No.

Japan International Cooperation Agency (JICA)
Ministry of Transport (MINTRANS)

Final Report

The Study on Urgent Rehabilitation Program of Ports in the Republic of Angola

Main Report

August 2006

The Overseas Coastal Area Development Institute of Japan
Ecoh Corporation

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PREFACE

In response to a request from the Government of the Republic of Angola (hereinafter referred to as "GOA"), the Government of Japan decided to conduct a Study on Urgent Rehabilitation Program of Ports in the Republic of Angola and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team to Angola four times between March 2005 and August 2006, which was headed by Dr. Haruo Okada and composed of members from the Overseas Coastal Area Development Institute of Japan (OCDI) and Ecoh Corporation.

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

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

Finally, I wish to express my sincere appreciation to the officials concerned of GOA for their close cooperation extended to the team.

August 2006

Kazuhisa Matsuoka

Vice President

Japan International Cooperation Agency

LETTER OF TRANSMITTAL

August 2006

Mr. Kazuhisa Matsuoka
Vice President
Japan International Cooperation Agency

Dear Mr. Matsuoka,

It is my great pleasure to submit herewith the Final Report of the Study on Urgent Rehabilitation Program of Ports in the Republic of Angola.

The study team composed of the Overseas Coastal Area Development Institute of Japan (OCDI) and Ecoh Corporation conducted surveys in the Republic of Angola over the period between March 2005 and August 2006 according to the contract with the Japan International Cooperation Agency (JICA).

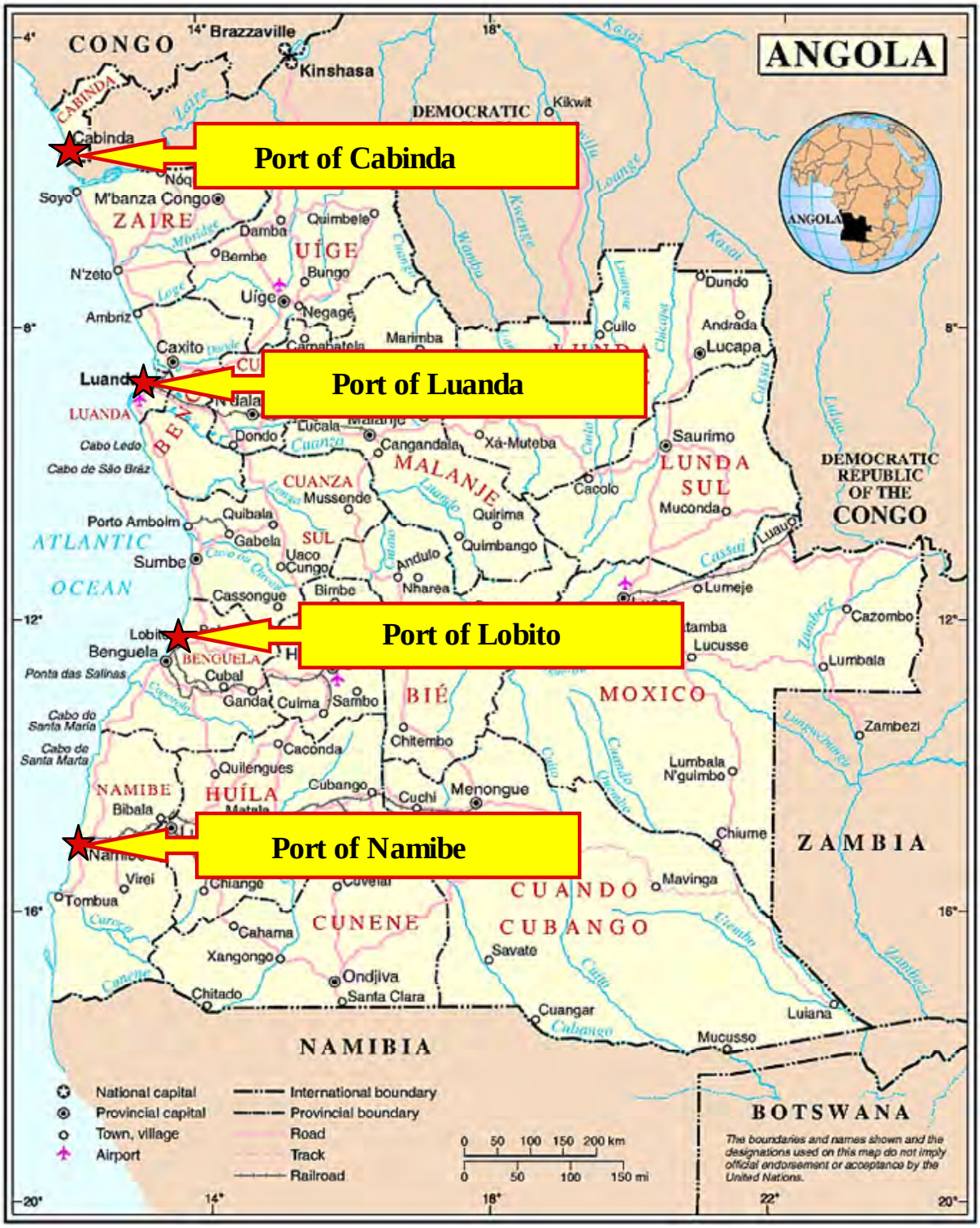
The study team compiled this report, which proposes a short term port rehabilitation plan for 2010, an urgent rehabilitation program of port facilities, and an action program for the improvement of port management and operation, through close consultation with officials of the Government of the Republic of Angola and other authorities concerned.

On behalf of the study team, I would like to express my sincere appreciation to the Government of Angola and other authorities for their diligent cooperation and assistance and for the heartfelt hospitality, which they extended to the study team during our stay in Angola.

I am also very grateful to the Japan International Cooperation Agency, the Ministry of Foreign Affairs of Japan, the Ministry of Land, Infrastructure and Transport of Japan, Mr. Carlos A.S.S.H. de Freitas, the former Japanese honorary consul, and the Embassy of Japan in the Republic of Angola for giving us valuable suggestions and assistance during the course of the study.

Yours faithfully,

Haruo Okada
Team Leader
The Study on Urgent Rehabilitation Program of Ports in the Republic of Angola



Location Map

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ABBREVIATIONS

A	AfDB	African Development Bank
	AIDS	Acquired Immunodeficiency Syndrome
B	B/L	Bill of Lading
C	CBD	Convention on Biological Diversity
	CDL	Chart Datum Level
	CFB	Benguela Railway
	CFL	Luanda Railway
	CFM	Moçamedes Railway
	CFS	Container Freight Station
	CIA	Central Intelligence Agency
	CIF	Cost, Insurance and Freight
	CLC	International Convention on Civil Liability for Oil Pollution Damage
	COD	Chemical Oxygen Demand
D	DBSA	Development Bank of Southern Africa
	DNMMP	National Directorate of Merchant Marine and Transport
	DRC	Democratic Republic of Congo
E	EC	European Community
	ECP	Poverty Reduction Strategy (Estrategia de Combate a Pobreza)
	EDI	Electronic Data Interchange
	EDP	Electronic Data Processing
	EIA	Environmental Impact Assessment
	EIS	Environmental Impact Study
	EMRP	Emergency Multisector Recovery Project
	EPC	Public Corporation of Port of Cabinda
	EPL	Public Corporation of Port of Luanda
	EPLo	Public Corporation of Port of Lobito
	EPN	Public Corporation of Port of Namibe
	EPS	Public Corporation of Port of Soyo
	EU	European Union
F	FAO	Food and Agricultural Organization of the United Nations
	FRP	Fiber Reinforced Plastic
G	GDP	Gross Domestic Product
	GEPE	Cabinet of Study, Planning and Statistics
	GRC	Glass Fiber Reinforced Cement
H	HDI	Human Development Index
	HIV	Human Immunodeficiency Virus

I	IBRD	International Bank for Reconstruction and Development
	ICT	Information and Communication Technology
	IEE	Initial Environmental Examination
	IMF	International Monetary Fund
	IMO	The International Maritime Organization
	INAMET	The National Institute of Meteorology and Geophysics
	INEA	National Institute for Roads in Angola
	ISPS	International Ship and Port Facility Security
	IUCN	International Union for Conservation of Nature and Natural Resources
J	JICA	Japan International Cooperation Agency
K	Kz	Kwanza
L	LDC	Less Developed Country
	LDC/LC	London Dumping Convention (Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter)
	LNG	Liquefied Natural Gas
	LRRD	Link Between Relief, Rehabilitation and Development
M	MDG	Millennium Development Goals
	MHWN	Mean High Water Neap
	MHWS	Mean High Water Spring
	MINADER	Ministry of Agriculture and Rural Development
	MINARS	Ministry of Social Affairs and Reintegration
	MINOP	Ministry of Public Works
	MINPLAN	Ministry of Planning
	MINTRANS	Ministry of Transport
	MINUA	Ministry of Urban Affairs and Environment
	MIREX	Ministry of External Relationship of Angola
	MSL	Mean Sea Level
	MLWN	Mean Low Water Neap
	MLWS	Mean Low Water Spring
	MPLA	The Popular Movement for Liberation of Angola
N	NEPAD	New Partnership for Africa's Development
	NGO	Non-Governmental Organization
O	OCDI	The Overseas Coastal Area Development Institute of Japan
	OCHA	Office for the Coordination of Humanitarian Affairs
	ODA	Official Development Assistance
	OGE	Orçamento Geral do Estado
	OJT	On-the-Job Training
	OPRC	International Convention on Oil Pollution Preparedness, Response and Co-operation

P	PIC	Polymer Impregnated Concrete
	PMAWCA	Port Management Association of West and Central Africa
	PPMRRP	Priority Phase Multisector Rehabilitation and Reconstruction Program
	PRSP	Poverty Reduction Strategy Paper
	PSP	Port Security Plan
S	SADC	Southern African Development Community
	SONANGOL	Angola's National Oil Company
	SPT	Standard Penetration Test
T	TAAG	Angola Airlines
	TEU	Twenty-Foot Equivalent Unit
	TOR	Terms of Reference
U	UN	United Nations
	UNCCD	United Nations Convention to Combat Desertification
	UNCLOS	United Nations Convention on the Law of the Sea
	UNDP	United Nations Development Program
	UNESCO	United Nations Educational, Scientific and Cultural Organization
	UNFCCC	United Nations Framework convention on Climate Change
	UNITA	The Union for the Total Independence of Angola
	UPOE	Unit of Protection for Strategic Objectives
	USAID	U.S. Agency for International Development
W	WB	The World Bank
	WFP	World Food Programme
	WHC	World Heritage Center -UNESCO
	WHO	World Health Organization
	WTO	World Trade Organization

Executive Summary

1) Situation of the Angolan Ports

Following the end of civil war, the cargo throughput of Angolan ports has dramatically increased in accordance with the economic reconstruction. In particular, container throughput grows larger every year; throughput in 2005 is twice recorded in 2001. However, the port facilities are too poor to meet the increasing demand. Since the maintenance of the four ports was not conducted for nearly thirty years, their yard pavements, coping concrete of quay walls, rubber fenders, cargo handling equipment, roads and railroads in the ports, warehouses and other port facilities are in very poor condition. Consequently, the cargo handling operations suffer from low productivity and remain unsafe.

Furthermore, the waiting time of entering ships at the Port of Luanda has risen to 5-7 days due to the cargo increase. Shipping companies levy ship congestion surcharges and emergency terminal congestion surcharges on their freight rates to Luanda. Consequently, the freight rates to Angola are very expensive and the consumer prices of imported commodities are at very high level compared with other developing countries. Since the cargo throughput of major Angolan ports will increase more and more in the near future, it is obvious that ship waiting time will increase and become a bottleneck for the economic recovery of the country. It is indispensable to increase the capacity of major ports by modernizing the port facilities, developing new terminals and improving the productivity of cargo handling.

2) Government's Post-war Restoration

Angolan Government adopted the poverty reduction strategy (Estrategia de Combate a Pobreza) in 2004 as the highest priority national policy. ECP runs from 2003-2007 and aims at both post-war restoration and mid-term economic growth with a budget of $US3.17 billion. The government has also authorized the Priority Phase Multisector Rehabilitation and Reconstruction Program (PPMRRP), which aims at implementing urgent rehabilitation of infrastructure and building effective administration system. PPMRRP includes a component of restoring critical infrastructures in transport networks, in which the rehabilitation and improvement of ports, roads, railways and bridges play a key role, particularly in the Strategic Transport Loop.

3) Cooperation of International Organizations

WB signed the loan agreement on the Emergency Multisector Recovery Project (EMRP) in May 2005. The first phase of EMRP is mainly for the capacity development and the second phase is to improve the water supply, power generation and transport infrastructure in Angola. The amount of assistance by WB is estimated at about US$100 million by the year 2010.

The NEPAD, as a framework for socio-economic development of African countries, has a Short-term Action Plan (STAP) for developing regional infrastructure covering sectors of transport, energy, information and communication, water and sanitation. In the field of ports, STAP includes projects on the rehabilitation of Angolan ports. NEPAD regards corridors from inland countries to sea ports as important international routes. In particular, Lobito corridor, consisting of Benguela Railway and the Port of Lobito, is deemed as an important unique international corridor for the west coast of Africa. The Development Bank of Southern Africa (DBSA), as a funding agency for projects promoted by NEPAD, is now appraising reconstruction projects in Angola inclusive of the Port of Luanda.

4) Natural Conditions of Ports

The study team implemented a field survey on soil conditions and the ground level in the Ports of Lobito and Namibe. Boring survey in the Port of Lobito revealed a clay layer at a depth of 25-31 meters at one point, however, the layer at a depth of 12-20 meters is strong enough as the foundation at three points in the port. The ground level survey revealed that part of the yard area within 80 meters from the quay wall subsided about 4-17 cm, which indicates serious leakage of soil may not have happened in the area. Boring survey in the port of Namibe showed that a strong foundation layer exists at a depth of 8-11 meters at three points in the port. The ground level survey proved that the maximum subsidence in the north area of the wharf was 22 cm and that in the south area was 36 cm, which would not be caused by the leakage of soil from the quay walls.

5) Environmental Conditions

Environmental conditions around the four ports were examined by making reference to past studies. Since no data were found on the water quality of the port waters, the study team implemented a water quality test by a handy method at the time of a flood tide and an ebb tide during September to October 2005. Items of the test were transparency, COD and Coliform Count. In general, COD figures were not so high as to indicate the water pollution by organic matter, however, the deterioration in water quality was found in the waters in the inner part of Lobito Bay and Luanda Bay as both samples showed more than 4 mg/l of COD. Water samples of the same points also showed more than 5,000 MPN/100mg of Coliform Count, a high level of pollution. Water quality figures of the three items showed no pollution in the Port of Cabinda, while the transparency is low owing to the sand drift from the go river. Water quality figures of the Port of Namibe revealed no pollution in the Bay.

6) Deterioration of Port Facilities

The deterioration of port facilities was examined by visual inspection of 528 facilities of the four ports. In case of need for further diagnosis, the deterioration of facilities was checked by portable equipment, namely, 1) nondestructive reinforcing bar detector to measure the thickness of concrete cover and the pitch of reinforcing bar; 2) ultrasonic thickness meter to measure the thickness of steel material; 3) Schmitt hammer to measure the compressive strength of concrete; and 4) phenolphthalein solution to measure the carbonation depth of concrete.

Among 283 facilities examined in the Port of Lobito and 210 facilities in the Port of Namibe, 200 and 167 were found in need for rehabilitation respectively. It was also found that all of the yard pavement, coping concrete of the quay walls and rubber fenders need rehabilitation. Regarding cargo handling equipment, it was found that 35 of 69 facilities need repair or replacement. Among 32 facilities examined in the Port of Cabinda, it was found that 28 facilities were already repaired or replaced recently and only 4 facilities need rehabilitation. Regarding the Port of Luanda, three buoys in the port waters were examined and found to be in need of rehabilitation. While the terminal facilities in the Port of Luanda are not included in the scope of work, most of their facilities seem to have need for rehabilitation judging from visual inspection.

7) Port Rehabilitation Policy

Short-term Port Rehabilitation Plan, which could effectively respond to the urgent demand in the post war restoration period, was proposed with a target year of 2010. In addition, urgent rehabilitation program was identified among the facilities in Short-term Rehabilitation Plan. Port facilities are basically rehabilitated to restore capacities up to the original design level in the Short-term Rehabilitation Plan.

The plan aims at 1) supporting the on-going national restoration projects in the hinterlands; 2) synthesizing the rehabilitation of facilities and the improvement in port management;

3) promoting functional allocations among major ports in connection with road/railroad network in the hinterland; 4) assisting human resources development of major ports; 5) paying special attention to the social and environmental conditions as well as the safety in the ports; and 6) contributing to the economic development of inland countries.

Since the Benguela railway connects DRC, Zambia, Zimbabwe, and Botswana with the Port of Lobito and makes up the Lobito Corridor, the rehabilitation of the port shall be implemented simultaneously with the rehabilitation of the railway. The Port of Namibe suffers from poor facilities so that urgent rehabilitation shall be carried out to improve the safety in cargo handling operations. The Port of Luanda needs urgent rehabilitation of facilities and expansion of container handling capacity in cooperation with private terminal operators. It is important for the Port of Cabinda to build a new wharf with a deeper basin to accommodate larger vessels and to avoid the use of barges.

8) Demand Forecast

World Bank predicted a GDP growth rate of 19.4% per year for Angola by 2008. IMF also predicted GDP growth rates of 14.7% in 2005 and 27.6% in 2006. Taking into account both predictions, this study assumed a GDP growth rate of 19.4% by 2008, as predicted by WB, and supposed that the rate of 19.4% would continue from 2009 to 2010 in a high growth case. Since the Angola 2025, Angolan long-term national economic development plan, predicted a GDP growth rate of 6.4% on a long-term basis, this study supposed that the rate of 19.4% would continue till 2008 and the rate of 6.4% from 2009 to 2010 in a low growth case.

Assuming the correlation between cargo throughput and GDP in Angola, this study forecasted future cargo throughput of Angolan ports. Cargo throughput demand for the Port of Luanda will increase from 3.15 million tons in 2004 to 7.03-8.97 million tons in 2010, 2.2-2.8 times larger than at present. That for the Port of Lobito will increase from 0.87 million tons in 2004 to 2.0-3.1 million tons in 2010, 2.3-3.5 times its current level; and for the Port of Namibe from 361,000 tons in 2004 to 618,000-6,794,000 tons in 2010, 2.4-26.0 times. A high growth case prediction for the Port of Namibe includes the export of iron ores from Sacomar. Cargo throughput of the Port of Cabinda will increase from 81,600 tons to 194,000-294,000 tons in 2010, 2.4-3.1 times its current level. Total cargo throughput of the four ports will increase from 4.4 million tons in 2004 to 9.8-19.1 million tons in 2010, 2.2-4.3 times the current level.

Container cargo throughputs of each port within the above forecasts are also estimated as follows: 1) the Port of Luanda's container cargo throughput will increase from 294,000 TEUs in 2004 to 698,000-906,000 TEUs in 2010, 2.4-3.1 times its current level; 2) the Port of Lobito from 37,000 TEUs in 2004 to 92,000-120,000 TEUs in 2010, 2.5-3.2 times; 3) the Port of Namibe from 8,300 TEUs in 2004 to 19,000-24,000 TEUs in 2010, 2.2-2.9 times; 4) the Port of Cabinda from 4,500 TEUs in 2004 to 12,000- 15,000 TEUs in 1020, 2.7-3.5 times. Total container throughput of the four ports will increase from 341,000 TEUs in 2004 to 807,000-1,048,000 TEUs in 2010, 2.4-3.1 times its current level.

Table 1 Future Container Throughput (1,000 TEU)

Year/Ports		Luanda	Lobito	Namibe	Cabinda	Total
2004		289	33	7	4	334
2010	High Case	906	120	24	16	1,066
	Low Case	698	92	19	12	815

9) Maximum Size of Calling Vessels

The tonnage of largest container vessel calling at the Port of Lobito is 41,500 DWT with a length of 231 meters and a maximum draft of 12 meters. That of the largest bulk vessel is 50,000

DWT with a length of 190 meters and a maximum draft of 11.9 meters. Since the operating draft of a container vessel is usually about 70%-80% of its maximum draft, a container vessel of 40,000 DWT class can enter the Ports of Luanda, Lobito and Namibe. Therefore, facilities of the short-term rehabilitation plan for 2010 are designed to accommodate vessels with the above mentioned size in the Ports of Lobito and Namibe.

10) Short-term Rehabilitation Plan

The assessment of deterioration of port facilities showed that the pavement of yard and apron, rubber fenders and coping concrete of the quay walls are in very poor condition and in need of repair as soon as possible. Demand forecast showed that cargo throughput would increase dramatically in the near future and all facilities should be utilized to meet the demand for 2010. In this connection, it is necessary for the Port of Lobito to implement the rehabilitation all over the North Wharf and the South Wharf, with a total area of 15 ha. Rehabilitation is also necessary for the Port of Namibe over an area of 11 ha in the No.1-3 Wharves. Rehabilitation of terminals in the Port of Luanda is the responsibility of concessionaires, so that the Study proposed the short-term rehabilitation plan for navigational aid facilities in the Port of Luanda.

