, and establishing adequate scheme of investment for each port.
5. Reviewing the terms of the Agreement of Sultan Qaboos Port, and deciding the management with the view to maintaining continuous operation during transition period.
6. In view of reducing the operational burden of the government, entrusting the management of the Shinas and Khasab ports to a private operator with operational subsidy.
7. Privatization of Duqm port after attracting a company that can manage entire port and its attached industry area through long term concession agreement.
8. Expansion of port capacities so as to meet the ever-increasing cargo demand which will be generated by not only domestic economic policies but also global development scheme.
9. Promotion of the economic diversification policy. Diversification of the national economic structure will affect the port activities by realizing a variety of port traffic.
10. Realization of portside industrial zones. Port areas are ideal positions for industrial activities because they are transition points between land and maritime transportation.
11. Balanced development and reduction of discrepancy among regions are important government targets, and ports should be developed to promote the government policy.
12. Exploration of the future needs of the port sector should be studied and potentials of Duqm and Musandam waterway should be carefully evaluated from socioeconomic and environment aspects.

2) Ports Sector Investment Programme in the 7th Five-Year Development Plan (2006-2010)

The important projects expected to be implemented in the 7th Five-Year development Plan are summarized in the following table by category and by sector.

Table Investment Plan for Port Sector Development in the Seventh 5-Year Plan

(Unit: RO. Million)

Type	Port	Project	Sector	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
Construction Works	**Sultan Qaboos**	**Cruise Terminal**	Public	0.55					0.55
			Private						0.00
			Sub Total	0.55	0.00	0.00	0.00	0.00	0.55
	Sultan Qaboos	**Outer Harbor (Phase I)**	Public	0.31	8.60	20.82	25.33	5.93	60.99
			Private	0.59	0.29	0.00	0.00	24.94	25.82
			Sub Total	0.90	8.89	20.82	25.33	30.87	86.81
	Salalah	**No.5 and 6 Berths**	Public	49.31	5.08				54.39
			Private	0.00	20.06				20.06
			Sub Total	49.31	25.14	0.00	0.00	0.00	74.46
	Salalah	**2nd Phase**	Public	0.34	12.60	14.22	13.62	1.93	42.72
			Private	0.84	0.02	0.00	1.28	25.81	27.94
			Sub Total	1.18	12.62	14.22	14.89	27.75	70.66
	Sohar	**Container and Bulk Berths**	Public	0.37	16.39	20.43	10.29		47.48
			Private	0.31	0.00	0.00	10.07		10.38
			Sub Total	0.68	16.39	20.43	20.36	0.00	57.86
	Duqm	**1st Phase (Berths & Dock)**	Public	3.12	2.17	18.43	32.70	20.01	76.43
			Private	0.04	0.04	0.00	0.00	2.37	2.44
			Sub Total	3.16	2.21	18.43	32.70	22.38	78.88
	Shinas	**Channel and Berths**	Public	0.08	3.82				3.90
			Private						0.00
			Sub Total	0.08	3.82	0.00	0.00	0.00	3.90
EDI	**Nationwide**	**EDI**	Public	1.00	0.46				1.46
			Private						0.00
			Sub Total	1.00	0.46	0.00	0.00	0.00	1.46
Studies	**Khasab**	**Canal (Feasibility /S)**	Public	0.08					0.08
			Private						0.00
			Sub Total	0.08	0.00	0.00	0.00	0.00	0.08
	Duqm	**2nd Phase (Feasibility/S)**	Public	0.15					0.15
			Private						0.00
			Sub Total	0.15	0.00	0.00	0.00	0.00	0.15
	New Port	**Feasibility Study**	Public	0.20					0.20
			Private						0.00
			Sub Total	0.20	0.00	0.00	0.00	0.00	0.20
	TOTAL	**All Projects Above**	Public	55.52	49.12	73.91	81.94	27.87	288.35
			Private	1.77	20.41	0.00	11.35	53.13	86.65
			Total	57.29	69.53	73.91	93.28	80.99	375.00

Source: JICA Study Team

5 Recommendations

With the view to promoting successful port sector development in the Sultanate of Oman, the JICA Study Team recommends that;

(1) Scale of port development budget should substantially be increased and implementation of projects should be expedited.

The current budget for port development is insufficient to accommodate ever increasing port traffic demand of the country as well as to survive Omani ports through international competition.

Considering recent rapid increase of container traffic and severe competition with the ports in neighboring countries, the amount of port development budget should firstly be increased as proposed in the Report. Although further activation of private sector involvement in port sector development is very important under the situation, the positive input of the public sector budgeting and government leadership in this context is considered indispensable.

(2) Port Planning Committee should be created in MOTC for formulation of long term port development plans.

Through the modernization stage of port development in the Sultanate, no clear comprehensive port development coordinating policy or planning system is observed. Successful port sector development in national level context can only be achieved by well coordinated port planning supported by effective cooperation network of port operation and management. This kind of policy target can never be achieved by the simple collection of individual port improvement schemes.

In order to effectively establish the above policy and plan, creation of a Port Planning Committee (PPC) in MOTC is recommended. The function of PPC is to authorize the long term and short term port development plans by coordinating opinions and interests of related government agencies and relevant port users. Major port authorities are responsible to prepare draft long term and short term port development plan and submit to PPC. Some important / fundamental policies on port development and management matters may also be discussed.

(3) "An Additional New Port Development Plan" should be made during 7th Five Year Plan period to prepare for increasing traffic demand.

Considering rapid increase of port traffic and capacities at three major ports, namely Sultan Qaboos, Salalah and Sohar Ports, there would still be considerable shortage of port capacity if all the industrial projects under planning would be fully completed and operated, and the Omani economy would be further accelerated than expected by such economic effects. Because of their limited rooms for expansion, the serious port capacity shortage may be occurred under the situation, in particular at the hinterland of Sultan Qaboos Port and Sohar Port in the long run.

Therefore, it is recommended that development of a new port should be studied somewhere at the

southern or northern coast about 100 km apart from Sultan Qaboos Port. Since development of such a new port shall require careful port planning works supported by thorough technical and economical survey, appropriate budget for the project planning should be included in the Seventh Five Year Plan and implemented accordingly under technical assistance of well experienced foreign country in this field if necessary.

(4) Regulatory function of the Government need to be reviewed in view point of streamlining of decision making and providing better business environment.

Some of the Government's regulatory function is necessary for ensuring port authority's performance in good order, however, in order not to impose an excessive burden on port authorities; the degree of oversight should be minimal. The government should "monitor" rather than "control," and "advise" rather than "intervene".

For a port to be more competitive with neighboring ports, efforts must focus on expediting the decision making process in the port.

It is recommended, therefore, to review decision making procedure within the port as well as among government agencies concerned, so that the necessary action to strengthen competitive ability of the port can be taken without delay.

(5) Coastal and Adjacent Water Area Management should be strengthened in view point of harmonization of port and maritime activities with utilization of natural coast.

Although, more than 90% of coastal and adjacent water area in Omani territory is unutilized natural coast, and it seems almost unlimited space available for various human activities' requirements, there are many historical facts in the world developed and developing countries, which failed to manage these areas in reserving sound natural and social environment. In this context, utilization of the area should be strictly controlled under well conceived management system.