To increase the productivity of cargo handling operations, the plan proposes the procurement of reach stackers, folk lifts, top lifters and mobile cranes for the Ports of Lobito and Namibe. The plan also proposes the installation of reefer plugs and power generator for the both ports. The procurement of such equipment is the responsibility of concessionaires at the Port of Luanda. It is also urgently necessary to repair roads in the port, demolish unused warehouses and quay cranes, repair water pipe and fuel oil pipe, and install the electronic data interchange system.

Regarding navigational channel and basin, it is recommended to implement a bathymetric survey to confirm the depth of channel and basin, particularly in the Bay of Luanda and along the navigational channel of Cabinda.

The cost of the short-term rehabilitation plan is estimated at US$35 million for the Port of Lobito and US$29 million for the Port of Namibe. The cost of bathymetric survey and repair of buoys is estimated at about US$0.5 million at the Port of Luanda. The clearance of broken ships and dredging in the Port of Luanda are assumed to be carried out after the completion of the short-term rehabilitation plan. Since the rehabilitation of the Port of Cabinda has already been implemented by the port authority, short-term development plan is not proposed for that port.

Preliminary economic analysis and financial analysis showed that FIRR of the short-term rehabilitation plan is 6.7% for the Port of Lobito and 5.1% for the Port of Namibe. Comparing with and without cases, EIRR is estimated at 28% for the Port of Lobito and 24% for the Port of Namibe.

Table 2 Summary of Short-term Rehabilitation Plan

Facilities	Luanda Port	Lobito Port	Namibe Port
Pavement in the yard and apron; Quay wall capping concrete and rubber fenders	By Concessionaires GC*1: 10 ha MPT: 19 ha CT: 14 ha	North and South Wharves: 15 ha、 Quay l: 1,112m	Yard and Berths No.1-3: 11 ha、 Qua: 680m
Procurement of cargo handling equipment	By Concessionaires	Additional one MC*2; two RS, and two FT	Additional two RS, one FT, and one TP
Navigational channel and basin	Bathymetric survey: 15.6km2 Two buoys and one light beacon	To be discussed in the next phase	To be discussed in the next phase
Reefer facilities and power supply	By Concessionaires	Reefer plugs and power generator	Reefer plugs and power generator
Others	By Concessionaires	Water and fuel oil supply pipes;	Inner port road; Yard lighting; Demolition of quay cranes and a warehouse; Water and fuel oil pipes;
Estimated cost	US$ 0.5 million*3	US$ 35 million	US$ 29 million
Preliminary Economic and Financial Analysis		EIRR 28% FIRR 6.7%	EIRR 24% FIRR 5.1%

Note: The Port of Cabinda is not included in the Short-term Development Plan
*1 GC: General Cargo Terminal, MPT: Multi-purpose Terminal, CT: Container Terminal
*2 MC: Mobile Crane, RS: Reach Stacker, FL: Folk Lift, TP: Top Lifter
*3 Rehabilitation of buoys only. In the General Cargo Terminal, Multi-Terminal Co. plans to invest US$19million.

11) Priority for Rehabilitation

Priority of the short-term rehabilitation plan is examined from the viewpoint of 1) the promotion of economic reconstruction of Angola and the development of damaged regions by the civil war, 2) the connection with Priority Phase Multisector Rehabilitation and Reconstruction Program and the multiplier effect of railway and road rehabilitation projects, 3) the extent of deterioration of port facilities and the safety and productivity of cargo handling operations, 4) requirements from port authorities, and 5) the possibility of development of port facilities by the concession to private sectors.

Evaluation of each port was made by judging priority of the above items 1) to 5) using priority A to C. The Ports of Lobito and Namibe were evaluated as 3A, Luanda was as 1A, and Cabinda was as 3B. Since the Ports of Lobito and Namibe have the same score, priority shall be given to the Port of Lobito in case of need for encouraging the economic development of hinterland and land-locked countries, but priority shall be given to the Port of Namibe in case of need for placing emphasis on the deterioration of port facilities and difficulties in attracting private sector participation.

12) Urgent Rehabilitation Program

Urgent rehabilitation area is selected from the short-term rehabilitation plan in view of the effective use of the port and demand for the facilities. Berths No.7/8 and its back yard in the Port of Lobito and Berth No.3A and its back yard in the Port of Namibe are selected for urgent rehabilitation areas. Urgent rehabilitation program of the both areas consists of civil works, procurement of cargo handling equipment and installation of incidental facilities such as reefer container storage, power supply, yard lighting, water and fuel supply, warehouses, silo and other facilities.

The cost of the urgent rehabilitation program is estimated at US$9.9 million for the Port of Lobito and US$9.4 million for the Port of Namibe. Civil works, procurement of cargo handling equipment and installation of incidental facilities are so synergetic that they shall be carried out simultaneously in order to enhance the productivity. Physical construction work will take twelve months. Taking into account that contract procedures and design work will take a considerable period of time, urgent rehabilitation program shall be started as soon as possible.

Table 3 Summary of facilities and Equipment for Urgent Rehabilitation

Facilities and Equipment	Lobito Port	Namibe Port
Pavement in the yard and apron; Coping concrete, car stoppers and rubber fenders on the quay wall	Yard behind the Berth No.8 and part of the Berth No.7 with a total area of 4.6 ha, a length of 240m	Yard behind the Berth No.3A with an area of 2.3 ha, a length of 240m
Cargo handling equipment	Additional one reach stacker and one top lifter	Additional one reach stacker, one mobile crane and one forklift
Reefer facilities and power supply	Reefer plugs and power generator	Reefer plugs and power generator
Others	Water and fuel oil supply pipes	Inner port road 620 m, Yard lighting towers, Removal of warehouse and quay cranes, Water and oil supply pipes
Estimated cost	US$9.9 million	US$9.4 million

13) Emergency Rehabilitation Equipment

Based on the assessment of deterioration of port facilities in the four ports, the Study team discussed emergency measures for improving the present situation with port authorities. For the Port of Luanda, necessary items selected are 1) rehabilitation of navigational aids; 2) removal of sunken ships and wrecks; 3) monitoring of the depth in port waters. For the Port of Lobito, emergency measures discussed are 1) temporary repair of pavement; 2) floating fenders for container berth; 3) installation of steel plates to repair uneven yard surface. For the Port of Namibe, emergency measures are 1) floating fenders for No.3 Berth; 3) installation of steel plates to repair uneven yard surface. Since the Port of Cabinda suffers from sedimentation and needs maintenance dredging, necessary item is the monitoring of water depth along the channel and anchorage.

Taking into account the urgency of items, cost and benefit, procurement of items and necessary time, JICA supplied 20 pieces of steel plate each to the Ports of Namibe in January 2006, and to the Port of Lobito in February 2006. JICA also supplied a set of echo sounders each to the Ports

of Luanda and Cabinda. Demonstration on the use of echo sounder was held in March 2006 at the Port of Luanda with participation of officials from the both ports.

14) Port Management and Operation

Angola has six commercial ports, namely the Ports of Luanda, Lobito, Namibe, Cabinda, Soya and Porto do Amboim, and each port is administered by respective port authorities. Angolan government agencies are divided into two categories, i.e. commercial service department and noncommercial department. The agencies categorized as commercial service have been requested to introduce privatization since 2000, and the port authorities became self-supporting accounting bodies. The Port of Luanda, therefore, adopted privatization of terminal operations and gave the concession of general cargo terminal and multi-purpose terminal to two private operators for 20 years in 2005. Concessionaire of the container terminal has not been decided yet but it will soon be handed over to a private operator. Terminals in the other ports are operated by port authorities on a self-supporting basis, and their privatization is not scheduled at this stage of rehabilitation. Financial situation of the four ports has recently improved owing to the increase of cargo throughput, however, the Port of Cabinda still shows a loss and the Port of Namibe suffers from little allowance for investment. Neither port has sufficient funds for investment and, therefore, needs assistance by the national government or international ODA.

Problems in port management and operation of Angolan ports are 1) low productivity of cargo handling due to poor infrastructure and equipment; 2) slow documentation for gate clearance/billing and long dwelling time of cargo due to the lack of computerization; and 3) low skilled labors due to lack of training opportunities. In case of the concession, problems are in the administrative role of the port authority, i.e. to encourage concessionaires to improve port facilities, cargo handling equipment and productivity. The Port of Luanda has to enhance the ability to coordinate concessionaires and manage the port as a whole.

Average ship waiting time for entering the Port of Luanda increased to 5-7 days in the second half of 2005. Congestion surcharge is levied on the ocean freight rates to Luanda and emergency terminal congestion charge is also levied on the rates. Therefore, container freight rates from Europe to Luanda are 40%-45% higher than the rates to nearby ports, such as the Port of Abidjan or Cape Town. It is urgently requested that the Port of Luanda reduce ship congestion. Together with economic growth in Angola, ship congestion will become worse if necessary rehabilitation and development do not take place in the near future. Ocean freight rates to the Ports of Lobito and Namibe are also high due to low volumes of cargo and low productivity of cargo handling. Ship waiting queue may appear at the Ports of Lobito and Namibe in the near future if port capacity remains at the present level.

To realize the modernization of ports, it is indispensable to invest in port facilities and raise the capability of port management bodies. A concession to private operators is not a solution to cope with increasing demand for cargo throughput. Port authorities shall be responsible for the whole management and operation, demand forecast in the future, master plan of the port development, and security and environmental regulation in their ports. Based on the proper supervision by port authorities, terminal operations shall be handed over to commercial entities. Since private terminal operators in Angola do not have enough funds for port rehabilitation and development, port authorities shall assist them in raising funds or shall develop some port facilities and lease them to private operators. It may be effective for the Ports of Lobito and Namibe to avail themselves of international ODA funds.

15) Capacity Development

Reconstruction of Angola requires capacity development in order for a port authority to act on its own initiative in planning and implementing the projects. Capacity development of port authorities is important in view of three elements of the capacity, namely, administrative institution,

human resources and infrastructure. To improve the capacity of Angolan ports, it is indispensable to enhance the institutional framework and human resources of port management as well as port infrastructure including equipment and computer.

Port authorities shall introduce Electronic Data Processing to improve port management and operation. In particular, cargo information, billing and other documentation require computerization. Efforts shall be made to train port officials and enhance their capacity.

16) Workshops and Seminars

Workshops on recent issues related to world shipping and modern ports were held 17 times during the stay of the Study team with the participation of officials mainly from the Port of Luanda. Seminars on port rehabilitation and modernization were also held in Luanda and Lobito with the participation of managers and officials from MINTRANS, each port authority and relevant organizations.

Moreover, special workshops were held at the Port of Namibe to transfer a container tracking method using a bar code system. Trainees studied a method of container tracking with a bar code attached to a box. Participants learnt how to process data on the location of containers, in and out dates of containers, and other cargo related information on computer. Port authorities are expected to introduce such a container tracking system, which is a prologue to RFID (Radio Frequency Identification).

17) Recommendations

Development of a modern container terminal in the Port of Luanda can reduce port congestion and provide users with prompt container operation services. Development of bulk cargo facilities is also necessary at the Ports of Luanda, Lobito and Namibe to realize lower cost by modern cargo handling system. Since the multi-modal transport will soon become popular in Angola, it is essential to develop a container marshalling yard adjacent to the port to transfer containers to railway or trucks. As the Ports of Luanda, Lobito and Namibe have railway tracks in the ports, it is necessary to change the old railway, which was developed for bulk and break bulk cargoes, into a means compatible with the transport of containers. It is also important to rehabilitate and develop access roads to the ports.

Electronic data processing is essential for improving the efficiency of port operation. Electronic data interchange is also necessary to exchange information on cargoes, arriving and departure date, ship entering and others between customs, port authorities, immigration and other relevant organizations. It will enable the port to offer one stop service for all documentation and provide port users with fast and smooth service.

Ports are basic infrastructure to support the national economy through the efficient handling of imports and exports. The government shall take necessary measures to avoid economic loss resulting from ship congestion, slow cargo operation, and expensive port/terminal charges. It shall be encouraged to introduce private terminal operators in view of providing competitive services and quality. Port authorities shall provide services or develop facilities which private companies cannot provide due to financial reasons.

Problems of Angolan ports will not be solved simply by granting concessions to private companies. The government shall make a plan to cope with ship congestion and have a strategy to modernize the ports and raise funds. Port authorities shall make a demand forecast and authorize a master plan. To realize the plan, port authorities shall coordinate the investment of private operators and funds offered by international aid agencies or donor countries. At the first stage of port development, many developing countries utilized foreign funds, so the government shall have a scheme to develop ports with public private partnership and have the financial means to encourage

port development by port authorities and private companies.

To provide better services at ports, it is necessary to improve not only the infrastructure but also the productivity and efficiency of terminal operations. Capacity development program of the port authorities plays a key role in enhancing individual capability of officials and institutional capability of the port authorities.

At the Port of Luanda, two terminals are operated by concessionaires and container terminal operation will be transferred to a private operator in the near future. However, the port authority of Luanda shall be responsible for ship/terminal congestion as a landlord. The authority shall monitor the operation of terminals and take necessary action to reduce ship waiting queue and congestion surcharges. Moreover, the authority shall propose a strategy to develop a new container terminal which will play a key role in maritime transportation of Angola.

At the Ports of Lobito, Namibe and Cabinda, respective port authorities provide cargo handling services and other port services. In accordance with cargo increase, private companies shall be invited for cargo handling operations or as terminal operators to provide competitive and efficient services. The port authorities shall be responsible for port management as a whole and take necessary action to expand the capacity and reduce ship congestion as a landlord.

A comprehensive study for the master plan of each port will be necessary to give shape to future plans indicated in this report. From the viewpoint of port development, effective use of the port and the protection of the environment, the study shall examine 1) future demand for the port, 2) navigational requirements for channel, basin and quays, 3) proper scheme for the development and operation of terminals, and 4) financial feasibility of the development. It is also important to have a master plan of the transportation network in Angola including roads, railways, airways, shipping routes and ports.

1. Background, Objectives and Outline of the Study

1.1 Background of the Study

Angola's transportation infrastructure was severely damaged by the civil war. The production of agricultural and mineral products which were previously carried from the inland area to ports and exported to various countries has been greatly curtailed due to the shortage of labor, mine fields and the difficulties of transportation. Angola is now recovering from the damage with the aid of international organizations and donor countries including Japan. The lives of people in urban area are heavily dependent on imported commodities. Major ports in Angola are, therefore, playing a vital role in supporting people's daily life and will play an important role to revive the national economy through encouraging exports and imports. However, facilities in Angolan ports are too deteriorated and old-fashioned to cope with modern container transportation. In addition, human resources were greatly depleted during the civil war. It is thus necessary to develop expertise in port management, operations and port engineering.

In light of this situation, the Government of the Republic of Angola has requested the Government of Japan to undertake the study on the urgent rehabilitation program which is comprised of three main items, namely 1) Urgent rehabilitation program of major ports, 2) Long-term port development plan all over the country, and 3) Establishment of an organization and operation system in the ports. In accordance with this request, a preparatory study team was dispatched to the Republic of Angola in October 2004 and signed the Scope of Work, in which it was agreed that the Study would give high priority to formulating an urgent port rehabilitation program of four major ports while the formulation of a long-term port development plan would be beyond the scope of the study. The Study is carried out by the Japan International Cooperation Agency, who has commissioned a study team comprising the Overseas Coastal Area Development Institute of Japan and ECOH Corporation.

1.2 Objectives of the Study

The purpose of the Study is to formulate a rehabilitation plan of the Ports of Luanda, Cabinda, Lobito and Namibe in order to improve old and damaged port facilities. Specific objectives of the study are as follows:

To formulate a short term port rehabilitation plan for 2010;

To formulate an urgent rehabilitation program of port facilities and to select some items for urgent implementation;

To formulate an action program for the improvement of port management and operation; and

To carry out a capacity development program of port management and operation including the privatization of the Port of Luanda.

1.3 Outline of the Study

1.3.1 Scope of the Study

Rehabilitation of ports all over the country is a critical policy issue for the rebuilding of the national economy. After identifying the current condition of each port, the study aims at formulating a short-term development plan as well as an urgent program and action plan for the capacity development.

A capacity development program will be formulated to cope with the privatization of the Port of Luanda, which is one of the most important components for improving the port performance. The Study encompasses the following nine aspects:

Review and analysis of the present condition;

Formulation of basic policy for rehabilitation;

Formulation of short-term rehabilitation plan;

Formulation of urgent rehabilitation program;

Execution of emergency rehabilitation program;

Development of Action Plan for improvement of port management and operation;

Consideration of socio-environmental aspects;

Recommendation for future port development; and

Capacity development and Technology transfer.

1.3.2 Study Schedule

The study consists of four phases in Angola and study reports are prepared for the consideration of counterparts at each phase of the study. The final report will be submitted to the Government of Angola after the official approval of JICA. Figure 1-1 shows the flow chart of the Study.

- First visit to Angola : March - June 2005
- Progress Report : September 2005
- Second visit to Angola : September - December 2005
- Interim Report : January 2006
- Third visit to Angola : February - March 2006
- Draft Final Report : May 2006
- Fourth visit to Angola : June 2006
- Final Report : August 2006

1.3.3 Members of the Study Team

The Study Team is headed by Professor Dr. Haruo Okada and consists of seven members from the Overseas Coastal Area Development Institute of Japan, three members from ECOH Corporation and an interpreter. Members and their specialties are listed hereunder:

Prof. Dr. Haruo Okada	Team Leader	OCDI
Dr. Sumio Suzuki (Dr. Hiroshi Ueda)	Port Development/ Restorative Planning	OCDI
Mr. Junichi Takemura	Demand Forecast/Financial Analysis	OCDI
Mr. Osamu Kunita	Port Management	OCDI
Mr. Ado Yoshimoto	Privatization/Capacity Development	OCDI
Mr. Takeshi Nakano	Cargo Operation/Yard Planning	OCDI
Mr. Fumiaki Kiyosue	Deterioration Survey/Facility Design	OCDI
Mr. Takahisa Aoyama	Natural Conditions	ECOH
Mr. Takeaki Hoshino	Construction/Cost Estimate/Rehabilitation	ECOH
Mr. Kenji Kuroki	Socio-Environmental Considerations	ECOH
Mr. Yuji Osaki (Mr. Yousuke Agari)	Business Coordination	OCDI
Ms. Keiko Fujisawa	Interpreter	OCDI

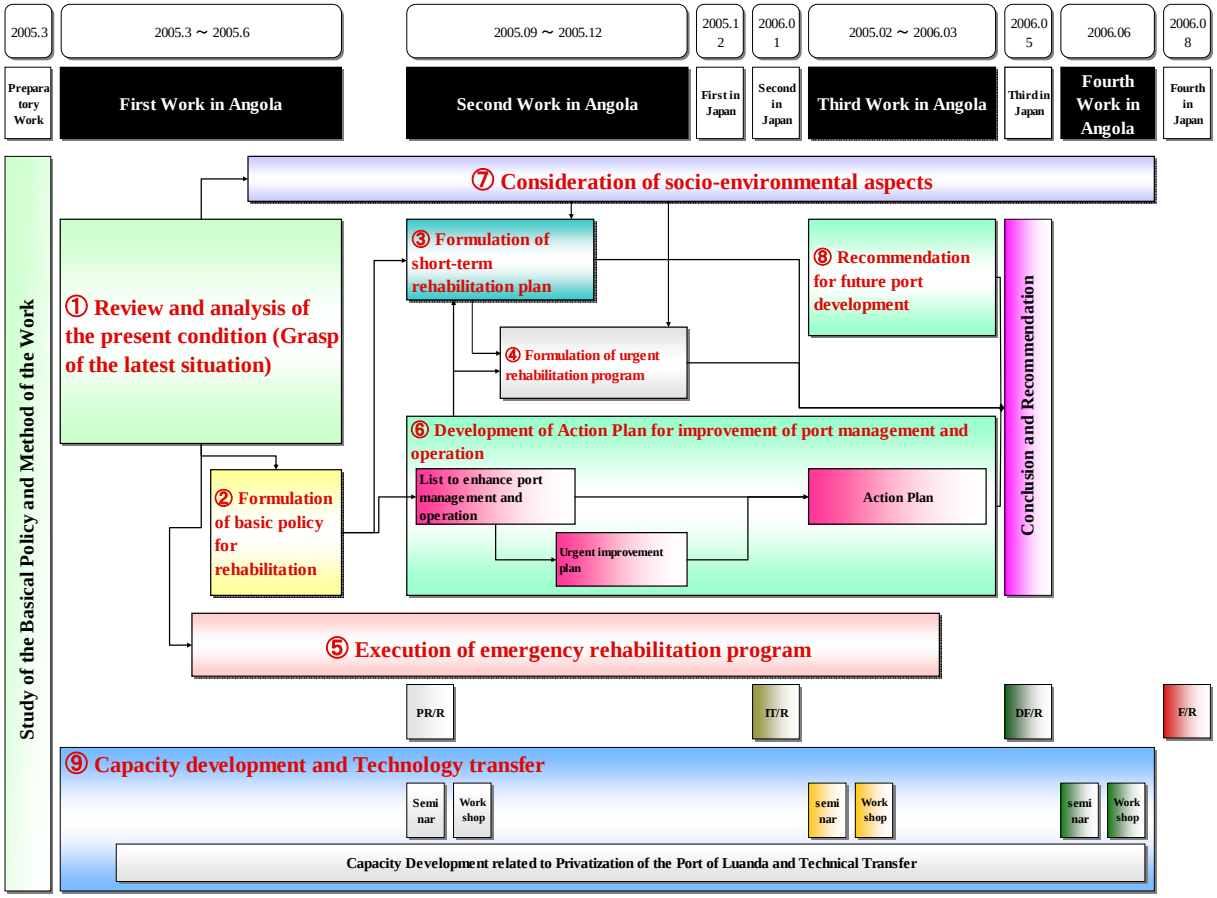


Figure 1-1 Flow Chart of the Study

1.3.4 Counterparts

The Study Team will collaborate with the Angolan counterpart members listed hereunder.