Presently, coordinating function over the coastal land area belongs to Supreme Committee of Town Planning. MRMEWR overviews environment matters on both land and water area. Any construction of structure in the water requires approval MOTC and/or MOAF in relation to security and safety of port and maritime activities.

The difficulty to establish a conceived management scheme of the area lies in the overlapping the interest and jurisdictions of the Agencies, and any single Agency cannot deal the issue entirely. Considering the above mentioned facts and the heavy requirements for various utilization of the Omani coastal area, it is recommended that the government should seriously consider establishing coastal and water area management scheme based on the comprehensive survey of utilization and environment coastal and adjacent water area.

Since MOTC has a vital interest in the management of the area, and it should positively try to materialize the scheme.

(6) Importance of port in the national economy should be propagated with proactive public relation effort.

Any public projects can not be promoted only by the efforts of public sector. The most important base of successful port development is no doubt fair understanding and positive cooperation of private business circles and majority of individual stakeholders. Various efforts and devices have been tried in many world countries to this end.

In this connection DGPMA should take every possible opportunity to communicate propagate importance of port activities to general public and potential customers and investors not only within the country but also to those of foreign countries.

(7) Present DGPMA staff numbers and levels should be upgraded.

The objectives of DGPMA stipulated in the Royal Decree well covers necessary aspects in respect to the port administration. However, effective number of professional stuff is far from enough to cover the given tasks of the DGPMA. DGPMA should have more formal and informal contact and exchange of views with related Agencies and port authorities in order to enhance better understanding of port activities for port administration and development policy.

As the short term targets, it is recommended to add the staff (say at least about 10 technical staff) in DGPMA for port planning and overseeing the performance of the port authorities. Creation of the Secretariat for recommended PPC in DGPMA is also recommended as a short term target.

Creation of assistant DG for maritime affairs is also recommended for the short term and separation of maritime affaires from DGPMA for the long term reform; to be assigned to attend for the national merchant marine fleet, enforcement of maritime rules relating to international requirement for security and environment, and water area management..

Creation of the national EDI center in MOTC is also recommended as the long term target of MOTC.

(8) Procedures for coordinating natural and social environment with port development project implementation need to be improved.

Successful development of large scale infrastructure always requires full understanding and cooperation of the related stakeholders. Although sparsely utilized coast line has only limited area with critical natural habitat or people actively utilizing, environment assessment for a project at early stage is necessary.

In this connection some projects could have earlier disclosure of the project to the stakeholders. GSO has its own environmental legislation and tradition to communicate with stakeholders. Nevertheless, within the permissible limit of the policy of GSO, it may be recommendable that the disclosure system of the project information on the early planning stage be established for the benefits of both project owners and local stakeholders through positive dialogue and cooperative relation among the parties concerned.

(9) Follow-up Actions for JICA Proposals.

How to tackle and realize the various proposals included in this Report are also vital challenges both for DGPMA and the Study Team. It is recommended that the government should scrutinize the Report once again and apply its proposals in actual stage of administration of DGPMA under close cooperation of the member ministries of the Steering Committee for the Study.

It is also important to select the most suitable subject among them for future cooperation scheme between the Sultanate and the cooperating country. While the official cooperation agreement for the follow-up actions is not confirmed at this stage, it is considered worthwhile to seek possible cooperation schemes, for example, a new port development planning, establishment of "Port Planning Committee", coastal area management policy making, general administrative advisor scheme and so on.

DGPMA and the Study Team should share the view that completion of the Study is not end of cooperation but another start line of possible future cooperation.

SUMMARY REPORT

Preface
Letter of Transmittal
Location of the Study Ports
Photographs on the Study

CONTENTS

13 DRAFT GUIDELINE FOR SEVENTH FIVE-YEAR DEVELOPMENT PLAN OF PORT SECTOR

List of Tables

List of Figures

List of Photos

1 INTRODUCTION

1.1 Introduction

In response to the request from the Government of the Sultanate of Oman, the Government of Japan decided to conduct the National Ports Development Strategy Study in the Sultanate of Oman in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency dispatched a full scale study team (JICA Study Team) to conduct the Study in July 2004 based on the Scope of Work and Minutes of Meetings signed on 22 December 2003 and Minutes of Meeting signed on 12 April 2004.

This Report contains the Team's observations and recommendations following extensive works both in Oman and in Japan up to May 2005. It is hoped that this Report will be useful for people in the port circles as well as those who are engaged in economic and administrative matters at both the national and regional levels.

1.2 Background

The government's current long-term strategies aim both to double per capita income in real terms by 2020 and to decrease dependence on oil exports. Port development is expected to act as an impetus for the development of new industries and to promote private sector development.

There are six major commercial ports in the Sultanate; namely, Sultan Qaboos Port, Salalah Port, Sohar Port, Khasab Port, Duqm Port, and Shinas Port. Although increased importance of the port sector has been recognized for achieving the long-term economic goals of Oman, clear vision on the roles and functions among these ports has not been established. Effective coordination system as well as an integrated and efficient management and operation system of national ports has not yet been formulated.

1.3 Objectives of the Study

The objectives of the Study are:

(1) To formulate the master plan for the strategic development of the national port system up to the target year 2025
①Long-term strategy for the development of ports
②Long-term strategy for administration, management and operation of ports

(2) To formulate the guideline for the Seventh Five-Year Development Plan (2006-2010) of the port sector

(3) To pursue technology transfer to the counterpart personnel in the course of the Study

2 PRESENT SITUATIONS ON ADMINISTRATION, MANAGEMENT AND OPERATION

2.1 National Port System

MOTC has jurisdiction over six common-user ports, Sultan Qaboos Port（PSC）, Salalah Port (SPS), Khasab Port, Sohar Port (SIPC), Shinas Ports and Port Ad Duqm. There are two industry-specific ports under the administration of the Ministry of Oil and Gas ("MOOG"). Sur (Qalhat) is a LNG terminal and Al Fahal is an oil terminal. Both ports are managed and operated by joint venture companies. The Ministry of Agriculture and Fishery (MOAF) administers about 12 fishery harbors. There is no clear jurisdiction in the administration of two private marinas. Royal Oman Navy, Royal Yacht Squadron and Royal Oman Police (ROP) Coast Guard have their own base ports.

2.2 Administration of Ports Affairs

According to the Royal Decrees the objective of DGPMA is outlined as follows:

"To execute laws and regulations and submit proposals for developing and improving the maritime activities, improving the performance of utilization of marine resources as well as to provide plans to develop the commercial sea ports."

Functions of DGPMA with respect to port matters are as follows;

- Executing laws and regulations, convention and treaties with respect to the safety of human life and ships at sea, ensuring sovereignty within Omani territorial waters, and taking all precautionary measures to prevent marine pollution,
- Continuous evaluation of the port projects with a view to modernizing, expanding or creating ports, and supervising the study of aforementioned projects,
- Preparing the drafts and studies concerning expansion, development and modernization of port abilities, and reviewing and examining technical studies and designs for establishing the approved ports, and following up the execution of the works to ensure consistency,
- Evaluation of port operation by the entrusted companies and organizations, examining the agreement made in this regard, and submitting the findings to the authorities concerned,
- Operating of ports and observing the efficiency of performance, and raising the performance level where necessary,
- Establishing plans and policies regarding the development of goods and vessel movements using Omani ports, following up and preparing detailed statistics on ships and goods in Omani ports, analyzing and studying these statistics and extracting the results and indicators of port performances,
- Conducting site survey to compare fees, tariff and wages with designated performances or operation cost,

- Representing the Sultanate at conferences, seminars and in maritime organizations and following up the implementation of the resolution and recommendations.

Within the Directorate, the following departments are attached;

- Maritime Affairs Department,
- Department of Development and Marketing,
- Port Affairs Department, and
- Sohar Port Department.
- Duqm Port Department

DGPMA employs nearly 60 people, of which less than 20 can be said to be professionals in port affairs. And the number of qualified experts may be much less. With such a small staff, it is difficult cover the functions shown above, nor can sufficient manpower be deployed all the departments and divisions in DGPMA port sector. DGPMA personnel inevitably work on a project basis, supported by DG of Finance and Administration Affairs and Legal Department. This working arrangement may be sensible as it allows for flexibility, bearing in mind that number of ports is very limited and demand for work of at each port may occur at different times.

However, shortage of professional staff may make it difficult to carryout routine activities such as inspection of assets and collation of data transmitted from each port, since these works may not be suitable for outsourcing.

2.3 Ports under Jurisdiction of DGPMA

(1) Sultan Qaboos Port

GSO built the port facility in 1974 to become the gateway port in Oman. PSC is registered as the Public Joint Stock Company. The government has constructed infrastructures and PSC has invested in the superstructures and operates the port. The contract expires in November 2006. Financial situation of PSC is healthy and Net Profit Margin was 28% in 2003. Operation efficiency of PSC, however, has room for improvement due to obsolete layout of the terminal, over-aged equipment and insufficient skilled labor. Delayed introduction of IT system is another reason for the low efficiency.

(2) Salalah Port

SPS as the Joint Stock Company in 1998 created the container port of Sealand Line adjacent to Mina Raysut and in 2000 SPS amalgamated Mina Raysut. Net profit Margin of SPS in 2003 registered 19% in 2003. Operation efficiency is comparable to the international standard.

(3) Sohar Port

Situated at the center of Al Batinah Region, SIPC was created as the Joint Stock Company to manage

the industrial port. SIPC manages the port as a landlord and actual management is contracted out to Rotterdam Port of Netherlands and quay and marine operations are sub-let to private companies or tenants of the industrial area.

(4) Khasab Port

Facing Hormuz strait, the port was opened in 1983. Further facilities were initiated in 2002 and a 300m long -10m berth within the harbor basin is almost complete. The port is under direct management of MOTC with direct handling of cargo by boat/cargo owners. Dues collected by the branch office of MOTC are far from sufficient to support management costs.

(5) Duqm Port

Duqm Port is located at the sparsely populated south-east coast of Oman. The port is at present non-functional and a few fishing boats are landed on the beach. Construction plan of a 100,000DWT dock yard with other commercial facilities and fishery berths harbor has been contemplated.

(6) Shinas Port

Located 50km north-west of Sohar, the port was built as a fishery port in 1995 and was converted to a commercial port in 2001. Similar to Khasab Port, MOTC manages the port directly.

3 PRESENT SITUATION OF PORT INFRASTRUCTURE AND PREVIOUS STUDIES

Photo 3-1 Sultan Qaboos Port

Sultan Qaboos Port, built in 1974, is a maritime gateway to the Sultanate with a total of 13 berths. The harbor entrance has a depth of 13m, and a 15 ha container storage area has been secured at Shutaifi Bay through reclamation. Main facilities are summarized as follows;

- Two multi-purpose berths with a length of 458m equipped with two quayside gantry cranes
- Two container berths with a length of 366m and a depth of 10.9m equipped with RTG on 1,236 slots with container yard area of 18,600sq.m.
- Berth No.3 between container berths and multipurpose berths is used for unloading bulk grain and rice with a length of 228m
- Berth No.7 and No.8 are used for conventional cargo and naval vessels with a length of 183m each and alongside depth of 9.6m.

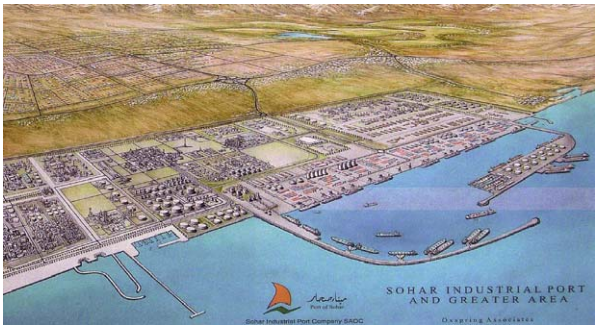
Sultan Qaboos Port handles about 2 million tons of conventional cargo while container throughput registered 265,000 TEUs in 2003 including 114,000 TEUs in transshipment containers. In 1990 JICA recommended the development of the Shutaifi Bay container yard. PSC eventually entrusted the study to Halcrow Group Ltd and Final Report was submitted to PSC in October 2004.

Photo 3-2 Salalah Port

Salalah port is located at the southernmost point of the Sultanate, 1,050 km away from Muscat by road. The Port consists of a conventional port and container terminal. The former was developed in the early 1970s and there are berthing facilities to accommodate bulk carriers, conventional cargo vessels and oil tankers. The total length of berths is 2,116 m.

The container terminal was developed to attract transshipment containers and operation commenced on 1st November 1998. The total area of the container terminal is 54 ha and the total berth length is 1,260 m with water depth of 16m. In 2000 JICA formulated a master plan with the target year of 2020 including an expansion project to add two berths with 18.5m alongside depth which is now in the preparatory stage. In 2003, Salalah Port recorded throughput of 2 million TEUs and is operating at full capacity.

Photo 3-3 Sohar Port



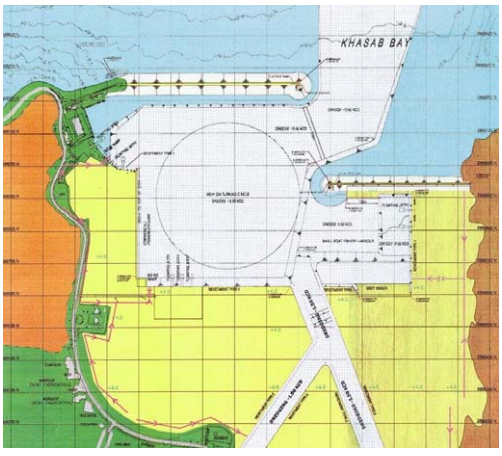
Sohar Port is being developed as a key part of The Sohar Industrial Area Development Project, which contains an industrial port zone stretching 2,000 ha inland area for future industrial expansion of 6,000 ha.

JICA implemented the study on the Port Development for Northern Oman in 1990 and recommended a new port at Sohar. In June 1998 an agreement was signed between Japan Export & Import Bank and the Government of Oman, and construction commenced in July 1999.

Industrial projects in the early stage development include oil refinery projects, polypropylene project, methanol project, urea project, aluminum project. An iron and steel project which will be carried out by Abu-Dhabi based company was recently financed in January 2005.

Port construction works for the initial stage have been completed, including a 3.6 km long north breakwater and a 2,400 m long south breakwater, dredging of approach channel and turning basin up to 16.5m and 16.0m, respectively. Construction of a multi-purpose wharf (700m), government wharf (150m), bulk berths (550m and 260m), and two detached dolphins for liquid cargo have also been completed.