1) Head Office

Dr. Filomeno Silva	National Director of DNMMP
Dr. José Kuvíngwa	National Director of GEPE
Mr. Diur K. Angelo	Chief of Port Department of DNMMP
Mr. Kama Ndungu	Chief of Section of DNMMP
Mr. Tiago Neto	Chief of MM Department of DNMMP
Mr. Miguel Alexandre	Superior Technician of GEPE
Mr. Vita	Superior Technician of DNMMP
Mr. Manuel Lemos	Superior Technician of DNMMP
Mr. José Condesso Carvalho	Technician of DNMMP
Mr. Manuele Narciso	Technician of DNMMP
Mr. Barnabé Janota	Superior Technician of DNMMP
Mr. Victor Carvalho	Assessor of DNMMP

2) Port of Luanda

Mr. Silvio Barros Vinhas	Director General
Mr. Abel Cosme	Commercial Director

Mr. Rui Mendonça	Commercial Director
Mr. Sansão Pitra	Technical Director
Ms. Maria Cândida Gaspar Cohen	Chief of Study Cabinet
Mr. José M. Silva Neto	Economist
Mr. Bengui	Technician
Mr. Natalino	Superior Technician
Mr. Augusto Salvador Sebastião	Chief of Training Department

3) Port of Lobito

Dr. José Carlos Gomes	Director General
Mr. Pedro Joaquim	Deputy Director
Mr. Manuel da Cruz do Rosário	Chief of Maintenance Department
Mr. José André	Vice-Chief of Operation Department
Mr. Faustino Venâncio	Vice-Chief of Cargo Handling
Mr. Vicente F. Albano	Chief of Planning Department
Mr. Cacesto Simão	Chief of Human Resources Department

4) Port of Namibe

Mr. Bento Da Paixao Dos Santos	Director General
Dr. Emídio R. André	Financial Director
Mr. Pedro Kahamba	GRPN Director
Mr. João Mzumbi Mateketa	Chief of Financial Department
Mr. Virgílio Saprinho Tchimbuli	Chief of the Section of Planning
Ms. Conceição F. Benza	Commercial Director
Mr. Luís Gonzaga Kalui	Human Resources Director
Mr. José João Lau	Sub Director of Production Department
Mr. Destino Bunga	Chief of Maintenance Department
Dr. Eduardo Belo	Health Director
Mr. Pompeu António	Environment Director

5) Port of Cabinda

Mr. Osvaldo Lobo do Nascimento	Director General
Mr. Salustiano F. Pinto Ferreira	Chief of Infrastructure Department
Mr. Artur A. F. Carvalho	Port Operation Coordinator
Mr. Joaquim Laurindo Meconda	Chief of Administration and Finance Department
Ms. Arlete Arminda Puti Pongo	Chief of Cabinet of Planning and Statistics

1.4 Relevant Institutions

1.4.1 Steering Committee

Effective implementation of the study requires that 1) the Study Team and executive members of relevant ministries discuss government policies on the reconstruction and development of transport infrastructure, and 2) the Study Team can obtain the assistance of relevant local organizations under each ministry. In this regard, steering committee is organized by executive members of related organizations as follows:

- Cabinet Secretariat (CS)
- Ministry of Transport (MINTRANS)
  Dr. Filomeno H.C.M. da Silva (National Director of DNMMP)
  Dr. José João Kuvíngwa (National Director of GEPE)
  Mr. Diur Kassul Angelo (Chefe de Departamento, MINTRANS-DNMMP)
  Mr. Victor Alexandre de Carvalho (Técnico Superior/Assessor, MINTRANS-DNMMP)
- Ministry of Planning (MINPLAN)
  Mr. Miguel Chaves (Deputy Director of Investments)
- Ministry of Urban Affairs and Environment (MINUA)
  Mr. Manuel Zangui (National Director)
- Ministry of Social Assistance and Re-integration (MINARS)
  Mr. Marcelino Bonzela Franco (Minister's Counsellor)
- Ministry of Public Works (MINOP)
  Mr. Fernando Sebastião Francisco (Chefe de Departamento)

1.4.2 Relevant Ministries and Public Agencies

The Study team visited and had a discussion with following organizations:

- Department of Surface Transport
  Mr. José António de Freitas Neto (National Director)
- Ministry of Commerce
  Mr. Jeremias Amaral dos Santos
- Ministry of Public Works
  Mr. António G. Montenegro F. Duarte
- Ministry of Fishery (Namibe)
- Ministry of Agriculture (Luanda)
  Mr. António Cardoso (Director Nacional, Planeamento e Estatíca, Gabinete de Estudos)
- Instituto Nacional de Meteorologia e Geofisica (INAMET)
- Instituto de Estradas de Angola (INEA)
  Mr. Joaquim D. Malichi (Chefe do Dept. Construção)
- City of Lobito
  Mr. Antonio Bencourt (Administrator)
  Mr. Matias
- City of Namibe
  Mr. Kapapa
- Caminhos De Ferro De Benguela (CFB)
  Mr. Vaz de Carvalho (senior advisor)
- Caminhos De Ferro De Mocamedes (CFM)
  Mr. Paulo (Director)
- Marine Research Center (Lobito)
  Ms. Vanaquissa Jonico (Biologist)
  Mr. Marcelo Calisto (Veterenário)

1.4.3 Stakeholders

Stakeholders Meetings were held three times. Angolan participants are as follows:

1) The First Stakeholders' Meeting

- Date: June 14, 2005, from10:00 hours
- Venue: Meeting room of the Port Authority of Luanda
- Participants of Angolan side

MINTRANS	: Dr. Filomeno H.C.M. da Silva (National Director of DNMMP)
	: Mr. Diur Kassul Angelo (Chief of Port Department),
	: Mr. MeVictor Alexanndre Carvalho (Superior Technician)
Cabinda Port	: Mr. Fernando Lobo (Chief of Luanda office)
	: Mr. Joaquim L. Mecuyda (Chief of Finance)
Luanda Port	: Ms. Maria Cândida Gaspar Cohen (Chief of Study Cabinet)
	: Mr. Natalino Mateus (Environment Department)
Lobito Port	: Mr. Domingo Isata (delegate of Lobito Port)
Namibe Port	: Mr. Pompeu António(Environment Director)
C.F.M	: Mr. JÚlio Joaquim (Director General)
	: Mr. Simão AntónioParticipants:

2) The Second Stakeholders' Meeting

- Date: November 17, 2005, from10:00 hours
- Venue: Meeting room of the Port Authority of Lobito
- Participants of Angolan side

MINTRANS	: Mr. Diur Kassul Angelo (Chief of Port Department)
Lobito Port	: Dr. José Carlos Gomes (Director General)
	: Mr. Manuel da Cruz do Rosário (Chief of Maintenance Department)
	: Mr. Vicente F. Albano (Chief of Planning Department)
	: Mr. Cacesto Simão (Chief of Human Resources Department)
	: Mr. José André (Vice-Chief of Operation Department)
	: Mr. Faustino Venâncio (Vice-Chief of Cargo Handling)
	: Mr. Jeremias Estevâo (Chief of Department)
City of Lobito	: Mr. José Duklario Vaponço (Provincial Director of Transports)
	: Mr. Mario José Ponta (Chief of Environmental Department)
	: Mr. Joaquim Pedro Teixeira(General Secretary)
C.F.B	: Mr. Beweenle Zsao da Htia
Marine Research Center	: Mr. Antonio Buco (Biological Technician)
Capitania	: Mr. Henrique Pedro (Captain)

3) The Third Stakeholders' Meeting

- Date: November 25, 2005, from10:00 hours
- Venue: Meeting room of the Port Authority of Luanda
- Participants of Angolan side

MINTRANS	: Mr. Diur Kassul Angelo (Chief of Port Department)
	: Mr. Mevictor Alexanndre Carvalho (Superior Technician)
MINUA	: Ms. Julieta Posoley (Chief of Environmental Department)
Luanda Port	: Ms. Maria Cândida Gaspar Cohen (Chief of Study Cabinet)
	: Mr. Natalino Mateus (Environment Department)
	: Mr. Sansão Pitra (Technical Director)
Namibe Port	: Mr. Pedro Kahamba (GRPN Director)

Agostinho Neto University

: Ms. Anabela da Graça Alexandre Leitão (Full Professor of Advanced Studies and Research Canter on Chemical and Environmental Engineering)

1.4.4 Relevant International Organizations and Relevant Enterprises

The Study team visited and had a discussion with following international organizations and enterprises:

- The New Partnership for Africa's Development (NEPAD)
- United Nations World Food Program (WFP)
- United Nations Development Programme (UNDP)
- Food and Agriculture Organization of the United Nation (FAO)
- The World Bank (WB) Angola Country Office
- Development Bank of Southern Africa (DBSA)
- AFRIKALINE
- Angonal Shipping Agency
- CHEVRON
- CIMANGOLA
- Construtora
- Manubito, Lda.
- MARESK SEALAND (Luanda, Lobito, Namibe)
- NILE DUTCH AFRICA LINE Lad.
- OREY (Angola) – Comércio e Serviços Lda.
- Sicap, Lda
- SONAMET
- SONANGOL
- SONILS
- Sulservices, LDA.

2. Geographical and Social Situation of Angola

2.1 Topography

Angola's rectangular land extends over a length of 1,300 km east to west and 1,100 km north to south with an area of 1,240,000 km2, which is about 3.3 times as large as Japan. The country is bounded on the north and northeast by the Democratic Republic of the Congo, on the east by Zambia, on the south by Namibia and faces the Atlantic Ocean in the west. Cabinda province, located about 400 km north of Luanda, is an isolated territory of Angola bordered by the Republic of the Congo and the Democratic Republic of the Congo.

Three geographical regions divide Angola. The coastal plain extended along the Atlantic Ocean in the west has a length of 1,600 km and a width of 50 km to 160 km. The inland plateau has a height of 1,200 meters to 1,800 meters and covers two-thirds of the country. The transition zone has a width of 150 km in the north and 30 km in the south and comprises a series of terraces and escarpments.

Along the coast, sandbars are often formed from south to north due to an offshore current, which is called the Benguela Current, and winds blow from south and southeast throughout the year. Photo 2-1 shows a typical coast line between Luanda and Lobito. Huambo Province encompasses mountainous plateau, where the highest peak, Mount Moco, is 2,620 meters above sea level. Most of the country is covered with savanna and grassland. Elevation map of the country is shown in Figure 2-2.

The Cuanza and Cunene are two major rivers draining into the Atlantic Ocean. The Kwango flows into the Congo River in the north, and the Cuando and Okavango rivers flow to the Okavango Delta.

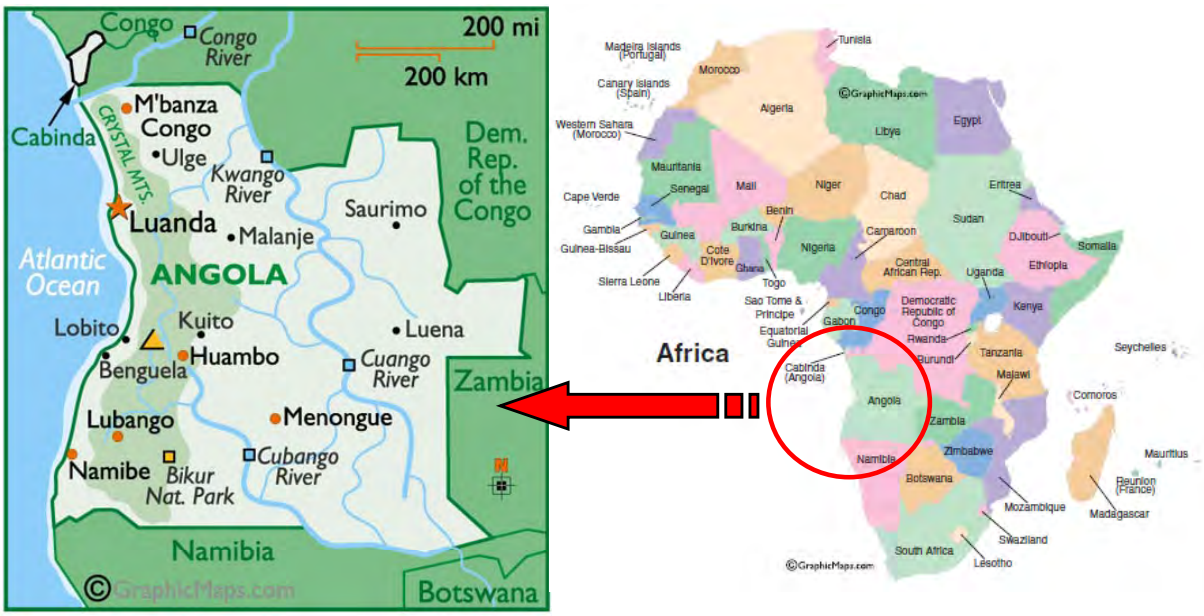
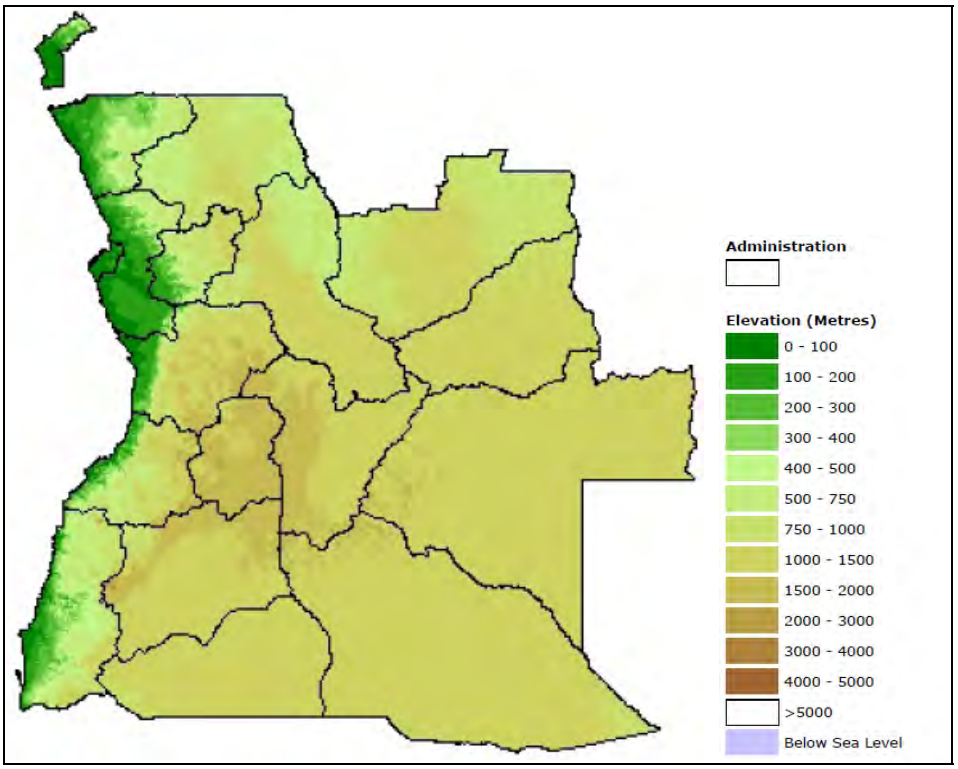


Figure 2-1 Location of Angola

Photo 2-1 Coast Line between Luanda and Lobito



Source: FAO

Figure 2-2 Elevation Map

2.2 Civil War and Reconstruction

2.2.1 Independence and Civil War

Soon after Angola gained the independence from Portugal on 11 November 1975, the three major Angolan parties, namely MPLA (the Popular Movement for the Liberation of Angola), UNITA (the National Union for the Total Independence) and FNLA (the National Front for the Liberation of Angola) came into conflict with each other. Military conflict, supported by foreign countries, was continued throughout the 1980's. A cease-fire agreement was made in 1991, and multiparty elections were held in September 1992 under the peacekeeping operations by UN. While the MPLA won the majority of seats in parliament, UNITA rejected the results as deceitful and resumed the war. The period from 1993 to 1994 was the worst time in the civil war, in which more than 1.5 million people were killed and 3.6 million became refugees.

In 2002, UNITA leader Jonas Savimbi was killed in action and UNITA signed a cease-fire agreement, which brought the 27 year long civil war to an end. Since then, reconstruction of Angola has been urgently desired not only by the country itself but also by the international community.

2.2.2 Reconstruction

Following the civil war, public security and economic stability have been the two main themes of the government as well as sustaining daily lives of returnees. In the short-term development plan for 2003/2004, the government highlighted the need for reducing poverty, consolidating peace and achieving the reconciliation of people. It is, therefore, necessary for the government to implement the reconstruction of social infrastructure, in particular, roads, bridges, railways, and ports. While WFP indicated that the food supply emergency subsided after the end of civil war, the shortage of foodstuffs is still a serious problem in Angola. Food production needs to be strongly encouraged. The government has set the following targets in the national development plan for 2005/2006.

- Consolidating peace and reconciling of people;
- Establishing the basis for sustainable economic development;
- Reconstruction all over the country by the central government;
- Development of human resources;
- Development of harmonized nation;
- Consolidating procedure for democratization

More specifically, the plan targets 1) promoting the repatriation of refugees to their territories, 2) creating employment for returnees, 3) improving social welfare, 4) stabilizing currency and exchange rates, 5) reducing inflation, 6) reconstructing social infrastructure, 7) increasing domestic production of goods and services, 8) encouraging development by the private sector, 9) reforming the administrative, financial and judicial system, 10) reorganizing the education system, 11) reducing the disparity between regions, 12) balancing the allocation of national expenditure, and 13) reforming the mass media.

The government has also set a mid-term development plan for 2009, in which the objective is to consolidate peace and reconciliation all over the country. As part of this plan, the government recently announced a policy for the eradication of poverty and a program for rehabilitation and reconstruction as follows:

ECP: Estrategia de Combate a Pobreza: Supported by UNDP and WB, the government is drawing up ECP, which comprises many urgent projects and activities to reduce poverty. Total amount required for ECP is estimated at about US$ 3.2 billion. Some urgent projects have already been implemented using their own funds.

PPMRRP: Priority Phase Multi-sector Rehabilitation and Reconstruction Program: The first phase of the reconstruction requires the rehabilitation of every kind of infrastructure, not only facilities and services but also the administrative, economic and social systems of the country. PPMRRP was proposed for the first stage of reconstruction, i. e. from 2003 to 2008, and 70% of the budget of ECP would be allocated to PPMRRP projects.

2.3 Social and Economic Conditions

2.3.1 Population and Returnees

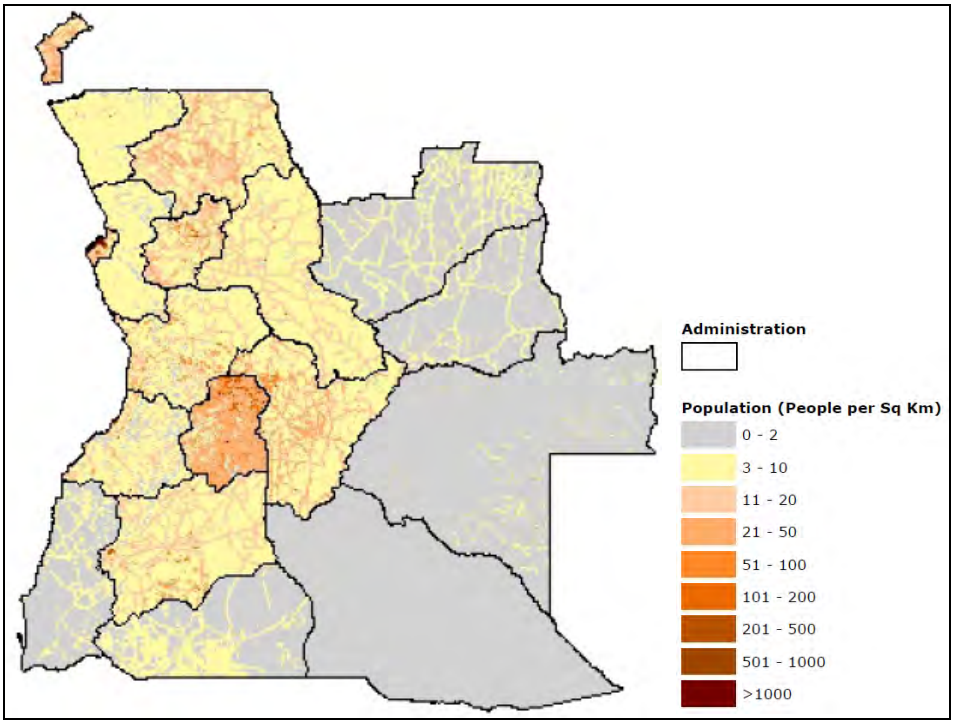
Angola's population[1)] is estimated at 12.1 million in 2005, which is approximately 10 % of Japan's population though the area is 3.3 times larger. Population growth rate[1)] is also estimated at 2.45 % in 2005, which is the same level as the average of central and southern African countries. By

age group, 43.7 % are under 14 years of age, 53.5 % are between 15 and 64 and 2.8 % are over 65 in 2005. Life expectancy[1)] is 38.62 years due to the high infant mortality rate of 185.36 deaths per 1,000 live births, which is the highest rate in the world. Child mortality[2)] under the age of five is 260 deaths per 1,000 lives, which is much higher than an average of 156 deaths among Less-Developed Countries, while it is slightly lower than 284 deaths of Sierra Leone and 262 deaths of Niger.