Figure 3-1 Khasab Port



Khasab Port was constructed in 1981 with minimum facilities for the purpose of supplying water and other support requirements to the outlying villages. In 2001, Khasab Port Technical and Economic Feasibility Study was conducted by WS Atkins International & Co. In line with the proposed plan, port expansion works were initiated in 2002 and the general outline of the new port has been completed.

The expansion project includes the north and south breakwaters (900m), a berth with a length of 300m (10m water depth), and a total of five floating jetties to accommodate Dhows and government vessels. A fishing port is also being constructed in the eastern part of the bay. Dredged materials created a reclamation area behind the port with an area of 75ha. Many high speed crafts come from Iran in the morning and leave in the afternoon. A total of 78,466 boats utilized the port in 2003.

Figure 3-2 Duqm Port

Duqm is used by wooden Dhows as an anchorage on a seasonal basis – up to 30 Dhows have been seen at anchor although only 16 are currently registered in the Duqm area. Difficulties are experienced during landing catches and loading fuel as there are presently no berthing facilities.

The GSO expects the port to become a development center in Al Wusta Region. POSFORD HASKONING LTD has conducted the feasibility study on the development of the port.

Major project of the plan is a dry dock for repairing vessels. Dimensions of the proposed facilities in Duqm Port are as follows:

- Commercial berths with a length of 380m and a depth of 10.0m,
- Ship Repair facilities with 800m in length and 10.0m in depth for Max. 100,000DWT,
- Government berths with a total length of 240m and a depth of 8.0m.

Photo 3-4 Shinas Port

Shinas Port is located 50 km north of Sohar and was originally constructed as a fishery port by the Ministry of Agriculture and Fishery in 1995. It was then converted to a commercial port in 2001 by Royal Decree.

The port has the following components:

- North breakwater (370 m) and South breakwater(517 m).
- Depth of the basin is 3 ~ 4 m while 5m at the entrance of the port.
- Floating bridge for vessels and boats. Length is 98 m and width is 4 m.
- Sand coast for docking of boats with the length of 500 m.

As a part of efforts to enhance port functions, Government of Sultanate of Oman has a plan to establish both a veterinary quarantine and a market for sale and unloading of fish while the private sector is encouraged to establish a fish processing and packing factory and cold storage facilities.

4 NATURAL CONDITIONS AND ENGINEERING ASPECTS OF THE STUDY PORTS

4.1 Natural Conditions

The natural conditions around the study ports are summarized as follows.

- The Sultanate of Oman has a coastline of approximate 1,700 km facing the Arabian Gulf, Gulf of Oman and the Arabian Sea. In the middle and southern area of Oman, namely around Duqm Port and Salalah Port, the sea condition becomes severe during the SW monsoon (May to September).
- The land of Oman consists mainly of deserts and rocky mountains, and wadis flow through mountains to the sea only in floods. The annual average rainfall in Muscat is 80 mm and that in Salalah is 108 mm.
- A significant earthquake has never experienced in and around the study ports.
- It is reported that the net volume of littoral drift to the north is 50,000 – 100,000 m^3/ year along Batinah Coast and approximate 500,000 m^3/ year around Duqm.

Table 4.1-1 shows wave conditions at each port. There is a remarkable contradiction in that the wave period in Sultan Qaboos Port is much longer than that in Duqm or Salalah, even though long-period waves come not only to Sultan Qaboos Port but also to the coastal areas such as Duqm and Salalah. Thus, the wave condition in each port should be checked with those in other ports.

Table 4.1-1 Design Waves at Each Port

	Wave Direction	Wave Height	Wave Period	Return Period	Data Source	Remarks
Sultan Qaboos Port	ENE	6.4m	12.0s	100 years	JICA 1990	offshore
Salalah Port	S	7.0m	8.4s	50 years	JICA 2000	Port entrance
Sohar Port	E	5.9m	12.0s	100 years	JICA 2000	offshore
Khasab Port	NNE	3.6m	6.4s	100 years	WA Atkins 1998	Breakwater
Duqm Port	E	5.8m	10.0s	100 years	Haskoning 2004	Breakwater

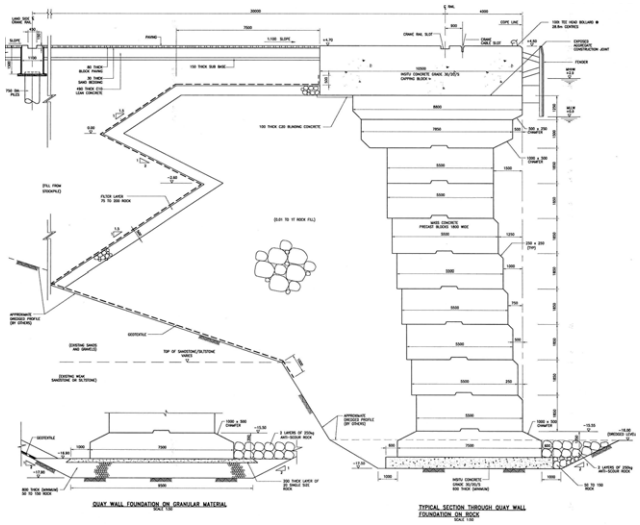
Note1: Wave data at Shinas Port is not available.

Note2: "Remarks" shows the location where wave parameters are set up.

Source: mentioned in Table, arranged by JICA Study Team

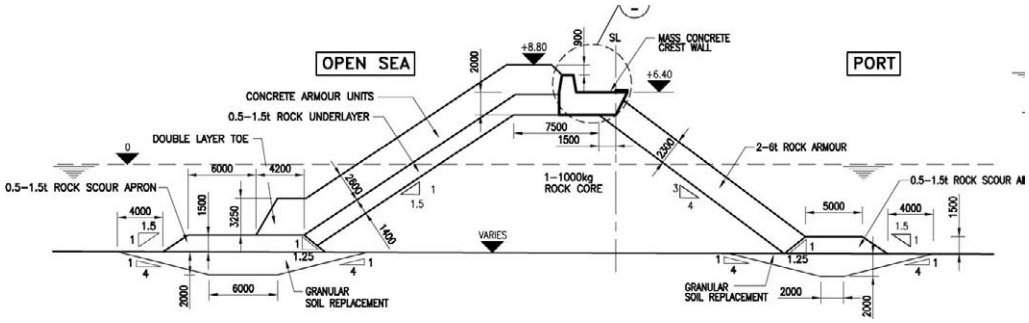
Bearing the above conditions in mind, the pre-cast concrete block type is predominantly applied for the structure of quay wall due to absence of significant earthquake, and the rubble mound type is for that of breakwater because of abundant rock materials. One salient feature is that of pre-cast concrete blocks is piled like a bow. Typical cross sections of quay wall and breakwater are shown in Figures 4.1-1 and 4.1-2, respectively.

Figure 4.1-1 Typical Cross Section of Quay Wall at Sohar Port



Source: MOTC

Figure 4.1-2 Typical Cross Section of Breakwater at Sohar Port



Source: MOTC

4.2 Engineering Aspects of the On-going Infrastructure Development Project

4.2.1 Sultan Qaboos Port

In the Feasibility Study (Halcrow, 2004) for the expansion of Sultan Qaboos Port, a caisson breakwater was selected after an economic comparison with the rubble-mound breakwater with armoured concrete blocks. The height of caisson was designed as over 26.0 m, and its width was as 20.0 m. The stability of a caisson box should be checked again because of its great height and the narrow width of rock foundation, which supports the caisson box.