Note 1) The World Fact Book 2005, CIA, USA
Note 2) UNDP Human Development Report 2005

Largest cities are Luanda, the capital of Angola, with a population of 2,820,000 followed by Lobito (521,000), Huambo (400,000), Benguela (340,000), Malanje (193,000) and Lubango (175,000). There is a tendency for populations to concentrate in urban areas as in other countries and urban population is estimated at about 36 % in 2003. Population density is 9.2 persons per square kilometers, placing Angola in the lowest twenty countries in the world. Distribution of Angolan population is shown in Figure 2-3.

Province-wise populations and number of war-affected returnees are shown in Table 2-1. Provinces of Huambo, Cuando Cubango, Benguela and Cuanza Sul have large numbers of returnees, where Cuando Cubango, Luanda Sul and Moxico have high ratios of returnees in their population. Furthermore, Table 2-2 shows number of corridor-wise returnees and their population. Benguela Corridor and Mocamedes Corridor have higher ratios of returnees than Luanda Corridor and others. There is a rather big difference between the population estimates made by CIA and those by Angolan Health Ministry/UNDP. This chapter refers to the CIA's estimates while Table 2-1 and Table 2-2 indicate the Angolan Health Ministry's estimates as summarized by UNDP.



Source: FAO

Figure 2-3 Population Density

Table 2-1 Population and Returnees by Province

Province	Population (A)	Returnees (B)	B/A(%)
Bengo	322,000	94,530	29.4%
Benguela	1,570,000	496,530	31.6%
Bié	1,016,000	293,385	28.9%
Cabinda	362,000	1,645	0.5%
Cunene	449,000	75,904	16.9%
Huambo	1,148,000	568,365	49.5%
Huíla	1,347,000	188,625	14.0%
Cuando Cubango	514,000	552,045	107.4%
Cuanza Norte	551,000	48,430	8.8%
Cuanza Sul	1,130,273	430,465	38.1%
Luanda	2,935,000	20,920	0.7%
Lunda Norte	479,000	80,020	16.7%
Lunda Sul	277,000	170,540	61.6%
Malanje	824,000	214,685	26.1%
Moxico	442,000	245,150	55.5%
Namibe	253,000	1,705	0.7%
Uíge	1,321,000	203,340	15.4%
Zaire	285,000	42,940	15.1%

Source: Provincial Profiles, 2003, UNDP, based on data of the Ministry of Health

Table 2-2 Population and Returnees by Corridor

Corridor	Population (A)	Returnees (B)	B/A (%)
Luanda Corridor[1)]	4,632,000	378,565	8.2%
Benguela Corridor[2)]	4,453,000	1,773,970	39.8%
Mocamedes Corridor[3)]	2,114,000	742,375	35.1%
Others	4,593,273	834,314	18.2%

Note 1) Luanda, Bengo, Cuanza Norte, Malanje
2) Benguela, Huambo, Bié, Moxico
3) Namibe, Huíla, Cuando Cubango

2.3.2 Economic and Financial Conditions

Angola's economy severely deteriorated during the 27 year long civil war. After the war, the presence of land mines disrupted agricultural production. Number of land mines are estimated at about 5 - 15 million and removal work faces many difficulties. Therefore, people have suffered from famine conditions and heavily depend on food relief from international organizations.

It is deemed that 70 % of the population lives under the poverty level of one dollar per day and more than half of the population is out of work. Since the domestic production was heavily damaged during the war, prices rose by 100-200 % every year. Inflation peaked at 325 % in the year 2000, but has fallen to 43.6 % in 2004. However, returnees, farmers and other many people in Angola suffer from poverty. Inflation rates since 1997 are indicated in Table 2-3.

Table 2-3 Inflation Rates

Year	1997	1998	1999	2000	2001	2002	2003	2004
Annual Rate (%)	221.5	107.4	248.2	325.0	152.6	108.9	98.3	43.6
Index (2000=100)	3.26	6.76	23.53	100.00	252.59	527.63	1046.52	1502.37

Source: IMF

Gross domestic product in 2004 is estimated at US$19.5 billion and GDP per capita is at US$1,305, which is evaluated at US$2,457 on purchasing power parity. IMF estimated the growth rate was 11.2 % in 2004 (see Table 2-4). Angolan Ministry of Finance calculated that GDP of the agricultural sector would account for 8 %, the mining & industrial sector would be 67 %, and the service sector would be 25%, among which oil industry would occupy 51.7 % of total GDP of Angola and represent 90 % of the total value of exports. Eighty five percent of the labor force is engaged in the agricultural sector, while 15 % is assigned to the mining, industry and service sectors in 2003.

Table 2-4 GDP and Growth Rate

Year	1997	1998	1999	2000	2001	2002	2003	2004
GDP (US$ in million)	7,680	6,510	6,150	9,140	8,940	10,790	13,830	19,540
Growth Rate (%)	7.9	6.8	3.2	3.0	3.1	14.4	3.4	11.2
GDP per capita (US$)	627	517	475	685	651	764	950	1,304

Source: IMF

National budget of Angola for 2004 shows that the annual expenditure is US$ 9.6 billion while the annual revenue is US$ 9.0 billion and the cumulative deficit is increasing. However, national account is not so clear as IMF indicates the presence of unidentified expenditure of US$ 4.3 billion between 1997 and 2001. This unidentified expenditure became the biggest obstacle to open funding by IMF. Total amount of the cumulative deficit reached US$ 10.8 billion in 2003 as shown in Table 2-5. Exchange rate of the local currency, Kwanza (Kz, Code AOA), against US dollar has rapidly fallen due to severe inflation and increasing national deficit as shown in Table 2-6.

Table 2-5 Foreign Debt

Year	1998	1999	2000	2001	2002	2003
Foreign Debt (US$ million)	7,900	7,900	8,900	8,100	9,700	10,800

Source: Ministry of Finance, Angola

Table 2-6 Exchange Rates (Annual Average)

Year	1999	2000	2001	2002	2003	2004
Kwanza / US$	2.79	10.04	22.05	43.53	74.60	86.80

Source: Ministry of Finance, Angola

2.3.3 Industry

Angola enjoys rich natural resources and produces petroleum, diamonds, iron ore, phosphates, copper, feldspar, gold, bauxite, uranium and other minerals. Petroleum is, in particular, the most important product in Angola's exports. Oil well in Angola was first developed in 1955. Following the discovery of an important oil field offshore of Cabinda in 1966, revenues from the

export of petroleum exceeded those of coffee in 1973, and then oil exports became to earn most of the national revenue. Angola is now the second largest oil producing country in Africa with a production of 980,000 barrels per day in 2004, making it the world's 19th ranked oil producers. Angola is expected to overtake Nigeria and become the largest oil producer in Africa. Angolan oil field is located offshore of Cabinda and along the coast between Soyo and Quinzau. Table 2-7 shows the production of crude oil and petroleum products.

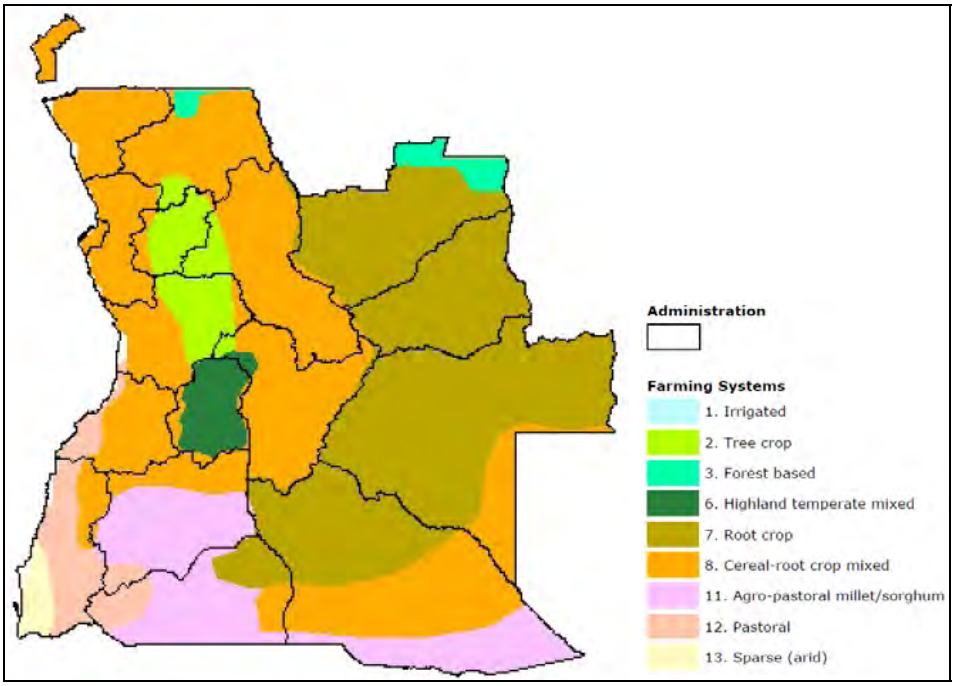
Table 2-7 Production of Crude Oil and Petroleum Products

Year	2003	2004	2005
Crude Oil (barrel)	319,248,000	363,471,626	441,433,677
Petroleum Products (ton)	1,670,022	1,971,759	2,131,268

Diamonds are yielded in the northeast region. While diamonds were Angola's largest export commodity before the end of World War II, coffee exceed those of diamond after the War. Today, however, diamonds are the second largest export product after petroleum. The estimated amount of deposit is the second largest next to South Africa. Angolan diamonds are famous for the high quality and 99 % are exported to Belgium.

Iron ore had been yielded in provinces of Malanje, Uige and Huambo from 1950 to 1975, and annual production reached 6 million tons during 1970-1975. Most of iron ore were exported to Japan, Germany and United Kingdom. Since iron ore mines were destroyed during the civil war, there has been no production since 1975. It is also identified that phosphates deposits of 150 million tons lie under the ground of provinces of Cabinda and Zaire. In addition, southern provinces, Namibe and Huíla, yield marble stones, quartz and granite. Black granite is exported to US and Japan.

While agricultural production is now lower than in the past, main products are sugarcane, cassava, rice, coffee, cacao, sisal, tobacco, cotton, banana and palm oil. Farming systems of Angolan agriculture are shown in Figure 2-4.



Source: FAO

Figure 2-4 Farming Systems in Angola

2.4 Outline of the Related Inland countries

Outlines of DRC, Zambia, Zimbabwe, and Botswana are shown in Table 2-8, Table 2-9, Table 2-10 and Table 2-11. Those countries are located inland from Angola. Many kinds of natural resources are found in those countries, and thus there is potential for sustainable development and growth.

DRC, Zambia are categorized as Least Developed Countries (LDCs) like Angola. In the program of action for the LDCs, adopted by the Third United Nations Conference in Brussels on 20 May 2001, the overarching goal is to make sustainable progress toward halving the proportion of people living in extreme poverty and suffering from hunger by 2015 and promote the sustainable development of the LDCs. And one of the priorities is accelerating LDCs' growth with the aim of enhancing their share in the world trade and global financial and investment flows. The rehabilitation of Angolan ports is indispensable to achieve this goal, considering the importance of Angolan ports as the gateway of those LDCs to world trade.

Botswana, Zambia and Zimbabwe are landlocked developing countries. Land locked developing countries are disadvantaged by high transportation costs due to the geographical constraint of isolation from the sea. In the Almaty Programme of Action adopted by the International Ministerial Conference of Landlocked and Transit Developing countries and Donor Countries and International Financial and Development Institutions on Transit Transport Cooperation in Almaty on 28-29 August 2003, infrastructure development and maintenance including ports are mentioned as priorities. It is also stated that landlocked and transit developing countries should seek cooperative arrangements to improve port facilities and services for transit goods, including the modernization of existing terminals, the establishment of new ones and simplification of procedures where appropriate. Huge amount of commodities were coming from and going to those countries before the civil war. But during the war, transport infrastructure was destroyed and the cargo flow stopped. So the rehabilitation of Angolan ports will contribute to not only the development of Angola but also that of those landlocked countries. Angolan ports are the nearest ones for many regions of the DRC and will play a roll of the gateway port for those regions.

It is also mentioned that the New Partnership for Africa's Development (NEPAD) is an important initiative, as most landlocked and transit developing countries are in this content, and may well boost the creation of sub regional and regional infrastructure. Due to the importance of Angolan Ports Rehabilitation for Southern African region, NEPAD adopted Angolan Ports Rehabilitation Project as one of its Infrastructure Short term Action Plan (STAP) in 2005.

Table 2-8 Outline of Botswana (Source: IMF, CIA)

Population	1,640,115(2005 est.)
Population growth rate	0% (2005 est.)
GDP (purchasing power parity	$15.05 billion (2004 est.)
GDP - real growth rate	4.2% (2005 est.)
GDP - per capita	$4,260 (2005 est.)
GDP - composition by sector	agriculture: 4% industry: 44% (including 36% mining) services: 52% (2003 est.)
Inflation rate (consumer prices)	7% (2004 est.)
Agriculture - products	livestock, sorghum, maize, millet, beans, sunflowers, groundnuts
Industries	diamonds, copper, nickel, salt, soda ash, potash; livestock processing; textiles
Exports	$2.94 billion f.o.b. (2004 est.)
Exports - commodities	diamonds, copper, nickel, soda ash, meat, textiles
Exports - partners	European Free Trade Association (EFTA) 87%, Southern African Customs Union (SACU) 7%, Zimbabwe 4% (2000)
Imports	$2.255 billion f.o.b. (2004 est.)
Imports - commodities	foodstuffs, machinery, electrical goods, transport equipment, textiles, fuel and petroleum products, wood and paper products, metal and metal products
Imports - partners	Southern African Customs Union (SACU) 74%, EFTA 17%, Zimbabwe 4% (2000)

Table 2-9 Outline of DRC (Source: IMF, CIA)

Population	60,085,804 (2005 est.)
Population growth rate	2.98% (2005 est.)
GDP (purchasing power parity	$42.74 billion (2004 est.)
GDP - real growth rate	6.1% (2005 est.)
GDP - per capita	$1190 (2005 est.)
GDP - composition by sector	agriculture: 55% industry: 11% services: 34% (2000 est.)
Inflation rate (consumer prices)	14% (2003 est.)
Agriculture - products	coffee, sugar, palm oil, rubber, tea, quinine, cassava (tapioca), palm oil, bananas, root crops, corn, fruits; wood products
Industries	mining (diamonds, copper, zinc), mineral processing, consumer products (including textiles, footwear, cigarettes, processed foods and beverages), cement, commercial ship repair
Exports	$1.417 billion f.o.b. (2002 est.)
Exports - commodities	diamonds, copper, crude oil, coffee, cobalt
Exports - partners	Belgium 47.8%, Finland 21%, US 10.9%, China 7.6% (2004)
Imports	$933 million f.o.b. (2002 est.)
Imports - commodities	foodstuffs, mining and other machinery, transport equipment, fuels
Imports - partners	South Africa 18.5%, Belgium 15.5%, France 10.8%, Kenya 6.3%, US 6%, Germany 5.8% (2004)

Table 2-10 Outline of Zambia (Source: IMF, CIA)

Population	11261795 (2005 est.)
Population growth rate	2.12% (2005 est.)
GDP (purchasing power parity	$9.409 billion (2004 est.)
GDP - real growth rate	2.5% (2005 est.)
GDP - per capita	$351 (2005 est.)
GDP - composition by sector	agriculture: 14.9% industry: 28.9% services: 56.1% (2004 est.)
Inflation rate (consumer prices)	18.3% (2004 est.)
Agriculture - products	corn, sorghum, rice, peanuts, sunflower seed, vegetables, flowers, tobacco, cotton, sugarcane, cassava (tapioca); cattle, goats, pigs, poultry, milk, eggs, hides; coffee
Industries	copper mining and processing, construction, foodstuffs, beverages, chemicals, textiles, fertilizer, horticulture
Exports	$1.548 billion f.o.b. (2004 est.)
Exports - commodities	copper/cobalt 64%, cobalt, electricity, tobacco, flowers, cotton
Exports - partners	South Africa 25.6%, UK 17%, Switzerland 16%, Tanzania 7.4%, Democratic Republic of the Congo 7%, Zimbabwe 5.8% (2004)
Imports	$1.519 billion f.o.b. (2004 est.)
Imports - commodities	machinery, transportation equipment, petroleum products, electricity, fertilizer; foodstuffs, clothing
Imports - partners	South Africa 46.2%, UK 14.2%, UAE 7.1%, Zimbabwe 6% (2004)

Table 2-11 Outline of Zimbabwe (Source: IMF, CIA)

Population	12,746,990 (2005 est.)
Population growth rate	0.51% (2005 est.)
GDP (purchasing power parity	$24.37 billion (2004 est.)
GDP - real growth rate	-7.1% (2005 est.)
GDP - per capita	$515 (2005 est.)
GDP - composition by sector	agriculture: 18.1% industry: 24.3% services: 57.7% (2004 est.)
Inflation rate (consumer prices)	133% (2004 est.)
Agriculture - products	corn, cotton, tobacco, wheat, coffee, sugarcane, peanuts; sheep, goats, pigs
Industries	mining (coal, gold, platinum, copper, nickel, tin, clay, numerous metallic and nonmetallic ores), steel, wood products, cement, chemicals, fertilizer, clothing and footwear, foodstuffs, beverages
Exports	$1.409 billion f.o.b. (2004 est.)
Exports - commodities	cotton, tobacco, gold, ferroalloys, textiles/clothing
Exports - partners	South Africa 31.5%, Switzerland 7.4%, UK 7.3%, China 6.1%, Germany 4.3% (2004)
Imports	$1.599 billion f.o.b. (2004 est.)
Imports - commodities	machinery and transport equipment, other manufactures, chemicals, fuels
Imports - partners	South Africa 46.9%, Botswana 3.6%, UK 3.4% (2004)

Table 2-12 Cargo Throughput through Dar es Salaam Port from/to Inland Courtiers

Unit: 1000 tons

Country		2000	2001	2002	2003	2004
Tanzania	Imports	1198	1586	1725	1972	2215
	Exports	313	340	370	519	528
	Total	1511	1926	2095	2491	2743
Zambia	Imports	40	28	74	55	124
	Exports	159	139	103	122	169
	Total	199	167	177	177	293
DRC	Imports	66	83	100	114	152
	Exports	5	18	1.4	4	19
	Total	71	101	101.4	118	171
Burundi	Imports	78	72	51	48	80
	Exports	29	17	14	25	13
	Total	107	89	65	73	93
Rwanda	Imports	77	64	40	44	56
	Exports	9	7	8	6	8
	Total	86	71	48	50	64
Malawi	Imports	5	6	66	29	22
	Exports	0.1	0	0.3	0.2	3
	Total	5.1	6	66.3	29.2	25
Uganda	Imports	116	87	24	53	91
	Exports	22	25	16	17	21
	Total	138	112	40	70	112
Other	Imports	7	13	21	12	17
	Exports		79	84	66	102
	Total	7	92	105	78	119
Total	Imports	1587	1938	2101	2327	2757
	Exports	537	626	597	759	863
	Total	2124	2564	2698	3086	3620
Foreign Countries	Imports	389	353	376	355	542
	Exports	224	285	227	240	335
	Total	613	638	603	595	877
Share of Foreign Countries %	Imports	24.5%	18.2%	17.9%	15.3%	19.7%
	Exports	41.7%	45.5%	38.0%	31.6%	38.8%
	Total	28.9%	24.9%	22.3%	19.3%	24.2%

Source: Sector Statistics and Information 2004, the United Republic of Tanzania

Table 2-13 Cargo Throughput through Mombassa Port from/to Inland Countries

Unit: tons

Country		2000	2001	2002	2003	2004
Uganda	Imports	777,442	898,850	1,452,341	1,426,772	1,676,918
	Exports	235,139	215,736	217,475	283,326	216,772
	Total	1,012,581	1,114,586	1,669,816	1,710,098	1,893,690
Tanzania	Imports	50,979	78,699	126,125	134,809	161,466
	Exports	12,343	14,455	19,809	22,160	20,314
	Total	63,322	93,154	145,934	156,969	181,780
Burundi	Imports	3,403	1,783	2,939	24,738	2,791
	Exports	846	538	3,827	4,022	1,414
	Total	4,249	2,321	6,766	28,760	4,205
Rwanda	Imports	91,421	51,130	88,457	66,241	164,021
	Exports	17,866	20,584	20,610	14,581	12,781
	Total	109,287	71,714	109,067	80,822	176,802
Sudan	Imports	46,349	45,030	67,197	92,836	75,129
	Exports	0	44	174	163	308
	Total	46,349	45,074	67,371	92,999	75,437
DRC	Imports	42,250	26,875	57,220	85,575	57,129
	Exports	10,127	49,418	11,299	14,650	14,462
	Total	52,377	76,293	68,519	100,225	71,591
Others	Imports	13,031	50,985	49,248	43,668	49,061
	Exports	8,795	198	121	1,416	135
	Total	21,826	51,183	49,369	45,084	49,196
Total	Imports	1,024,875	1,153,352	1,843,527	1,874,639	2,186,515
	Exports	285,116	300,973	273,315	340,318	266,186
	Total	1,309,991	1,454,325	2,116,842	2,214,957	2,452,701

Source: Mombassa Port

Southern African railway network in early 1970's is shown in Figure 2-5. Most of railways run from port to its inner hinterland. The railways, starting from Dar es Salaam, Beira and Maputo, those cities are located in the east coast, and the railway starting from Lobito in the west coast were well-developed and reached to inland countries such as DRC, Zambia and Zimbabwe.

Figure 2-5 Southern Africa Railroad Network (Peak Period)

Location of Dar Es Salaam port (Tanzania), Maputo port (Mozambique), Lobito port (Angola) and Southern African countries is shown in Figure 2-6. From Figure 2-6, landlocked countries (LLCs) such as Zambia and Botswana are located between Lobito port and southern eastern African ports. There are lots of regions where the Angolan port is the closest port. At this time, Southern Eastern African ports are the only one gateway for those LLCs to world trade. Under such a monopolistic condition, those LLCs are disadvantaged by high transportation costs and low levels of transportation service.

After the rehabilitation of Angolan ports and Railway network, west part of LLCs will be the hinterland of Angolan ports the same as before. If the Angolan side provides better transport services such as lower price or punctual delivery compared with the service provided by eastern ports and corridors, even the eastern part of LLCs can be part of the Angolan hinterland.

For the western area of LLCs, cheaper transportation means to sea ports will be provided and that will enhance competitiveness of export goods in the international market. That also reduces the price of import goods to LLCs and that will contribute to stable national development there.

The eastern area of LLCs is also suffering from high transportation costs due to the monopolistic condition. By adding another route for international trade, east side transport corridor including ports will improve their service to keep their customers. Therefore, international traffic conditions will be improved even in eastern area of LLCs as a result of new competition. In fact, the study team was told by the NEPAD Secretariat, the improvement of entire southern African transport

network was expected as a result of the rehabilitation of Angolan ports.

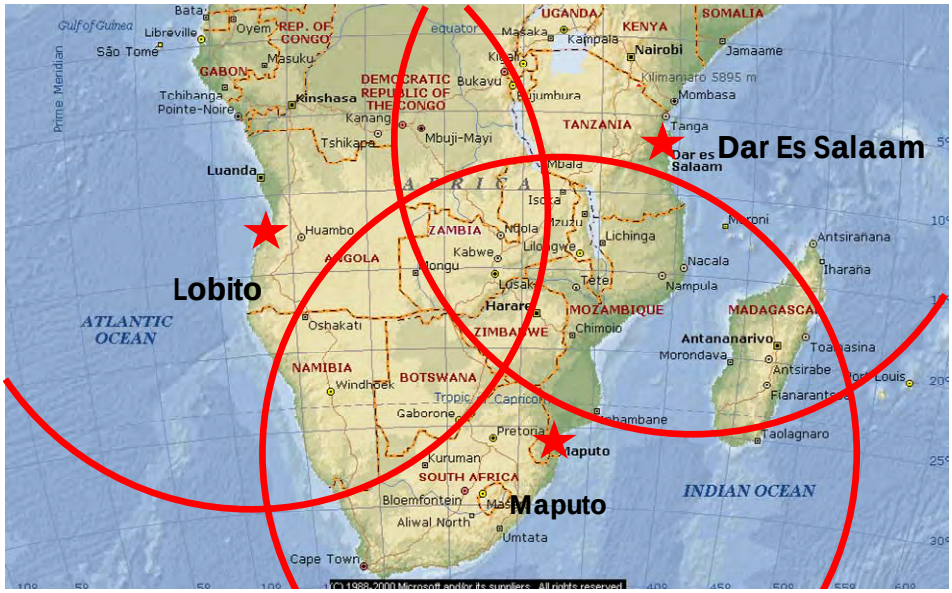


Figure 2-6 Southern African Countries and Ports

The routes between southern African landlocked countries and Europe, Northern America and Southern America using east or west coast of southern African ports are shown in Figure 2-7. The routes by way of western ports, are shown with red arrows while those through eastern ports and Cape Town are shown with blue arrows.

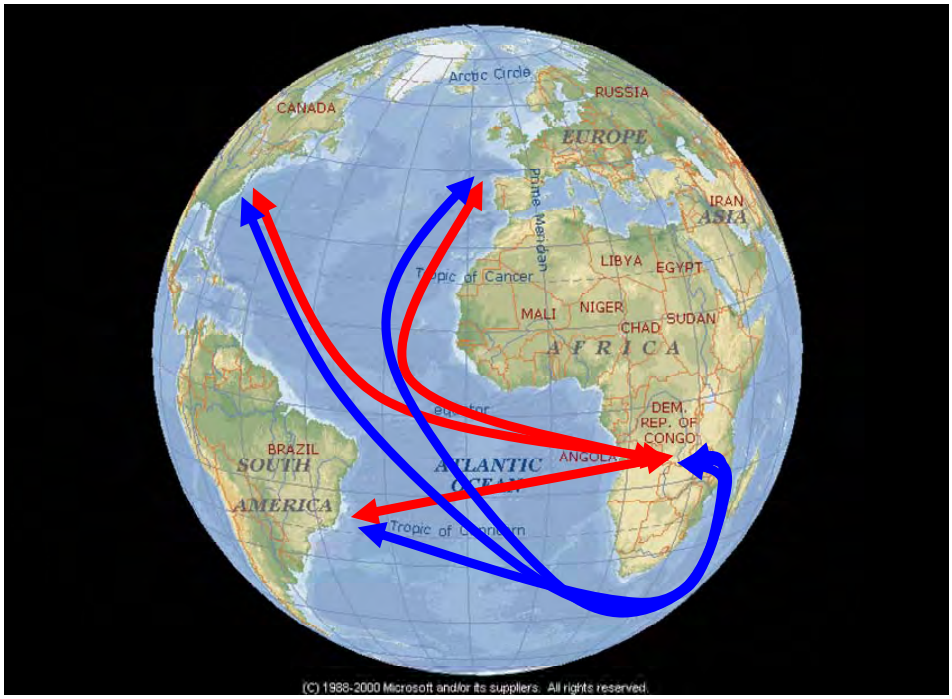


Figure 2-7 Routes from Southern Africa to Europe, North and South America

3. Government's Post-war Restoration Policy and Donor's Activities

3.1 Angolan Government's Post-war Restoration Policy

3.1.1 Poverty Reduction Strategy

Angolan Government approved a poverty reduction strategy, Estrategia de Combate a Pobreza (ECP), on January 2004 as the highest priority national policy. ECP runs from 2003-2007 and aims at both post-war restoration and mid-term economic growth with a budget of $US3.17 billion. Table 3-1 shows 10 main project components and respective budget of ECP.

Table 3-1 Main Projects and Budget of ECP

Project Components	Budget ($US Million)	Share (%)
1. Resettlement	350	12.3
2. De-mining	285	10.0
3. Food Security and Rural Development	70	2.5
4. HIV/AIDS	71	2.5
5. Education	450	15.8
6. Health	158	5.5
7. Rehabilitation of Basic Infrastructures	1,038	36.4
8. Employment and Training	45	1.6
9. Governance	325	11.4
10. Economic Management	60	2.1
Total	2,852 (*)	100

(*)Base cost of ECP amounts to $US 2.85 billion and total cost including contingencies is $US 3.17billion.
(Source) UNDP Economic Report 2002-2004

Of the total budget of $US 3.17 billion, approximately $US 2.28 billion or 72% of the total budget is to be financed by local budget while the remaining $US 0.89 billion or 28% of the budget is to be financed by foreign fund sources. The Angolan Government has already initiated a part of the prioritized project components using local funds. The Government has been consulting with international institutions and relevant donor countries to secure cooperation and fund sources. To that end, a Donors' Conference is being arranged in September 2005, although the schedule remains unfixed pending the outcome of the policy dialogue between IMF and the Government.

3.1.2 Priority Phase Multisector Rehabilitation and Reconstruction Program (PPMRRP)

The Angolan Government has authorized various post-war restoration projects of which several projects are closely coordinated with ECP. Among these projects, the most typical project is the "Priority Phase Multisector Rehabilitation and Reconstruction Program (PPMRRP)". PPMRRP is set as the first phase project of the "Rehabilitation and Reconstruction Program" and runs from 2003-2007.

The objective of PPMRRP is to implement urgent and effective multisectoral comprehensive projects which contribute to nationwide post-war restoration programs. Project components of PPMRRP include: (i) delivering of essential social and public services, (ii) promoting agriculture and production, and (iii) restoring critical infrastructures in transport networks, electricity and water supplies etc.

Table 3-2 Project Components and Budget of PPMRRP

Project Component	Budget ($USM.)	Shear(%)
A. Social Sectors and Agriculture	**792**	**40**
1. Agriculture	74	4
2. Health Services	174	9
3. Education	176	9
4. Rural Development	368	18
B. Priority Rehabilitation of Main Infrastructure	**1,125**	**56**
1. Transport	122	6
2. Roads/Bridges	447	22
3. Electricity	255	13
4. Water Supplies	199	10
5. Urban Infrastructure and Services	102	5
C. Capacity Building and Institutional Strengthening	**29**	**1**
D. Project Management & Preparation of 2nd Phase	**51**	**3**
Total	**1,997**	**100**

(Source) Project Information Document, IBRD, 30 Nov. 2004

The budget of PPMRRP amounts to $US 2.0 billion or 70% of the total ECP budget. However, only a limited portion of the PPMRRP budget has been endorsed by concerned organizations at this stage. Among other donors, the World Bank, Angolan Government and European countries have pledged their assistance with shares of 10%, 30% and 3% of the total PPMRRP budget, respectively. Other donors have not yet reached a final decision. Table 3-2 shows the project components and respective budget of PPMRRP.

Transport sector has set up the "Strategic Transport Loop", which consist of Luanda, Uige, Malange, Saurimo, Luena, Kuito, Huambo, Benguela, and Lobito. Ports, roads, railways and bridges included in the Strategic Loop are to be urgently rehabilitated and reconstructed under PPMRRP (see Figure 3-1).

3.2 Cooperation of International Organizations

The United Nations adopted the Millennium Declaration on September 2000, which defined the goals of international society in the 21st century specifying African Needs as one of the major issues to be considered. And Millennium Development Goals (MDGs) have been established combining the Declaration and several international development goals agreed in the main UN committees held in the 90's. Cooperation policies of international organizations towards Angolan post-war restoration basically comply with MDGs.

Angola has been able to sustain a peaceful environment since the cease-fire agreement in 2002. Reflecting such positive change, the Angolan government has given the highest priority to the above-mentioned nationwide restoration programs. In line with the government's policy, international organizations and donor countries have shifted their focus of assistance from basic human needs to mid-term economic growth.

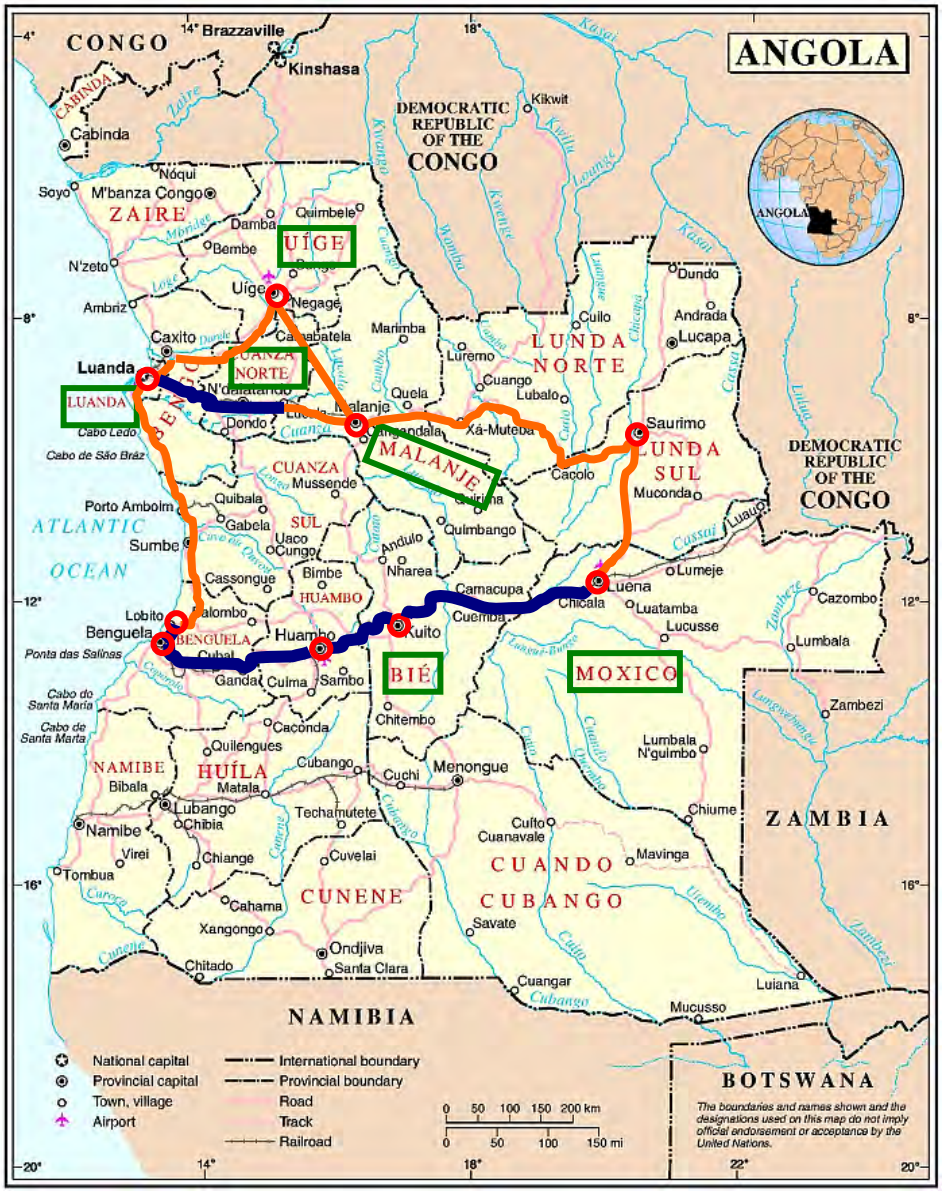


Figure 3-1 PPMRRP Strategic Loop and Project Province

Project Province Road Railway

3.2.1 IMF・World Bank

IMF and the World Bank (WB) dispatched a joint project mission to Angola in February and July 2004 to discuss the stabilization of the macro-economy and post-war restoration with the Angolan Government. In its policy dialogue with IMF, the Angolan Government has stepped forward to prepare such mandatory conditions as a disclosure of relevant official information and stabilization of macro-economy; the consultations are still ongoing and it may take more time to reach an agreement on the IMF Programs. Until this agreement is finalized, the Government will not be able to hold the Donors Conference and secure the funds necessary for implementation of ECP.

As mentioned above, IMF Programs are not yet finalized in Angola. However, considering the current positive movement of the Government's administration, WB signed the loan agreement on the "Emergency Multisector Recovery Project (EMRP)" in May 2005. EMRP is the comprehensive post-war restoration program which encompasses several relevant sectors and integrates them into one project package. The project area covers 6 Provinces, namely, Bie, Moxico,

Kwanza Norte, Luanda, Uige, Malange, where the civil war caused the most serious damage to the lives of citizens.

EMRP consists of two project phases. The 1st phase of the project will be implemented from 2005-2007 with a budget of $US 90 million (WB finance: $US 50 million) and the 2nd phase from 2006-2009 with a budget of $US 210 million (WB finance: $US 150 million). Fund sources of EMRP are WB, Angolan Government and other institutions with respective shares of 56%, 35% and 10%. EMRP is the restoration program to assist ECP and PPMRRP, and consists of four project components: (i) rural development and delivery of social services, (ii) rehabilitation of main infrastructures, (iii) capacity building and institutional strengthening, and (iv) project management and preparation of 2nd phase.

Regarding project component (ii), main infrastructures include transport, water supplies, electricity and urban infrastructure. Transport sector component in the 1st phase includes only capacity building and all the infrastructure development will be implemented in the 2nd phase after 2006. EMRP helps to finance the rehabilitation of main roads and bridges of Strategic Transport Loop proposed in PPMRRP (see Figure 3-1). Regarding railway rehabilitation, the Government is confident that the project will be implemented smoothly after securing a $US 2.0 billion loan from China. Financing for port rehabilitation has not yet been found. Table 3-3 shows the project components and respective budget.

Table 3-3 Project Components and Budget of EMRP

Project Component	Budget ($US M.)	Share (%)	Phase 1 ($US M.)	Phase 2 ($US M.)
A. Social Sectors & Agriculture	**93**	**30**	**20**	**73**
1. Rural Development	17	6	5	12
2. Health Services	35	12	8	27
3. Education	40	13	6	34
B. Rehabilitation of Main Infra.	**171**	**56**	**51**	**120**
1. Roads/Bridges	57	19	0	57
2. Electricity	32	10	0	32
3. Water Supplies	65	21	51	14
4. Urban Development	18	6	0	18
C. Capacity Building	**19**	**6**	**8**	**11**
D. Project Management	**22**	**7**	**13**	**9**
Total	**305(200*)**	**100**	**92(50*)**	**213(150*)**

(*) ( ) indicates the amount of WB finance.
(Sources) Project Information Document, IBRD, 30 Nov. 2004.

3.2.2 AfDB

The finances of the African Development Bank (AfDB) had been gravely reduced due to war and arrears. However, after the settlement of these issues, the Board of AfDB approved the Country Strategy Paper for 2004-2006 and grants for urgent post-war restoration projects which cover such sectors as agriculture, education, rural development, fisheries, and hospitals. In this regard, AfDB dispatched a project identification mission to Uíge, Malange and Huambo.

3.2.3 UNDP・WFP

UNDP has mid-term (4 year) assistance programs for the post-war restoration of Angola. While the last UNDP Program (2001-2004) was formulated during the war and, thus, focused on the

humanitarian aid, it also served as a bridge to long-term development aid with its capacity building activities in economic management, governance and environment. The newly approved UNDP Program (2005-2008) has highlighted two main fields: (i) to achieve MDGs and poverty reduction with 31% of the total Program budget ($US 38.7 million), (ii) to improve the governance with 24% of the total budget. In the field of MDGs, the Program focuses on privatization, decentralization and public administration reform. For the governance, the program supports the electoral process.

WFP has continued its activities for more than 20 years in Angola. Principal task of WFP is foods supply, which has been undertaken based on mid-term food supply program. In the on-going program (2003-2005), 250,000-300,000 tons of foods are being supplied but the new program (2006-2008) under preparation calls for a decrease of food supply to 130,000 tons reflecting the lasting peace conditions since 2002. WFP currently utilizes Lobito Port (75% of the total) Luanda Port (15%) and Namibe Port (10%) for the import of donated foods. According to WFP officials, the ratio will be changed to 10-20% for Luanda Port, 80-85% for Lobito and the ratio of Namibe Port will be negligibly small. In connection with food supply activities, WFP has assisted in infrastructure development to overcome the bottlenecks for smooth food transport including the reconstruction of 20 bridges in central Angola.

3.2.4 EU

European Commission (EC), the administrative organization of EU, has been a consistent major donor to Angola since 1985. EC has newly approved the assistance program for 2002-2007 with the total amount of 117million EURO in consideration of the drastic environment change since the cease-fire. The assistance program has been prepared based upon the strategy called "link between, relief, rehabilitation and development" (LRRD). LRRD consists of short-term, mid-term, and long-term projects.

Short-term project focuses on humanitarian aid and urgent post-war restoration. Mid-term and long-term projects intend to contribute to the Government's policy on social sector development and food production/security. 63-79% of total project budget, 117 million EURO, will be distributed to the following 3 major project components: (i) food security (0-2.5 %), (ii) health (42-51 %), and (iii) education (21-25.5 %).

3.2.5 NEPAD

The New Partnership for Africa's Development (NEPAD) is a framework for socio-economic development of African countries. Its establishment was adopted by the Organization of African Unity (present African Union) in 2001 based on the document drafted by Algeria, Egypt, Nigeria, Senegal and South Africa. Secretariat of the NEPAD is located in South Africa. Highest authority of the NEPAD is Heads of State and Government Summit of the African Union, in which 53 countries are participating. The aim of NEPAD is to eradicate poverty, to achieve sustainable growth and development, to halt the marginalization of Africa in the globalization process, and to accelerate the empowerment of women.

The NEPAD program of action places priority in 1) the short-term development of regional infrastructure covering sectors of transport, energy, information and communication, water and sanitation, 2) the implementation of the food security and agricultural development program, 3) the coordination of African position on market access, debt relief and ODA reforms, and 4) the Millennium Development Goals in the areas of health and education.

In the transport sector, NEPAD Short-term Action Plan (STAP) aims to develop 1) trade corridors without borders and barriers, 2) better and safer roads to bring Africa together, 3) competitive and seamless rail services, 4) efficient ports and safe seas, and 5) safe, secure and efficient skies and airports. In order to realize efficient ports, STAP includes projects of port rehabilitation or development of ports of Mombasa (Kenya), Nacala (Mozambique), Lobito (Angola), Abidjan (Cote

d'Ivoire), Dakar (Senegal) and Djibouti (Djibouti).