4.2.2 Salalah Port

A surge problem at Berth No.4 and 30 disturbs port operations for three or four days in a year. It is presumed that the waves reflected by the concrete wall at Berth No.30&31 are synchronized with incident long-period waves, and amplify vessel's motion. Therefore, a careful examination of its ship safety in the port should be conducted applying an appropriate simulation at the detailed design stage

of Berth No.5&6 and extended breakwater.

Another problem is the damage to the existing breakwater. Shore Protection Manual allows to reduce weight of armour concrete blocks in primary cover layer below a depth equivalent to twice of wave height. The design documents of the existing breakwater reveal that armour concrete blocks, which are less than required weight, had been placed above a depth of twice the wave height. That is the reason why sliding of amour blocks has taken place. A consultant named Consulting Engineering Service (CES) proposed that 30 tons of CORE-LOC should be applied for armour concrete block of the new breakwater.

The beach erosion in the northern side of Salalah Port, will be accelerated by the extension of breakwater since construction will obstruct.

4.2.3 Sohar Port

The average weight of a pre-cast concrete block for a quay wall shown in Figure 4.1-1 is 60 tons with the maximum size of 90 tons. In casting concrete to manufacture the pre-cast concrete blocks, its temperature was kept below 32 degree C with some ice being mixed in to control the quality of the concrete.

It is probable that some sedimentation will occur in the access channel because there is a big gap 6.0m at maximum between the original and dredged depth maximum gap of 6.0m. On the other hand, there is a serious problem concerning beach erosion in the northern side of Sohar Port, it is likely that the breakwaters will prevent the drift sand movement from south to north.

4.2.4 Khasab Port

Khasab Port is located at the mouth of the Khasab wadi. Though flow volume is quite small, it will be inevitable that some sedimentation in the port area during floods is inevitable.

4.2.5 Duqm Port

The soil materials, clay or silt, lying around the port are very sticky. The cliff in the eastern of the port can also provide such materials. Therefore, it is necessary to grasp the characteristics of soil materials further at the detailed design stage.

4.2.6 Shinas Port

There is evidence of beach erosion on the northern side of Shinas Port. The scope of the problem is currently being investigated. However, no projects to develop port facilities are scheduled here at this time.

5 SOCIOECONOMIC FRAMEWORK OF THE SULTANATE

In this study, we shall use the socio-economic frameworks such as population and GDP from 2005 to 2030 published in the interim report of the JICA Study Team on Road Network Development in the Sultanate of Oman (hereinafter the JICA Road Team) at the start of our study. The frameworks are to be used as those for the target years of our study.

The target years of the socio-economic framework for the JICA Road Team Study are 2005, 2010, 2015, 2020, 2025 and 2030, which include our target years, i.e. 2025 for the Master Plan. The JICA Road Team adopted the year 2000 as the base year for estimating socio-economic indices.

The basic policy of the JICA Road Team for estimation of the future population is as follows:

i. For estimation of the Omani population, its future sex-age structure is first projected place based on the assumed future fertility rate.

ii. For estimation of the expatriate population, the number of employed persons is obtained first as the supplement labor force for the total labor force demand depending on the future economic growth. The total expatriate population will be obtained by assuming their activity rate.

iii. For estimation of the future economic framework, the petroleum activities (crude oil and natural gas) in future are first projected. Then, the future non-petroleum activities shall be forecast based on the assumed sectoral growth rates.

iv. For estimation of the sectoral labor force demand, the future sectoral labor force demand shall be obtained by applying the sectoral labor productivity.

Estimated populations in 2010, 2015, 2020 and 2025 are shown in Table 5-1.

Table 5-1 Future Populations of Oman in 2010, 2015, 2020 and 2025

Year	2000	2010	2015	2020	2025
Population					
Omanis	1,693,000	2,032,481	2,237,327	2,433,429	2,596,691
Expatriates	623,600	455,215	353,215	353,918	324,821
Total	2,316,600	2,558,805	2,692,542	2,787,347	2,921,512
Year	2000-10	2010-15	2015-20	2020-25	2000-2025
Annual average growth rate (%)					
Omanis	1.84	1.94	1.69	1.31	1.73
Expatriates	-3.10	-2.86	-4.91	-1.70	-2.58
Total	1.00	1.02	0.69	0.94	0.93

Source: Interim Report of the Study on Road Network Development in the Sultanate of Oman, JICA

The JICA Road Team proposed three economic development scenarios, namely Higher Omanization Development (Case 1), New Oman Vision Development (Case 2) and Lower Economic Development (Case 3).

According to the JICA Road Team Interim Report, the future long-term economic frameworks (GDP) were estimated based on the recent trend of sectors and the labor force demands considering the Omani population, oil production and large-scale studies as well as various future government development policies.

After studying the above three cases, assumptions about improvement in unemployment of Omanis in Case 1 seem to be too optimistic and those of Case 3 too pessimistic. Economic growth assumptions of Case 3 are steady but hopeless. Assumptions about rising of labor productivity for construction and service sectors in Case 1 seem to be too high.

Finally Case 2 is selected. Economic growth assumptions of this case are challenging but succeed to the quantitative targets of Oman vision 2020.

The projected future economic indicators of the three scenarios are shown in Table 5-2.

Table 5-2 Future Economic Indicator (GDP) in 2010, 2015, 2020 and 2025

	2000	2010	2015	2020	2025
Higher Omanization Development (optimistic case)					
GDP at market price (million RO)	7,639.2	10,578.7	12,649.2	15,267.4	18,909.6
GDP per capita (RO)	3,297.6	4,202.4	4,814.7	5,610.3	6,746.3
GDP annual growth rate (%)	-	3.31	3.64	3.83	4.37
GDP per capita annual growth rate (%)	-	2.45	2.76	3.11	3.76
Total population (persons)	2,316,600	2,517,289	2,627,175	2,721,308	2,802,973
New Oman Vision Development (strategic case)					
GDP at market price (million RO)	7,639.2	10,578.7	12,649.2	15,267.4	18,909.6
GDP per capita (RO)	3,297.6	4,134.2	4,697.8	5,477.4	6,472.5
GDP annual growth rate (%)	-	3.31	3.64	3.83	4.37
GDP per capita annual growth rate (%)	-	2.29	2.59	3.12	3.40
Total population (persons)	2,316,600	2,558,805	2,692,542	2,787,347	2,921,512
Steady Economic Development (pessimistic case)					
GDP at market price (million RO)	7,639.2	10,248.1	11,438.5	12,988.3	14,918.5
GDP per capita (RO)	3,297.6	4,037.1	4,267.2	4,636.5	5,164.9
GDP annual growth rate (%)	-	2.98	2.22	2.57	2.81
GDP per capita annual growth rate (%)	-	2.04	1.11	1.67	2.18
Total population (persons)	2,316,600	2,538,458	2,680,537	2,801,335	2,888,441

Source: Interim Report of the Study on Road Network Development in the Sultanate of Oman, JICA

6 FUTURE PROSPECTS OF INDUSTRIES AND REGIONS

The current sixth five-year plan states that diversification of the national economy's production base is a basic pillar for the sustainability of development. The plan seeks to achieve its economic diversification related objectives through such measures as development of non-oil exports and natural gas based industries, tourism developments etc. The plan aims at developing the goods and services of Omani origin at an average /annual growth rate of about 16.3%.