In the area of railways, STAP includes a study on needs for the rehabilitation of Benguela railway from the viewpoint of DRC and other inland countries. NEPAD regards corridors from inland countries to sea ports as important. In particular, Lobito corridor is deemed important as it is the only international corridor to the west coast from inland countries in the central and southern Africa.

The Development Bank of Southern Africa (DBSA) is a funding agency for projects promoted by NEPAD and is now implementing a study on rehabilitation projects in Angola.

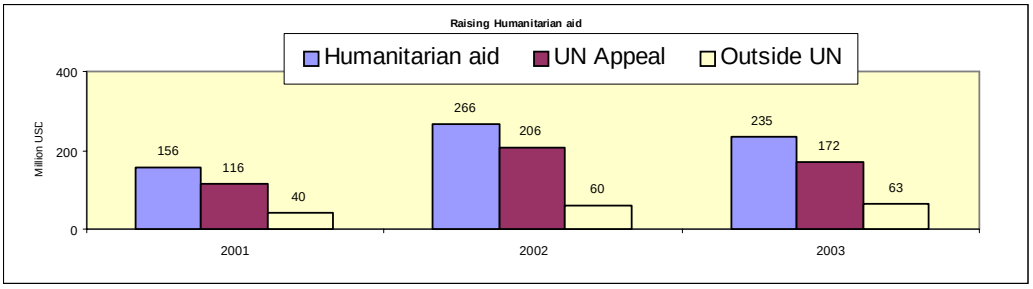
3.3 Bilateral Cooperation

Donors' bilateral cooperation to Angolan Government has been prioritized in humanitarian aid in cooperation with the policy of UN Office for the Coordination of Humanitarian Affairs (OCHA). Figure 3-2 shows that humanitarian aid increased significantly, peaking in 2002 through OCHA's appeal soon after the cease-fire agreement; however, the aid has since decreased reflecting long lasting peace conditions and accelerated restoration in 2003. UN closed OCHA in Angola in December 2004 due to the successful completion of its functions. Table 3-4 shows the amount of humanitarian assistance by donors, total amount of which was $US 235 million in 2003.

Regarding bilateral cooperation, US led donor nations in ODA to Angola throughout the war period. America's large amount of humanitarian aid could be a result of several factors. Angola is the 8th largest crude oil exporter to the United States and one of its biggest trade partners in Africa. Furthermore, Angola has the potential to play an important role in securing political stabilization in the Southern African region. USAID is implementing the assistance in compliance with the strategic cooperation program for 2001－2006. The program focuses on the following four project components: 1) food security with a focus on smallholder agriculture, 2) democracy reform, 3) maternal /child health and HIV/AIDS, and 4) economic reform policies.

European countries are the largest donors next to the United States. Norway focuses on health, water and de-mining. UK facilitates poverty reduction policy. While having concentrated its ODA to humanitarian aid for 5 years, Sweden has shifted the priority to development projects. Besides these countries, France, the Netherlands, Switzerland, Spain and Portugal have continued their ODA to Angola.

Among others, current lateral cooperation of China is worth mentioning. As stated already, the priority of financial cooperation to Angola has been shifted from humanitarian aid to economic growth. In this connection, China has recently signed a loan agreement in the amount of $US 2.0 billion, most of which is to be used for the rehabilitation of railways. India is also cooperating in a railway project which includes procurement of locomotives and trains for Mocamedes Railway with the amount of $US 40 million.



(Source) UNDP Economic Report 2004-2006

Figure 3-2 Trend of Humanitarian ODA in Angola

Table 3-4 Breakdown of Humanitarian Aid by Donors (2003)

Donor	Value ($US million)
1. United States	113.8
2. EC	35.1
3. Netherlands	11.8
4. Sweden	11.2
5. Unearmarked Funds	9.2
6. France	7.6
7. Norway	6.1
8. Switzerland	5.1
9. Denmark	5.0
10. Private	4.8
11. Japan	4.3
12. Germany	3.6
13. Canada	3.4
14. Algeria	3.2
15. United Kingdom	3.2
16. Others	7.8
Total	235.1

4. Overview of Transport Sectors

4.1 Land and Air Transport Systems

4.1.1 Railways

1) General

Railway network of Angola starts from the ports of Luanda, Lobito and Namibe and continues to the inland area. Since before Angola's independence, various goods have been conveyed from the inland area to the ports by railway, then transferred to ships and transported to various world destinations. During the civil war, most of the railway network was destroyed. When the civil war ended, only a small part of the railway was in use. The Angolan government has been reconstructing damaged facilities using its own budget. In addition, other railway rehabilitation projects are being financed by China. The Angolan government recognizes the importance of railway rehabilitation for the development of Angolan society and economy. And railway rehabilitation works are proceeding at a rapid pace.

Due to the huge volume of construction materials needed for railway rehabilitation, rehabilitation of ports is required urgently as the import gateway of those materials. After railway rehabilitation is completed, ports are expected to constitute freight transport system in Angola that provides massive and low-cost service. By using such a logistics network, donor countries' assistance can reach effectively to the inland area where many low income people live.

Angola's basic strategy is to export its rich natural resources and agricultural products to the world market. Not only Angola but also other countries welcome Angolan participation in the world market. Angola's logistics network, which consists of ports and railway and provides low cost and mass service, is indispensable for the development of Angolan industries. There are 3 railway lines in Angola. One is Luanda railway (CFL) starting from Luanda port, another is Benguela railway (CFB), starting from Lobito Port and the other is Mocamedes railway (CFM), starting from port of Namibe.

2) Luanda Railway (CFL)

Total length of Luanda railway is 424km and it has a branch line of 55km. The main route can be divided into two parts, one is Luanda – Baia 36km, and the other is Baia - Malanje 388km. The former consists of three parts, Luanda – Bungo, Bungo – Musseque (9km), Musseque – Viana (14km), Viana – Baia (13km).

The route between Luanda and Baia is under rehabilitation financed by a Chinese Loan. Project budget is US$ 90millon and the contractor is China Africa. This route is a kind of urban railway. The Presidential office is now evaluating the feasibility of the Baia – Malanje route.

Luanda – Bungo ran above ground. However, to avoid the heavy road traffic, the new railway is being constructed under ground. But construction work is behind schedule because of the existence of unknown laid water pipes, electric cables and telephone wires. Bungo – Baia route will be in use in 2006.

Luanda Port Authority is constructing an inland depot near Viana to ease congestion at the port of Luanda. The inland depot will be connected with the port of Luanda by railway. During the civil war, the port was not congested and it was much safer to store cargo in the port than outside. Since the end of the civil war, the Angolan economy has improved and cargo volume handled in the port is increasing. There is no room to cope with increased cargo in and near the port of Luanda and the inland depot project has become a necessity.

There seem to be no obstacles for construction of the railway between Baia and Malange. If China Africa starts its construction work now, Department of Ground Transport, Ministry of Transport thinks that railway service will start in 2006.

Until the railway rehabilitation works started, railway service had been provided by CFL. Ministry of Transport forecasts the number of trains starting from Luanda at 144 passenger trains per week and 16 cargo trains per week. The composition of CFL and transport volume is as follows:

Facility of CFL
Locomotives 19 (in service 2)
Carriages 131 (in service 26)
Freight cars 535 (in service 255)

Traffic volume of CFL
Passenger: 580 thousand (2002)
Cargo: 40thousand tons (2002)
Passenger: 946 thousand (1973)
Cargo: 301thousand tons (1973)

3) Benguela Railway (CFB)

Benguela railway is the biggest railway in southern Africa and connects Angola with the Democratic Republic of Congo (DRC) or Zambia. Railway length is 1336km. The Angolan government recognizes its importance and tried to rehabilitate this railway by its own finance. This plan became the basis for the Angoferro Plan. Because of the shortage of financial resources, the Angolan government plans to rehabilitate and restart operations in stages. Railway operation contributes to improving the quality of life and to developing socio-economic activities through the reduction of transport cost or commodities prices.

Benguela railway is designed for freight, and can accommodate heavy trains. Lobito – Benguela route was in operation during the civil war. The Angolan government has rehabilitated the section between Benguela and Cubal, and has removed mines between Cubal and Kuito. The Angolan government has invested more than US$ 10million for the rehabilitation of rails, stations and bridges.

The Angolan government is relying on Chinese financing for the rehabilitation of the section between Cubal and Luau which is located on the border with DRC. Construction work will start in the near future. First, the Angolan government plans to rehabilitate a 100km section between Cubal and Huambo. Huambo is the capital of Huambo Province and the biggest inland city in Angola. Ministry of Transport thinks that after operation to Huambo, commences more freight will be transported by the railway between Lobito and Huambo than that transported between Luanda and Menongue. Construction offices and residences for Chinese workers are now being secured.

Before the civil war, CFB was an important link between DRC, Zambia and Angola. It is crucial for inland countries like DRC and Zambia to have access to the ports. According, the rehabilitation of Lobito port and CFB also provides benefit to DRC and Zambia. Those countries have dispatched engineers to CFB. CFB also contributed to the transportation between DRC and Zambia by way of Angola.

Currently, routes between Benguela and Cubal, Calenga and St. Iria are in operation. Six trains per day are in service between Benguela and Lobito and carried 2million passengers in 2004. 120 thousand passengers per month are carried between Culenguer and St. Iria. In 1973, 15.92 million passengers and 32.8 thousand tons of freight were transported through the year. CFB posseses:

Locomotives 29 (in service 5)
Carriages 44 (in service 22)
Freight cars 2128 (in service 750)

4) Mocamedes Railway (CFM)

Mocamedes (Namibe) railway connects Namibe, Matala and Menongue. The 756 km route between Namibe and Matala is in operation. The Angolan government puts priority on this railway to connect the coastal area and the inland area in southern Angola. After the civil war ended, the Angolan government invested US$ 7million to convert carriages and sleepers, and for the rehabilitation of stations and bridges between Namibe and Matala. Minister of transport is calling for the rehabilitation between Matala and Menongue as the next project.

This project will be financed by Chinese funds, construction materials will soon be procured and construction commenced. India donated US$ 40 million for locomotives, carriages and staff training. There are iron ore mines at Cassinga which produced 6 million tons of exports per year. To carry this volume, 14 trains per day were operated. The composition of CFM and transport volume is as follows:

Composition of CFM
Locomotives 38(in service 8)
Carriages 34 (in service 14)
Freight cars 1447 (in service 271)

Traffic volume of CFM
Passenger: 330 thousand (2004)
Cargo: 1,660thousand tons (2004)
Passenger: 3,940 thousand (1973)
Cargo: 6,410thousand tons (1973)

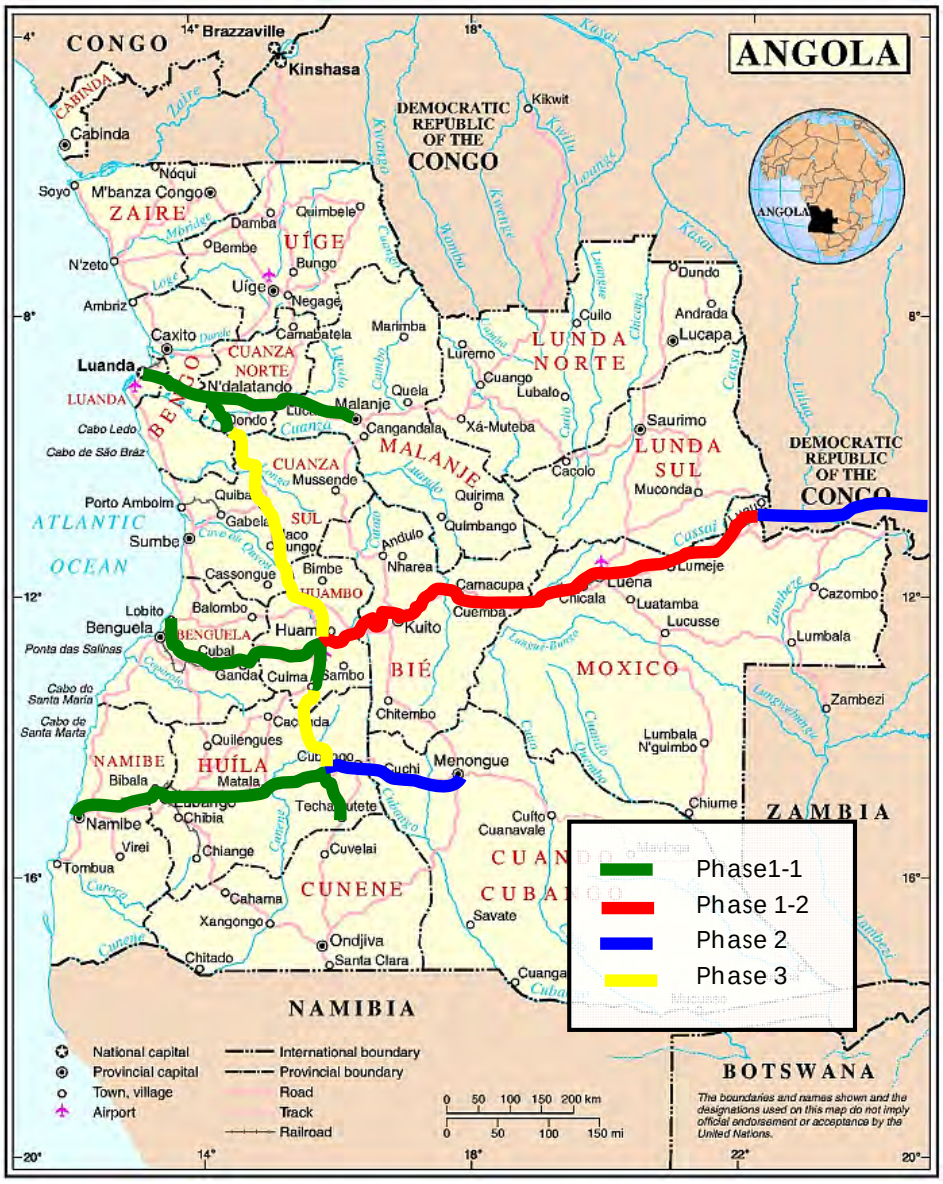
5) ANGOFERRO

Angolan railway network has deteriorated since stopping operations. Due to its importance for Angolan society and economy, it was attacked and damaged severely during the civil war. Ministry of Transport made 'ANGOFERRO', which is the master plan of railway rehabilitation in Angola and started rehabilitation works in 2000. Total budget of the railway rehabilitation is US$ 4 billion.

Rehabilitation of the existing railway (1,376 km in length) is included in the first phase. Double tracking, installation of a signal system, new locomotives, improvement of railway alignment, upgrade of carriages and installation of concrete sleeper are also included in the first phase. Rehabilitation of railway in the port area is included, too. According to the Department of Surface Railway, Ministry of Transport, rehabilitation of the existing railway will be completed by 2006, Assuming that an efficient and effective rehabilitation method is adopted and financing can be secured. Modernization works will be carried out in the 2nd Phase. In the 3rd phase, a new line is planned. The line runs from north to south of Angola and connects with three existing lines which start from the port in the west coast and continue to the eastern inland area. In phase 4, new lines connecting Angola with DRC, Zambia or Namibia are planned. This railway network plan connecting Angola with other countries is based on the Southern African Railway Master Plan and requires a huge investment. Construction of new railway to Santa Clara has almost been completed in Namibia.

Angola has been rehabilitating its railway using their own finances. However, China has made US$ 2 billion available for railway rehabilitation, so the work is expected to move at a faster pace.

The committee appointed by the President to discuss development of iron ore mines in Angola is discussing whether iron ore mines at Cassinga should be re-operated immediately. F/S of the railway to the Cassinga mines has already been made. So although the railway to the Cassinga mines is not included in the 1st phase projects, Cassinga railway rehabilitation could be adapted as a 1st phase project. Due to a strong request from Namibia, international route to Namibia could also be adapted as a 1st phase project.



(Source: MINTRANS)

Figure 4-1 ANGOFERRO Phase1 to 3 (Source: MINTRANS)

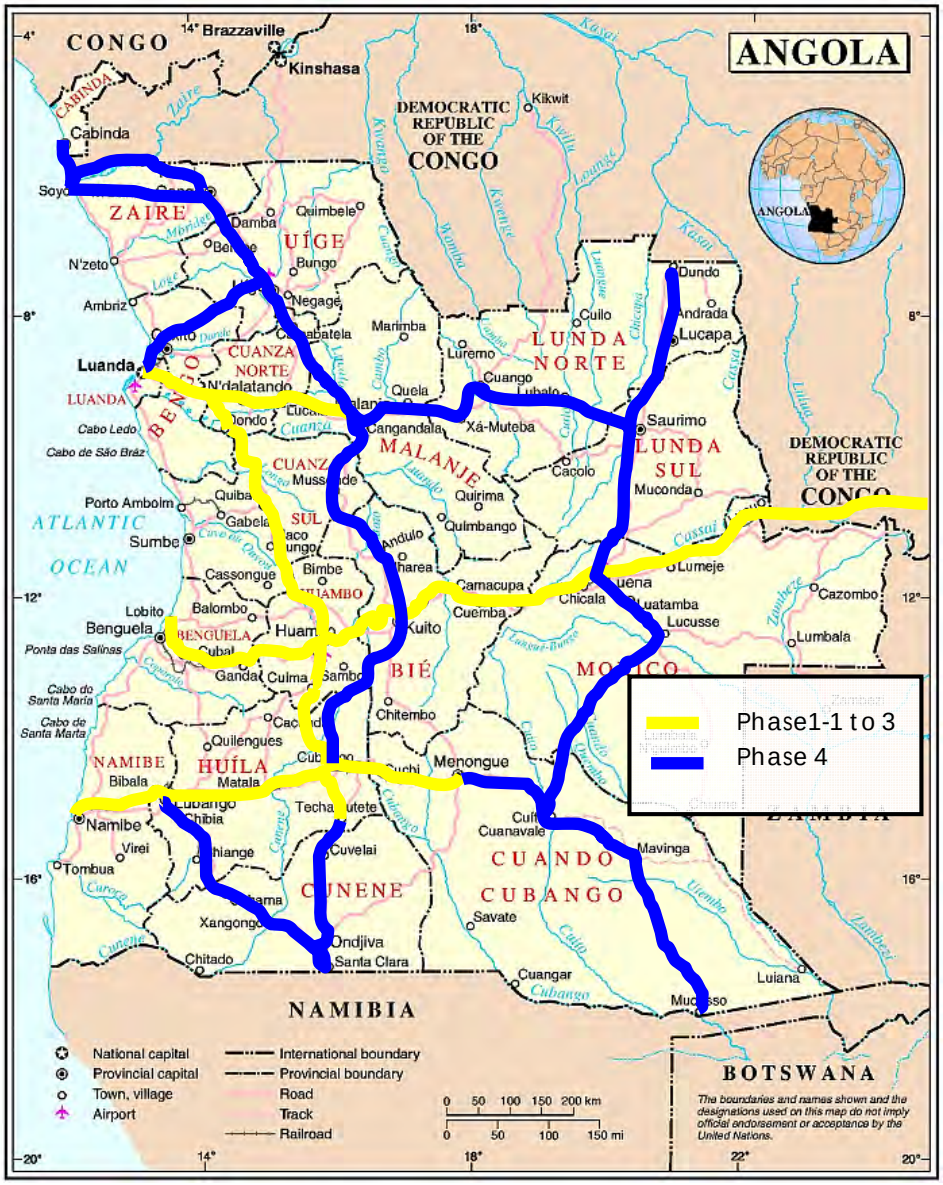
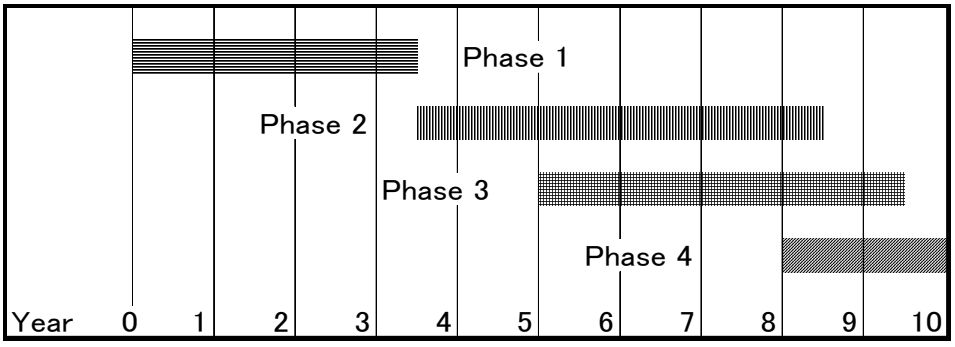


Figure 4-2 ANGOFERRO Phase 4 (Source: MINTRANS)



(Source: MINTRANS)

Figure 4-3 ANGOFERRO Schedule (Source: MINTRANS)

4.1.2 Roads

Total length of main roads in Angola is 15,500 km, including 7,950 km of paved road. Major roads are administrated by the Instituto de Estradas Nacional de Angola (INEA). There are 60,000 km roads administrated by provinces or municipal authorities. During the civil war, most of the main roads and bridges were destroyed. Eighty percent of roads were evaluated as being in bad condition in the EMRP report. Figure 4-4, Table 4-1, Table 4-2 and Table 4-3 shows main road rehabilitation works in Angola. INEA is rehabilitating 1,200km of principal roads per year. All works will be finished in one year and the next rehabilitation route will be selected and works will be start. INEA puts priority on the routes connecting Luanda and main local cities, the routes connecting ports and inland cities. But Benguela corridor is not given priority due to considering the rehabilitation work of CFB. INEA thinks that rehabilitation of main road will be finished in ten years.