1) Objectives of the Industry (Manufacturing) Sector in the Sixth Plan include:

- Achieving an average output growth rate of the Sector, including the Petrochemicals and Oil refining activities, of 11.7%.
- Achieving regional balance in industrial development.

The natural gas based industries are considered one of the basic pillars of the strategy for diversification of the national economy's economic base and increasing its development.

Previous JICA studies recommended development of natural gas based industries such as Ammonia & Urea, Methanol and C2 & downstream, and establishment of Port Salalah Free Zone. Table shown below is the list of possible new industries suggested in the previous JICA studies, those in bold being projects already realized or under way.

Table 6-1 Potential Projects Proposed in 1994 JICA Study

Group 0	Utilizing available mineral, fishery and agricultural resources Pet Food
Group 1	Development of export market based on available resources Gypsum / Marble / **Aggregates**
Group 2	Development of new application of available resources Gypsum Board / Rock Wool
Group 3	Natural gas based industries **Ammonia & Urea / Methanol / C2 & downstream**
Group 4	Import substitution **Glass Bottle**
Group 5	Utilizing location advantage of Oman Snack Food / Printing / Pharmaceutical Formulation / Repacking
Group 6	Utilizing advantage of production condition Knitwear

Source: JICA - Master Plan for Industrial Development in the Sultanate of Oman, December 1994

Another JICA report on the Development of Salalah Port (year 2000) pointed out the importance of industries based on Oman's agricultural, fishery and mineral resources. Following the resources-based industries, the report proposes logistics and redistribution industries, taking advantage of Salalah's

advantageous location, with a proposal to establish a free zone. The report also pointed out the importance of the Tourism industry for Oman. It also proposes formulation of the master plan for promotion of fishery industry based on a comprehensive marine fishery resources study.

2) The sixth plan states the targets of the Mining and Quarrying Sector including the following:

- Achieving an average annual growth rate of about 4.5%.
- Achieving an average annual growth rate of 10% in the Omani workforce in the sector.
- Increasing the inter-relations between mining sector and the manufacturing sector to obtain the highest value-added.
- To assign the leading role in managing and investments in the Minerals sector to the private sector.
- Achieving regional balance in the development of the sector and achieving environmental conservation.

3) The sixth plan's Fisheries industry's target includes:

- Achieving an average annual growth rate of 3.9%.
- Maintenance and development of the marine resources and fisheries.
- Improvement of post fishing activities and trading and achieving an average growth rate in the exports of 11.5%.
- Improving efficiency, handling and marketing system for traditional fishing.
- Improving economic inter-relations between fisheries and other national economy sectors by rectifying manner of commercial fishing with respect to foreign fishing ships.

4) Industrial Development Project at Port Area

A new industrial area integrated in Sohar Port is under development. Encouraging investment and creating employment opportunities, infrastructure development projects such as port project, road project, seawater desalination project, seawater cooling project, sewerage water treatment project have been implemented by the Government.

Industrial projects in the first phased development in Sohar Port include oil refinery project, polypropylene project, methanol project, and urea project, and these projects are expected to start production activities in 2006. Aluminum project, and Ferrochrome and Ferrosilicon project are expected to start operation in 2009.

On the other hand, the Government has been developing Free Zone in Salalah Port. Salalah Free Zone Company was established with 100% of Government share to develop, manage, and operate the Free Zone. Phase I of FZ development will provide customers with approximately 40 ha of distribution, logistics, freight forwarding and manufacturing facilities.

7 FORECAST OF PORT TRAFFIC

7.1 Large Projects-Related Cargo

New large industry related port development at Sohar will generate the major part of industrial cargo for export, mostly natural gas, chemicals, or energy dependent products such as aluminum or steel manufacturing. Nearly half of the 2000ha waterfront lots have already been allotted to industries and the Study Team has incorporated their prospective product volumes into the traffic projection. The remaining areas will also be allotted within the project period and the resultant volume is assumed based upon the acreage allocated and unit production of acreage according to the latest statistics industrial area. Of the total industrial area behind Sohar port of 6,828 ha, occupancy rate was estimated to reach 5% by 2015, 12.5% by 2020 and 25% by 2025.

	2010	2015	2025
Total from New project (base case) (Unit: Ton)	14,989,000	19,935,123	21,948,018

The total cargo includes liquid bulk, dry bulk, break-bulk and containers. Cargo types produced from the industries are assumed according to similar examples in other countries.

Salalah port will also expect to handle approximately one million tons of mineral export.

7.2 International Transshipment Container

Considering the recent high growth rate of container traffic in the Middle East and Omani ports, the trend of total traffic growth of Eastern African ports and Indian sub-continent ports, and world GDP growth rate forecast by regions of IBRD, future container transshipment traffic in Omani major ports are estimated.

(1) Salalah

Transshipment containers represent 99% of Salalah's total container handling volume. As indicated in table7.2-1, Salalah had a 6.8% share of the total container traffic of the three regions mentioned above which increased to 9.3% in 2003. Salalah's share has expanded as SPS has attracted more customers from other competing ports. In the base case, it is assumed that the total share to the region will stay at around 10%.

(2) Sultan Qaboos

Transshipment container volume at Sultan Qaboos port is estimated in a similar manner. Unlike Salalah, transshipment rate at Sultan Qaboos is only 43%. Consequently, the share of transshipment volume at Sultan Qaboos port is very small to the total container throughput in the three regions. As indicated in Table 7.2-2, share of transshipment containers at Qaboos to the total three regions traffic in 2002 was only 0.31% and 0.53% in 2003. This recent slight increase is mainly attributed to the shift of MSC from Salalah in 2003.

Table 7.2-1 Transshipment Forecast for Salalah

Container TEU '000	2002 Actual	2003	2004	2005	2010	2015	2025
Middle East TEU	11,175	13,499	11,772	12,565	17,311	23,369	38,016
Indian Sub-Continent TEU	5,950	6,796	6,804	7,361	10,633	14,889	25,066
East Africa TEU	1,119	1,231	1,157	1,214	1,363	1,476	1,722
Total three regions throughput	18,244	21,526	19,733	21,140	29,307	39,734	64,804
Total transshipment Salalah(1)	1,234	2,001	2,001	2,144	2,972	4,029	6,571
Transshipment share Salalah(1)	6.80%	9.30%	10.14%	10.14%	10.14%	10.14%	10.14%
Transshipment volume		2001	2328	2600	3663	5165	9073
Transshipment share Salalah(2)		9.30%	11.80%	12.30%	12.50%	13%	14%
Transshipment volume		20.01	1835	1966	2726	3695	6027
Transshipment share Salalah(3)		9.30%	9.30%	9.30%	9.30%	9.30%	9.30%

Source: JICA Study Team Note: (1) Base case, (2) High case and (3) Low case.