Poor road conditions seriously hinder redevelopment efforts in Angola. World Food Program (WFP) is constructing roads and bridges in cooperation with the Angolan government to provide food. WFP plans to rehabilitate 20 of the 1,000 destroyed bridges in Angola. EU's ODA is also contributing to road rehabilitation in Angola.

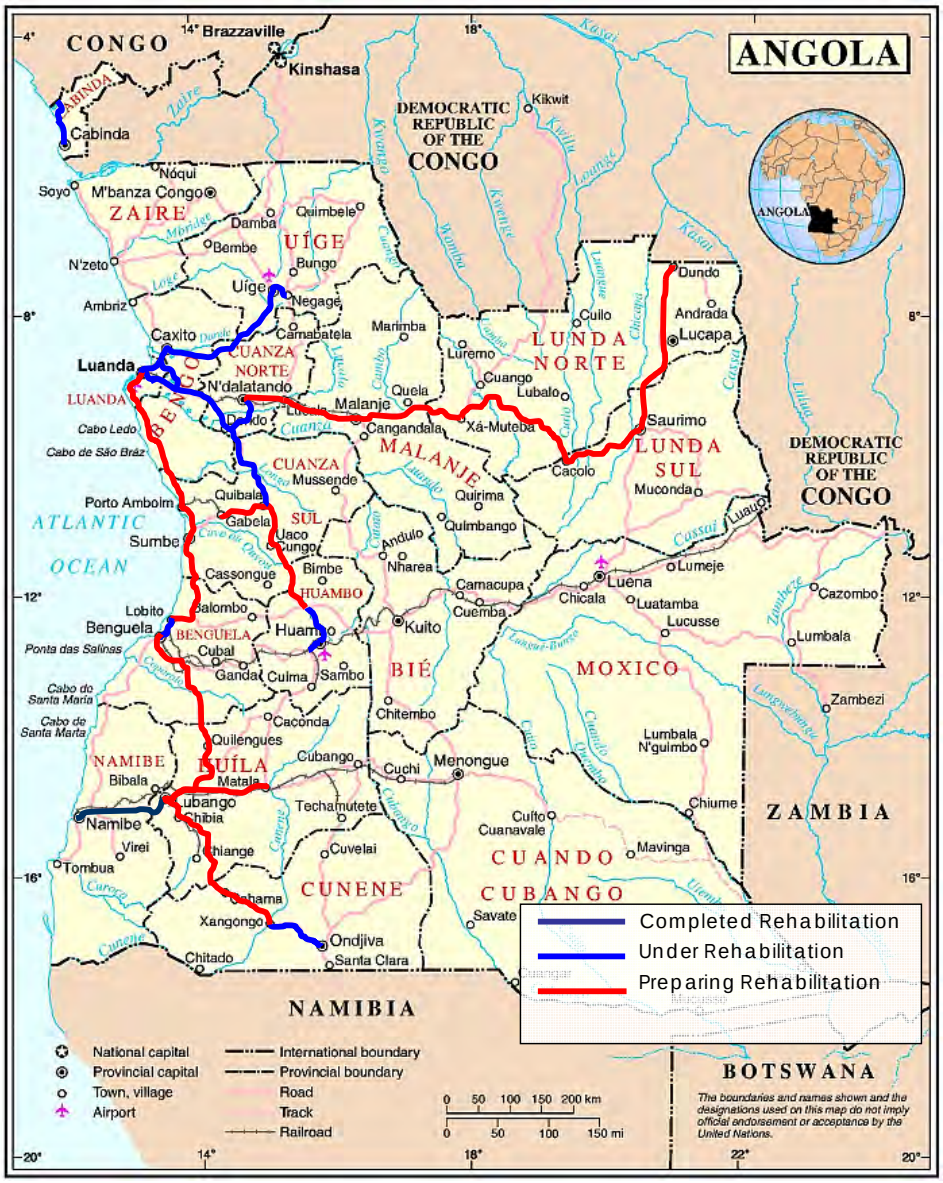


Figure 4-4 Road Rehabilitation in Angola

Table 4-1 Road rehabilitation (Completed)

From	To	Length (km)
Lubango	Namibe	177

Table 4-2 Road rehabilitation (undergoing)

From	To	Length (km)
Benguela	Lobito	30
Quifandondo	Catete	60
Quifandondo	Caxito	50
Caxito	Uige	295
Uige	Negage	37
Luanda	Viana	17
Viana	Catete	43
Catete	Maria Teresa	51
Maria Teresa	Dondo	70
Dondo	N' Dalatando	106
Cacuzo	Lukala	59
Huambo	Caala	20
Cabinda	Cacongo	48
Desvio De Matala	Matala	173
Lubango	Huambo	383
Matala	Lubango	173
Ondjiva	Humbe	110
Bitchequete	Massabi	
Estrada do Samba		
Estrada da Boa Vista		

Table 4-3 Road Rehabilitation (under preparation)

From	To	Length (km)
Luanda	Sumbe	304
Sumbe	Lobito	183
Quibala	Uaco Cungo	75
Uaco Cungo	Alto Hama	120
Desvio da Gabela	Quibala	76
Humbe	Lubango	275
Cacula	Lubango	90
Benguela	Cacula	276
Dondo	Malanje	235
Malanje	Saurimo	575
Saurimo	Dundo	263

4.1.3 Civil Aviation

Due to the destruction of railways and roads, people depend on air traffic when they travel. There are 243 airports in Angola and 32 airports have paved runways. Six airports have runways longer than 3,047 m (CIA, Table 4-4). Luanda airport has 3,700 m and 2,600 m runways. Characteristics of Luanda airport are shown in Table 4-5.

Table 4-4 Angolan Airports

Runway Length (m)	Airports with Paved Runways	Airports with Unpaved Runways	TOTAL
Over 3,047	4	2	6
2,438 – 3,047	8	4	12
1,524 – 2,437	14	30	44
914 – 1,523	5	95	100
under 914	1	80	81
TOTAL	32	211	243

Table 4-5 Runway Characteristics of Luanda Airport

RWY NR	Length (m)	Width (m)	Shoulder (m)
06/24	3,700	45	7.5
08/26	2,600	60	-

In Angola, Angola Air (TAAG) had monopolized civil aviation for many years. But now 25 companies are in this market. There are 130 airplanes for civil aviation in Angola (EMRP).Safety level of Angolan air transportation seems to be poor for the following reasons:

- Poor runway condition
- Poor maintenance of aircrafts
- Luck or substandard of air control or air navigation system

4.2 General Situation of Shipping and Ports

4.2.1 Latest Situation of Shipping in West Africa and in Angola

1) Latest Situation of Shipping in West Africa

West Africa exports natural resources, but greatly depends on imported goods because of insufficient development of inland industries. On the other hand、oil and natural gas development projects are being carried out. Once these projects are realized, oil and natural gas will be transported by tankers.

It is noteworthy that no gearless container vessel (container vessel without own gear) has been launched into this area. Loading/discharging operation of gearless vessel is very difficult because few container terminals have been constructed at this stage in most ports. Therefore only geared vessel (container vessel equipped with own gear) and Ro-Ro vessel are used. In world shipping, however, gearless container vessels are the norm. Also in West Africa, the main fleet will consist of gearless container vessels in future.

It is interesting how NILE DUTCH AFRICA LINE (so-called NDAL or NDS, head office is located in the Netherlands) takes vehicles from Europe to West Africa. It utilizes vacant space

on loaded containers. Two vehicles can be stowed on two 20ft containers (not 40ft containers, only 20ft containers) by NDS's original lashing materials. Trucks also can be stowed on three 20ft containers. Heavy vehicles are stowed under deck.

2) Container Terminal in West Africa

The latest situation of container terminal development in West Africa is as follows.

- Angola, Luanda

  The government decided to privatize Luanda port. In Dec. 2003, a joint venture of Danish AP Moller Terminal (so-called APMT, belongs to the same group with Maersk Sealand) and Angolan Gesto de Fundos made a successful bid for the concession of a container terminal. Its competitor SGEP, however, disputed this result, and brought a lawsuit against the concession in the high court. It remains unclear when the new container terminal will be opened.

- Cameroon, Douala

  Douala International Terminal (so-called DIT, Companies consortium mainly conducted by APMT) fixed a 15 year concession agreement in Jun. 2004. DIT is now operating a container terminal equipped with a 660 m berth and two gantry cranes.

- Ghana, Tema

  Consortium consisting of APMT and French Bollore group is to open a new container terminal in 2006.

- Ivory Coast, Abidjan

  Societe du Terminal de Vridi (so called SETV) is operating Vridi terminal. It belongs to the French conglomerate Bollore group, which has a container terminal, shipping agency, forwarding and oil transportation mainly in Africa. Shipping company Delmas, SETRAMAR and OTAL also belonged to Bollore group until 2005. Vridi terminal has quay of 960 m in length and three gantry cranes. Its throughput in 2004 was 490,000 TEU. In Jul. 2005, APMT purchased 40% share of SETV from the Bollore group and participated in management.

- Apapa in Nigeria

  The government decided to privatize port Apapa. APMT fixed a 25 year concession agreement in Sep. 2005.

- Onne in Nigeria

  A joint venture of APMT and Italian company is operating port Onne. It also planned to construct a container terminal. However, details such as purchase of gantry crane are not yet fixed. Furthermore civil unrest has become worse.

- Lome in Togo

  In Dec. 2004, a joint venture of French company CMA CGM and Spanish company Progosa fixed a concession agreement with the government in Togo, so as to construct a container terminal in Lome. Togo company SITC (invested by CMA CGMS and Progosa) was to commence construction of the 400 m long terminal in Jan. 2005. They were expected to invest Euro 45 million in 10 years. However, this project has been suspended due to political trouble.

3) Number of Handled Containers （TEU）

It was considered that nations in West Africa shared about 1.5% of world wide container handling volume in the 1980’s. They have increased their volume since then but have not been able to catch up with development of other countries. Their share is only about 0.7% in 2003, due to the stagnant economy and delay in construction of container terminals in West Africa (Source: Drewry Consultants report in third quarter 2004).

	1980	1990	2000	2001	2002	2003
Angola	**46**	**4,325**	**60,573**	**65,000**	**191,750**	**207,090**
Benin	7,689	19,211	81,862	85,000	90,950	98,226
Cameroon	35,363	80,717	126,958	139,587	146,737	156,000
Congo	10,778	15,000	22,000	15,000	16,050	17,334
Cote d'Ivoire	133,858	181,037	434,654	543,846	579,055	625,379
Gambia	700	10,710	28,743	30,094	35,344	44,152
Ghana	7,994	64,157	169,679	187,227	223,377	200,000
Guinea	3,500	20,593	44,431	60,000	64,200	69,336
Liberia	15,783	12,500	7,500	10,000	10,700	11,556
Mauritania	4,500	13,258	32,665	35,000	37,450	40,446
Nigeria	210,805	208,144	155,466	232,000	248,240	268,099
Senegal	35,000	78,842	165,176	170,450	164,341	177,488
Sierra Leone	10,475	15,989	21,000	21,000	22,470	24,268
Togo	30,000	42,240	57,350	60,000	84,783	166,441
Zaire	20,000	37,833	32,000	35,000	37,450	40,446
W.AFRICA TOTAL	526,491	804,556	1,440,057	1,689,204	1,952,897	2,146,261

Source: Drewry Consultants report in third quarter 2004

（Note）including export/import containers, empty vans and transshipped containers at terminal i.e. all handled containers at container terminal.

4) Main shipping lines and their route

Various companies are operating direct service to West Africa of which details are as follows;

- Map of main ports in West Africa (see Figure 4-5)
- Map of main routes of main three companies i.e. DELMAS／OTAL, Maersk Sealand／Safmarine group and NDS (see Figure 4-6 to Figure 4-10)
- Direct service details from all over the world to West Africa (see Appendix)

Even if a shipping line has no direct route from a remote port to West Africa, it can transport containers without any problem. One way is to transship the container from its east-west route to north-south route at some European port. The other way is to borrow slots on the east-west route of some other shipping line and to transship the container onto its own north-south route at a European port.

For example, NILE DUTCH AFRICA LINE transports containers from Japan to Antwerp by utilizing slots of CMA CGM and transships them at Antwerp onto NDS's own service to West Africa. It issues its own through bill of lading covering the loading port in Japan to discharging port in West Africa.

In 2005, purchase of shipping companies was very remarkable on a world-wide scale. Maersk Sealand purchased P&O Nedlloyd for US$2.9 billion (Euro2.3 billion) in August. French company CMA CGM bought shipping lines of Bollore group such as DELMAS, SETRAMAR and OTAL (OT AFRICA LINE) for US$580 millions (Euro470 millions) in September, so as to reinforce its service to Africa. TUI (parent company of Hapag-Lloyd in Germany) also got Canada's CP Ships for US$2 billion in September.

NYK Line has signed a long-term transportation agreement with Nigeria LNG Limited in

Nigeria which ranks 6th largest in the world in terms of LNG. Two new LNG tankers are being constructed at Samsung heavy industry in Korea. They will be launched in the summer of 2007. Transportation of natural resources is relevant to both national interests and the expansion plans of private companies.

To attract liner service, infrastructure such as railway and road together with container terminal development is required. The merit of containers is that they can be promptly delivered to consignees. But this requires an efficient system. If cargoes are re-stuffed from container to truck at the quay, container volume can not increase.

In this respect, political and social stability are prerequisites to creating an environment where representatives of foreign interests feel comfortable.

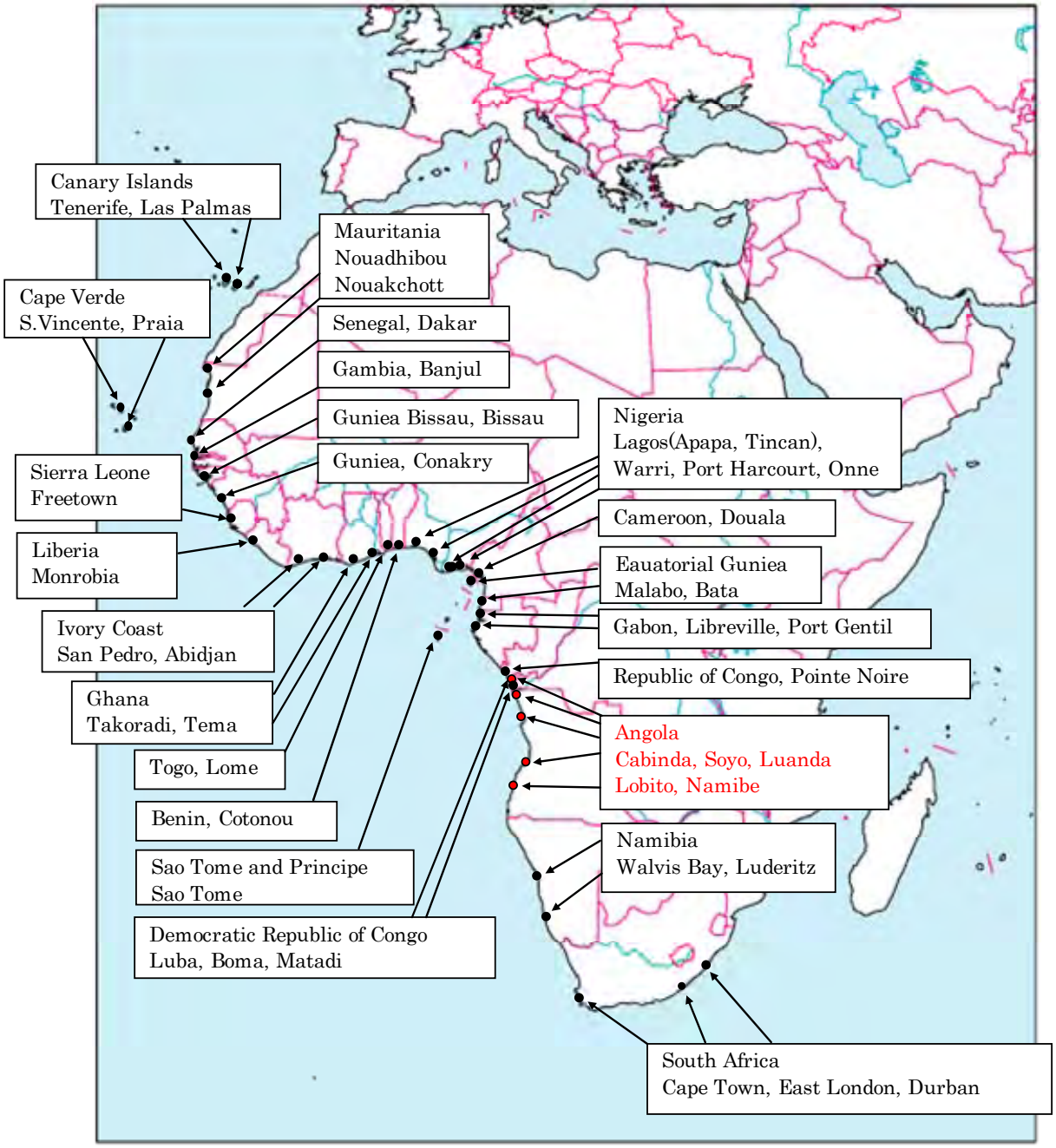


Figure 4-5 Map of main ports in West Africa

1. DELMAS/OTAL Angola Shuttle: 14 days, 42 days, 3 vessels

Leixoes(Portugal) － Lisbon(Portugal) － Dakar(Senegal) － Abidjan(Ivory Coast) － **Luanda(Angola)** － Abidjan(Ivory Coast) － Freetown(Sierra Leone) － Monrovia(Liberia) － Dakar(Senegal)－Leixoes(Portugal)

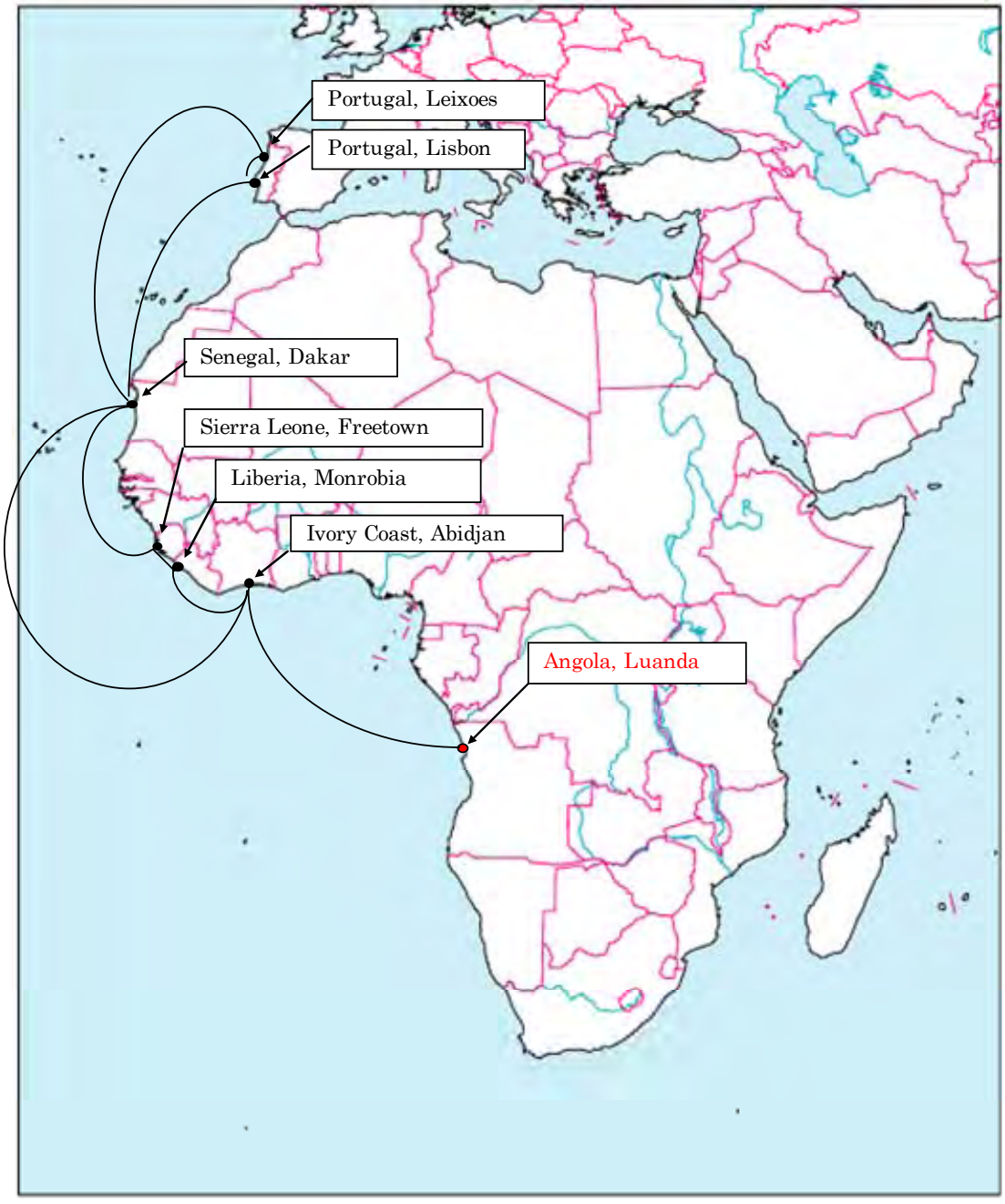


Figure 4-6 DELMAS／OTAL Angola Shuttle

2. MAERSK SEALAND Safmarine Group WAF 5 Loop 1: 14 days, 42 days, 3 vessels

Vigo(Spain) ― Leixoes(Portugal) ― Lisbon(Portugal) ― Algeciras(Spain) ― **Luanda(Angola)** ― Luderitz(Namibia)―Walvis Bay(Namibia)―Vigo(Spain)