Table 7.2-2 Transshipment Forecast for Sultan Qaboos Port

Container TEU '000	2002 Actual	2003	2004	2005	2010	2015	2025
Middle East TEU	11,175	13,499	11,772	12,565	17,311	23,369	38,016
Indian Sub-Continent TEU	5,950	6,796	6,804	7,361	10,633	14,889	25,066
East Africa TEU	1,119	1,231	1,157	1,214	1,363	1,476	1,722
Total three regions throughput	18,244	21,526	19,733	21,140	29,307	39,734	64,804
Ttal Containers handled Qaboos	203	265	265	285	395	536	874
Total transshipment Qaboos(1)	56	114	114	123	170	230	376
Transshipment share Qaboos(1)	0.31%	0.53%	0.58%	0.58%	0.58%	0.58%	0.58%
Ttal Containers handled Qaboos	203	265	265	295	443	647	1130
Transshipment volume Qaboos(2)		114.0	114.5	127	190	278	486
Transshipment share Qaboos(2)		0.53%	0.58%	0.60%	0.65%	0.70%	0.75%
Ttal Containers handled Qaboos	203	265	265	261	361	490	799
Transshipment volume Qaboos(3)		114	105	112	155	211	343
Transshipment share Qaboos(3)		0.53%	0.53%	0.53%	0.53%	0.53%	0.53%

Source: JICA Study Team Note: (1) Base case, (2) High case and (3) Low case.

7.3 Indigenous Cargo

The demand forecast for cargo other than transshipment containers are conducted by, estimating the cargo handling volume generated by implementation of new projects including construction of an industrial complex and that of "other" cargo handling.

The base case for break-bulk cargo was forecast based on the average trends in the past cargo volumes assuming that the cargo volume will not drastically decrease in the future to progress of containerization. The High Case was forecast by eliminating the portion of cargo volume which is smaller, and the Low Case by eliminating the cargo volume which is larger.

(1) Sultan Qaboos Port and Salalah Port

As discussed before, Oman's major ports are Qaboos and Salalah Ports, which handle 98% of the cargo volume handled by all ports in Oman.

(2) Sohar Port

Most of the cargo at Sohar Port is categorized as cargo related to new large projects described in the previous section. Sohar Port will not handle overflow cargoes from Sultan Qaboos Port.

(3) Khasab Port

With the first phase development project, the quay can accommodate up to 500,000 tons of cargo annually. Considering present traffic volume and surrounding conditions, high side estimates will still remain within the current capacity available at the port.

(4) Duqm Port

According to the Feasibility Study Report on Duqm Port Development, about 100,000 tons of general cargo imports and 30,000 tons of fish export as well as about 40,000 tons of petroleum products are forecast as potential cargo at Duqm in 2020.

(5) Shinas Port

At Shinas Port, trade with Iranian ports such as livestock and other general cargo will be developed. Assuming Batinah region is the hinterland for Shinas port, the port will easily handle up to about 100,000 tons of general/bulk cargoes including livestock.

7.4 Cruising Passenger

Based on the recent trend, the average annual growth rate of the number of world cruise passengers from 1990 to 2002 was about 8.7%. Considering relatively small sized cruise ships calling Oman at present, average number of passengers per one ship in the future is estimated to be approximately 500. Also reflecting the recent trend of Around the World Cruise, the number of cruise ships calling Oman and number of passengers are forecast as follows (Table 7.4-1).

Table 7.4-1 Forecast Number of Cruise Ships and Passengers Calling Oman

	2005	2010	2020	2025
No' of ships	9~10	10~12	14~19	16~25
Number of Passenger	5,000	6,000	10,000	13,000

Source: JICA Study Team

7.5 Summary of Demand Forecast by Study Port

Number of calling vessels at each major port and cargo volume in the target years of 2010, 2015 and 2025 are summarized as Tables 7.5-1 through Table 7.5-7.

(1) Number of Calling Vessels

Numbers of calling vessels at each major port are estimated in relation to the cargo volume and ship size/type analysis.

Table 7.5-1 Number of Vessels Calling at Qaboos Port in 2010, 2015 and 2025

(Unit: Vessels)

Type of Vessels	2010	2015	2025
General Cargo Vessels	135	135	81
Container Vessels	794	858	911
Ro-ro (for Vehicles)	229	251	412
Dry bulk (for grain)	20	22	28
Sugar Vesels	2	2	2
Vegetable Oil Tankers	26	28	30
Oil/chemical Tankers	36	43	68
Live Stocks	47	47	47
Cement Carriers	46	46	46

Source: JICA Study Team

Table 7.5-2 Number of Vessels Calling at Salalah Port in 2010, 2015 and 2025

(Unit: Vessels)

Type of Vessels	2010	2015	2025
General Cargo Vessels	34	34	26
Container Vessels	2,142	2,830	3,767
Ro-ro (for Vehicles) Vessels	24	25	33
Grain Vessels	6	7	8
Cement Carriers	147	235	235
Mineral Products Vessels	63	63	64
Oil Tankers	17	18	19
Live Stocks	12	12	12

Source: JICA Study Team

Table 7.5-3 Number of Major Calling Vessels at Sohar Port in 2010, 2015 and 2025

(Unit: Vessels)

Type of Vessels	2010	2015	2025
General Cargo Vessels	50	62	62
Container Vessels	139	176	233
Chemical Tankers	89	152	152
Dry Bulk	71	110	110
Liquid Bulk (Products carriers	217	219	219

Source: JICA Study Team

7.6 Summary of Cargo Volume Forecast

Table 7.6-1 Summary of Cargo in 2003

Package Type	Unit	Qaboos	Salalah	Sohar	Khasab	Duqm	Shinas
Break-bulk Cargo	(1,000 ton)				7		
Dry Bulk Cargo	(1,000 ton)	2,472	1,347				
Liquid Bulk Cargo	(1,000 ton)						
Ex / Im Container	(1,000 teu)	151					
Transshipment Container	(1,000 teu)	114	2,001				

Source: JICA Study Team

Table 7.6-2 Summary of Cargo Forecast for 2010

(Base Case)

Package Type	Unit	Qaboos	Salalah	Sohar	Khasab	Duqm	Shinas
Break-bulk Cargo	(1,000 ton)	766	131	854	400	400	100
Dry Bulk Cargo	(1,000 ton)	1,498	2,123	3,775			
Liquid Bulk Cargo	(1,000 ton)	458	214	7,679			
Ex / Im Container	(1,000 teu)	232	64	312			
Transshipment Container	(1,000 teu)	170	2,972	0			

(High Case)

Package Type	Unit	Qaboos	Salalah	Sohar	Khasab	Duqm	Shinas
Break-bulk Cargo	(1,000 ton)	982	130	854	400	400	100
Dry Bulk Cargo	(1,000 ton)	1,629	2,153	3,775			
Liquid Bulk Cargo	(1,000 ton)	492	233	7,679			
Ex / Im Container	(1,000 teu)	300	90	312			
Transshipment Container	(1,000 teu)	190	3,663	0			

(Low Case)

Package Type	Unit	Qaboos	Salalah	Sohar	Khasab	Duqm	Shinas
Break-bulk Cargo	(1,000 ton)	607	106	854	400	400	100
Dry Bulk Cargo	(1,000 ton)	1,423	2,111	3,775			
Liquid Bulk Cargo	(1,000 ton)	438	204	7,679			
Ex / Im Container	(1,000 teu)	176	42	312			
Transshipment Container	(1,000 teu)	155	2,726	0			

Source: JICA Study Team

Table 7.6-3 Summary of Cargo Forecast for 2015

(Base Case)

Package Type	Unit	Qaboos	Salalah	Sohar	Khasab	Duqm	Shinas
Break-bulk Cargo	(1,000 ton)	782	136	1,010	400	400	100
Dry Bulk Cargo	(1,000 ton)	1,706	2,722	6,385			
Liquid Bulk Cargo	(1,000 ton)	557	264	9,308			
Ex / Im Container	(1,000 teu)	312	114	422			
Transshipment Container	(1,000 teu)	230	4,029	0			

(High Case)

Package Type	Unit	Qaboos	Salalah	Sohar	Khasab	Duqm	Shinas
Break-bulk Cargo	(1,000 ton)	1,027	139	1,010	400	400	100
Dry Bulk Cargo	(1,000 ton)	1,871	2,760	6,385			
Liquid Bulk Cargo	(1,000 ton)	610	293	9,308			
Ex / Im Container	(1,000 teu)	414	170	496			
Transshipment Container	(1,000 teu)	278	5,165	0			

(Low Case)

Package Type	Unit	Qaboos	Salalah	Sohar	Khasab	Duqm	Shinas
Break-bulk Cargo	(1,000 ton)	600	105	1,010	400	400	100
Dry Bulk Cargo	(1,000 ton)	1,597	2,706	6,385			
Liquid Bulk Cargo	(1,000 ton)	498	234	9,308			
Ex / Im Container	(1,000 teu)	224	64	438			
Transshipment Container	(1,000 teu)	211	3,695	0			

Source: JICA Study Team

Table 7.6-4 Summary of Cargo Forecast for 2025

(Base Case)

Package Type	Unit	Qaboos	Salalah	Sohar	Khasab	Duqm	Shinas
Break-bulk Cargo	(1,000 ton)	688	120	1,010	400	400	100
Dry Bulk Cargo	(1,000 ton)	1,901	2,755	6,385			
Liquid Bulk Cargo	(1,000 ton)	849	416	9,308			
Ex / Im Container	(1,000 teu)	524	430	672			
Transshipment Container	(1,000 teu)	376	6,571	0			

(High Case)

Package Type	Unit	Qaboos	Salalah	Sohar	Khasab	Duqm	Shinas
Break-bulk Cargo	(1,000 ton)	904	125	1,010	400	400	100
Dry Bulk Cargo	(1,000 ton)	2,146	2,807	6,385			
Liquid Bulk Cargo	(1,000 ton)	962	475	9,308			
Ex / Im Container	(1,000 teu)	766	436	796			
Transshipment Container	(1,000 teu)	486	9,073	0			

(Low Case)

Package Type	Unit	Qaboos	Salalah	Sohar	Khasab	Duqm	Shinas
Break-bulk Cargo	(1,000 ton)	482	90	1,010	400	400	100
Dry Bulk Cargo	(1,000 ton)	1,721	2,726	6,385			
Liquid Bulk Cargo	(1,000 ton)	617	295	9,308			
Ex / Im Container	(1,000 teu)	368	222	546			
Transshipment Container	(1,000 teu)	343	6,027	0			

Source: JICA Study Team

8 BASIC POLICY ON PORT SECTOR DEVELOPMENT

8.1 Basic Direction of Port Reform

8.1.1 Objectives

Basic objectives in developing the port sector are to enhance the national development strategy as stipulated in the basic national policy by activating non-oil sectors and activating private resources. The port sector plays a key role for activation of non-oil sector by attracting industry to areas behind port, facilitating trade and attracting world wide cruise business.

8.1.2 Promotion of Port Utilization

Presently more than half of non-oil foreign trade uses UAE ports rather than Omani ports. Not only do UAE routes entail less overall transport cost and offer better accessibility to the international market, Omani ports have insufficient capacity as well as a relatively poor business environment.

In order to promote use of Omani ports by cargo owners, improvement of the business environment through streamlining administrative procedures and coordination among related Ministries & Agencies is necessary. Sufficient capacity can be secured by increasing operational efficiency as well as by increasing facilities both infrastructures and superstructures. To achieve the former, in particular, management reform and employee training is required.

8.1.3 Development of Adequate Port Facilities

To attract customers to Omani ports, the ports must have sufficient capacity. Improvement of cargo handling efficiency will partly ease present port congestion. Nevertheless, absolute shortage of facilities has to be solved by capital investment for infrastructures as well as superstructures.

Considering the Government’s relatively strong financial position and Oman's advantageous geopolitical position, now is a good opportunity to develop port facilities of a sufficient scale. The port development is required not only for domestic demand but to attract or maintain other traffic which otherwise might go somewhere else.

8.1.4 Activation of Private Resources

Expected capital investment may exceed the financial capacity of GSO. Therefore, introduction of private capital for port sector should be encouraged. However, considering the competitive environment in this region where most port infrastructures have been funded by the government, introduction of private investment to port development may have certain limitations.

8.1.5 Need for Appropriate System to Introduce Private Resources

Introduction of private finance will relieve the financial burden of the government. However, government does not always receive financial advantages in the long run. Therefore, prior to private investment in port infrastructures, MOTC and the port authorities must have sufficient management skills to safeguard the interests of the country.

8.2 Basic Direction of Port Infrastructure Development

8.2.1 Provision of Sufficient Port Capacity

Long term national development strategy up to 2020 strives to double per capita income in real terms. Ports in Oman have to meet the maritime transportation requirements in the target year. Cargo throughput at ports has a high correlation with economic activities, and could become three or four times larger than the present level. Ports should not become obstacles to achieving the national goal but promote the policy by providing sufficient capacities and services for the future needs.

8.2.2 Added Roles and Functions of Ports

Ports can fulfill a variety of roles and functions such as transition points between different transportation modes, industrial sites to minimize transportation costs, and tourist and recreation zones. These roles and functions reflect the economies and societies of the homeland, and will change from one era to another. The government's policy is to become less dependent on oil and develop diversified sources of national income. Therefore, ports in Oman are required to add an industrial function and a tourism promotion function to the existing roles and functions.

8.2.3 Balanced Development of the Nation

Population of the Sultanate is heavily concentrated along the coastal area facing the Gulf of Oman, especially in area stretching from the capital Muscat to the Northwest. The Rest of the national land area is scarcely populated and deserted. Ports should function as development centers by providing competitive maritime transportation means and opportunities for value added activities. Development axis should extend to the Southeast and to the South. It is worth noting that there is no commercial port in Sur and Al Wusta Region, centrally located in the Sultanate, awaits development.

8.2.4 Allocation of Roles and Functions

Gateway function for the nation has resided at Sultan Qaboos Port since the commissioning of this port, and should remain here for the foreseeable future. As Salalah Port is geographically closely located to the international major sea lane in the Sultanate, it should maintain and strengthen the international transshipment hub function. Sohar Port meets requirements for industrial port development and other locations such as Salalah, Sur and Duqm also cover considerable portions of the requirements if not all.

8.2.5 Coordinated Development with Urbanization

Port planning should be well coordinated with city planning, especially in the urbanized areas. Port surrounding area is likely to become a focal point where commercial, recreational and industrial activities take place. Port itself is a mode in the transportation chain, but it usually has multi functions as suggested above. Functions of a specific port also change with time. Therefore port's roles and functions should be periodically reviewed and evaluated.