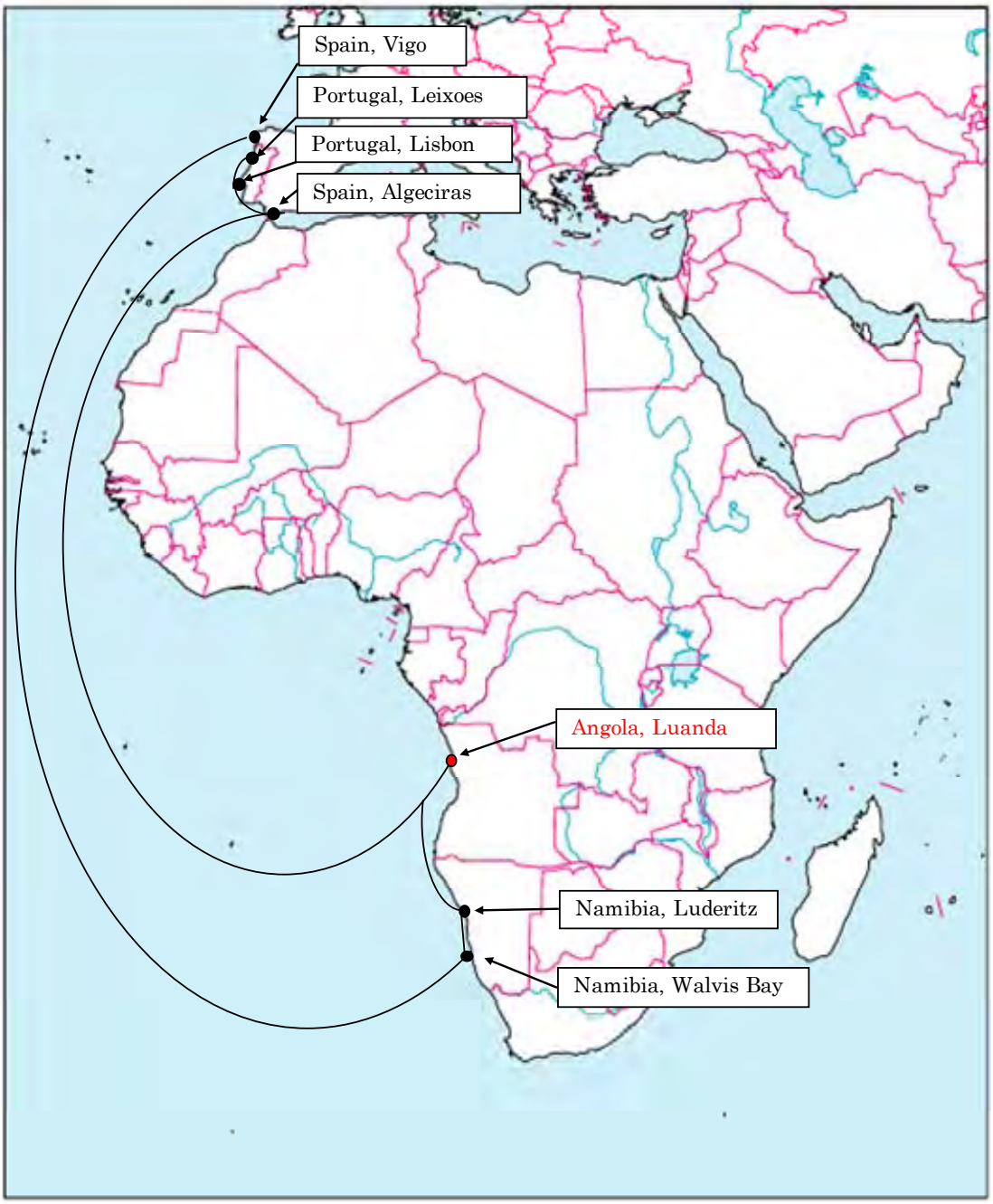


Figure 4-7 MAERSK SEALAND Safmarine Group WAF 5 Loop 1

3. NILE DUTCH AFRICA LINE(NDS)Europe－West Africa RORO Service : 8 days, 40 days, 5 vessels

Amsterdam － Antwerp － Rouen － Leixoes － Lisbon － Freetown － Monrovia － Abidjan － Sao Tome － **Luanda(Lobito ／ Namibe transshipped via Luanda)** － Pointe Noire(**Cabinda(Angola)／Soyo(Angola)**／Boma／Matadi transshipped via Pointe Noire)－ Libreville－Douala－Abidjan－San Pedro－Leixoes－Amsterdam

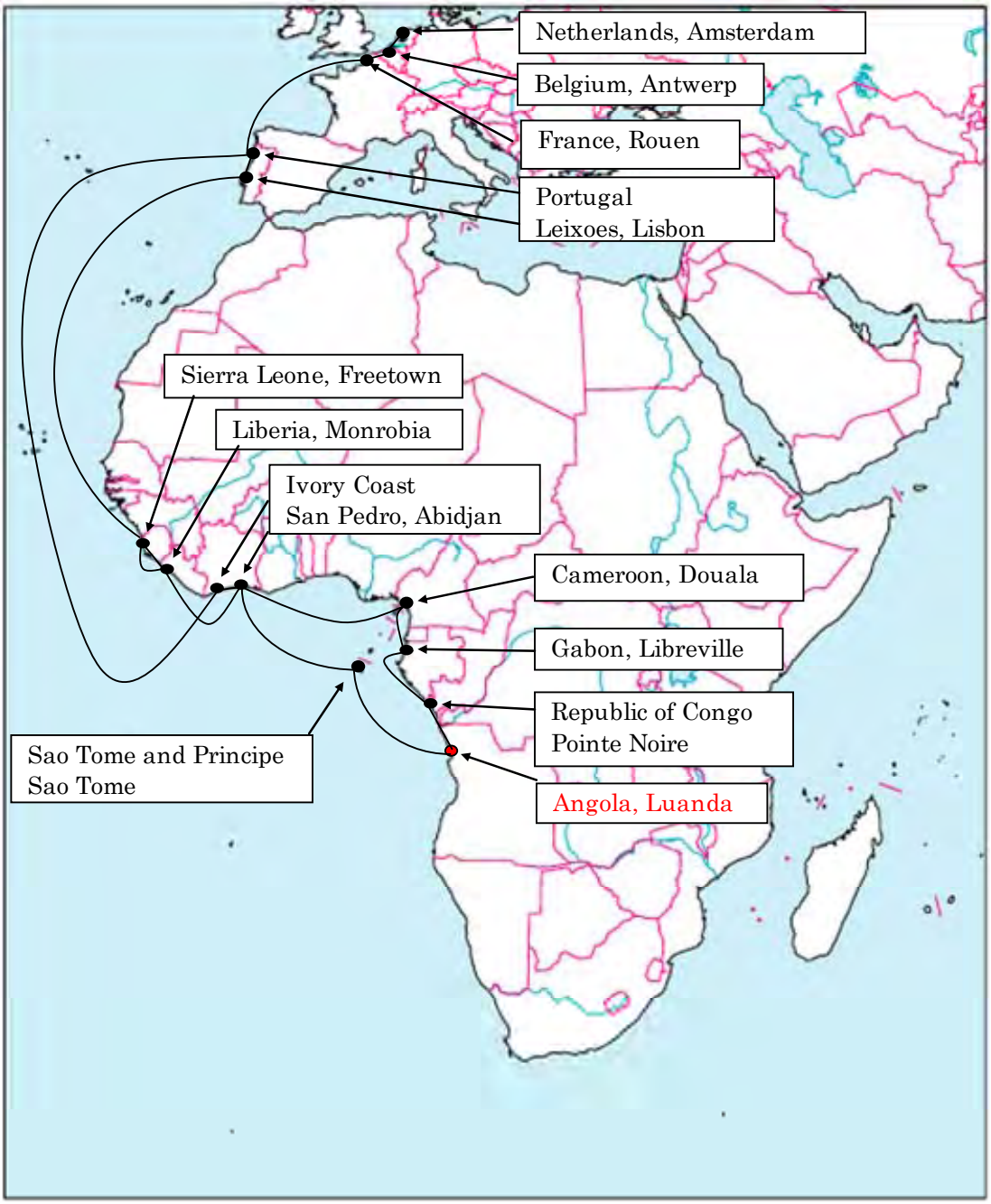


Figure 4-8 Europe－West Africa RORO Service

4. MAERSK SEALAND Safmarine Group SAFWAF COMBO Service: 9 days, 45 days, 5 vessels

Durban(South Africa)－Cape Town(South AFRICA)－Walvis Bay(Namibia)－**Namibe(Angola)** － **Lobito(Angola)** － **Soyo(Angola)** － **Cabinda(Angola)** － Matadi(Democratic Republic of Congo)－Luba(Democratic Republic of Congo)－Douala(Cameroon)－Libreville(Gabon)－Port Gentil(Gabon)－Pointe Noire(Republic of Congo)－Durban

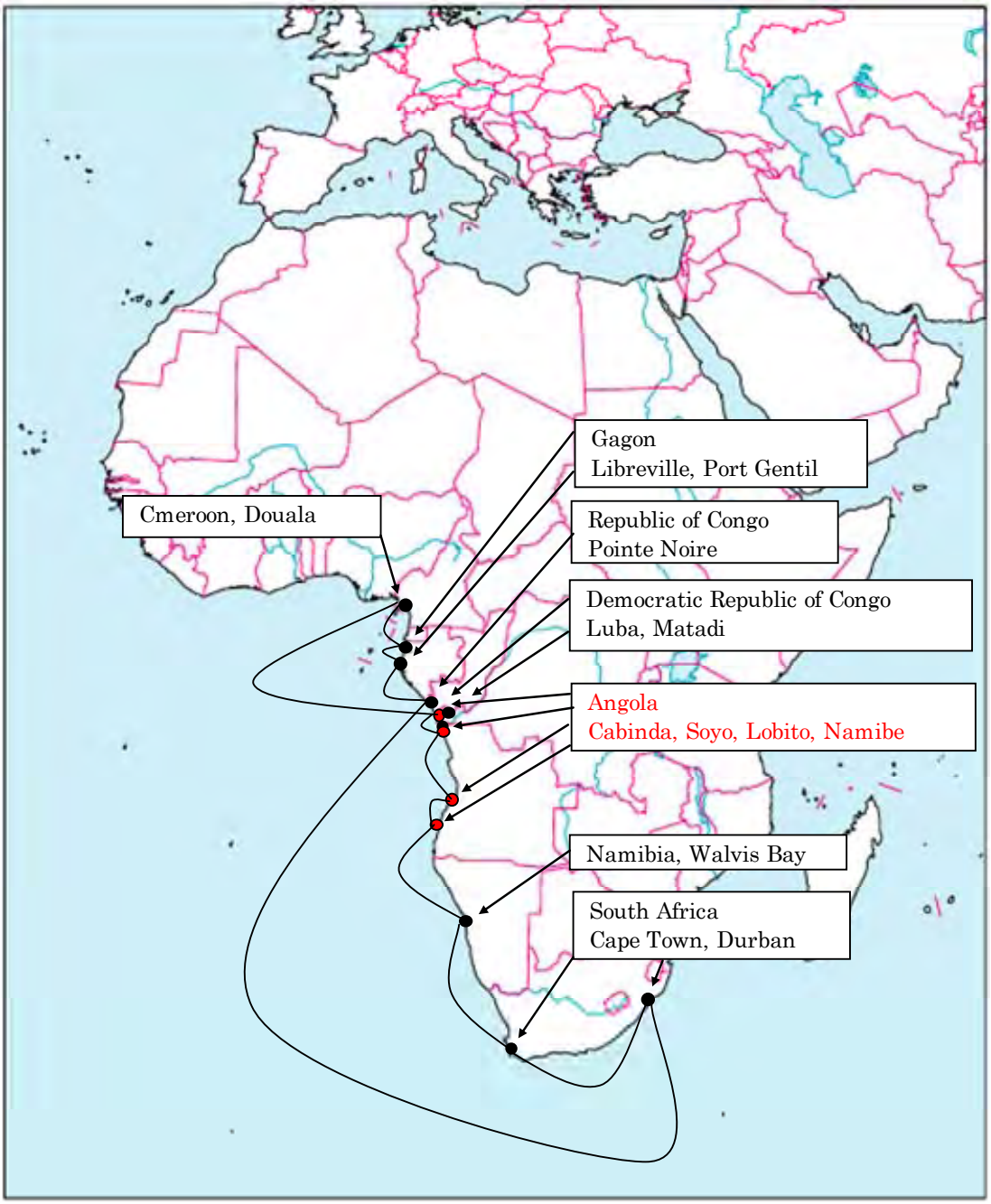


Figure 4-9 MAERSK SEALAND Safmarine Group SAFWAF COMBO Service

5. MAERSK SEALAND Safmarine Group Angola Express: 8 days, 24 days, 3 vessels

Durban(South AFRICA) － East London(South AFRICA) － Cape Town(South Africa) － **Lobito(Angola)－Luanda(Angola)**－Luderitz(Namibia)－Durban(South Africa)

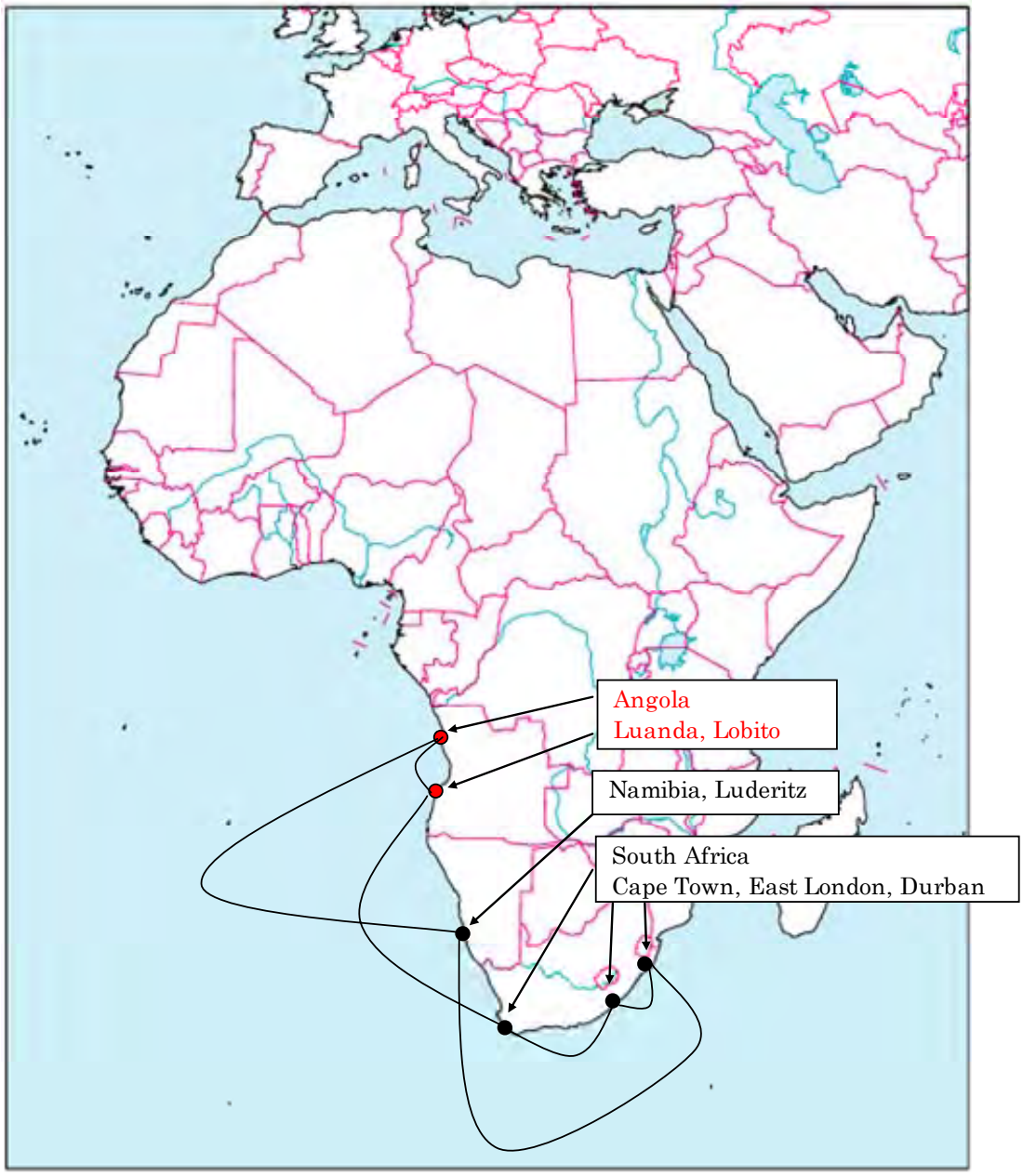


Figure 4-10 MAERSK SEALAND Safmarine Group Angola Express

5) Latest situation of Angolan shipping

i) Angolan world-wide shipping

Angonave UEE transported cargoes between Angola-South America and Angola-Europe but went bankrupt in 2003. There is no Angolan national flag shipping line supplying world-wide service. There being neither marine college nor seaman school, required talent for shipping can not be produced. They are depending on imported subsistence commodities taken by vessels with foreign flag.

Angola has not been able to foster local industries. Daily goods exclusively depend on imports. Main import cargoes and export country are as follows.

Rice (China and Vietnam), Maize powder (Argentina), Potato (South Africa), Beef (Argentina and India), Chicken Meat (Brazil), Furniture, (China), Construction machine (China).

99% of containers are handled at Luanda port. Lobito and Namibe handle rice and maize powder.

ii) Angolan domestic shipping

Considering the increase of demand for reconstruction materials after civil war, transport of woods from Cabinda to Luanda and cement from Luanda to Namibe, Amboin and Lobito is expected. Inland logistic cost by truck is very expensive. It is one of the reasons for the high price of commodities in local cities. Transportation by sea is economical and can make for not only price reduction but also support for reconstruction in local areas.

Domestic transportation by sea by foreign flag vessel is prohibited. Only an Angolan shipping line with domestic transportation license can transport domestic cargoes. This condition being fulfilled, shipping line is not required to use a vessel with Angolan flag. It is able to use a vessel with foreign flag such as Panama.

Now there is no domestic liner service in Angola. Interline (subsidiary of INTERTRANSIT, a one-time terminal operator in Luanda Port) was once operating liner service by Ro-Ro vessel. However it has suspended service due to demand shortage. Its Ro-Ro vessel is berthed in front of Luanda port without being used.

Domestic sea transportation is only available in case shipper's request meets vessel's schedule. However no suitable large ship can be used because of their old age and lack of safety certificate. Vessels' owners have let certificates expire due to expensive fee for renewal. Therefore only small vessels (about 300 tons or smaller), small fishing boats and barges are used for domestic transportation by sea. There is a harbor at the groin of the sandbar covering Luanda port.

iii) Imports to Angola

More than 15 shipping lines are calling Angolan ports. Main carriers and their share in 2004 are as follows. MAERSK SEALAND (25.3%), NILE DUTCH AFRICA LINE (20.3%) and DELMAS (13.4%).

Table 4-6 Angolan imports by region (TEU)

	2002	2003	2004	Jan.～Jun. 2005
Europe	50,765	53,637	52,403	26,422
Africa	28,227	30,065	29,157	11,604
Middle East	6,783	10,664	12,888	6,646
Far East	10,469	14,517	19,760	12,941
South America	11,179	20,148	19,323	11,450
North America	6,217	8,229	6,297	3,104
	113,640	137,260	139,828	72,167

By manifest of Angolan cargo handling companies organization

Above figures are the actual volumes of imported containers. They are different from Drewry’s figures which include loading/discharging of empty vans and transshipment containers.

iv) Export from Angola (except oil and LNG)

Few cargoes have been exported. Coffee, fruit (banana, pineapple and sugar corn), fish meal, sea products (crab, shrimp, and horse mackerel), granite and scrap are the main items. A Japanese company seems to be planning to export iron from an iron mine located close to Namibe port.

4.2.2 Ports

1) Commercial ports in Angola

The coastline of Angola stretches 1,650 km from North to South. The main ports in Angola are Cabinda, Soyo, Luanda, Lobito, and Namibe, and are scattered evenly along the Angolan coastline. Luanda is the biggest port among them. Middle class ports are Lobito and Namibe, and the small class ports are Cabinda, Soyo and the Porto Amboim.

Six ports are sequentially located from the north starting with Cabinda Port, Soyo Port, Luanda Port, Porto Amboim, Lobito Port, and Namibe Port. Porto Amboim is the smallest commercial port, and has a single mooring buoy and a 25m pier. Sonangol unloads petroleum products here for domestic use.

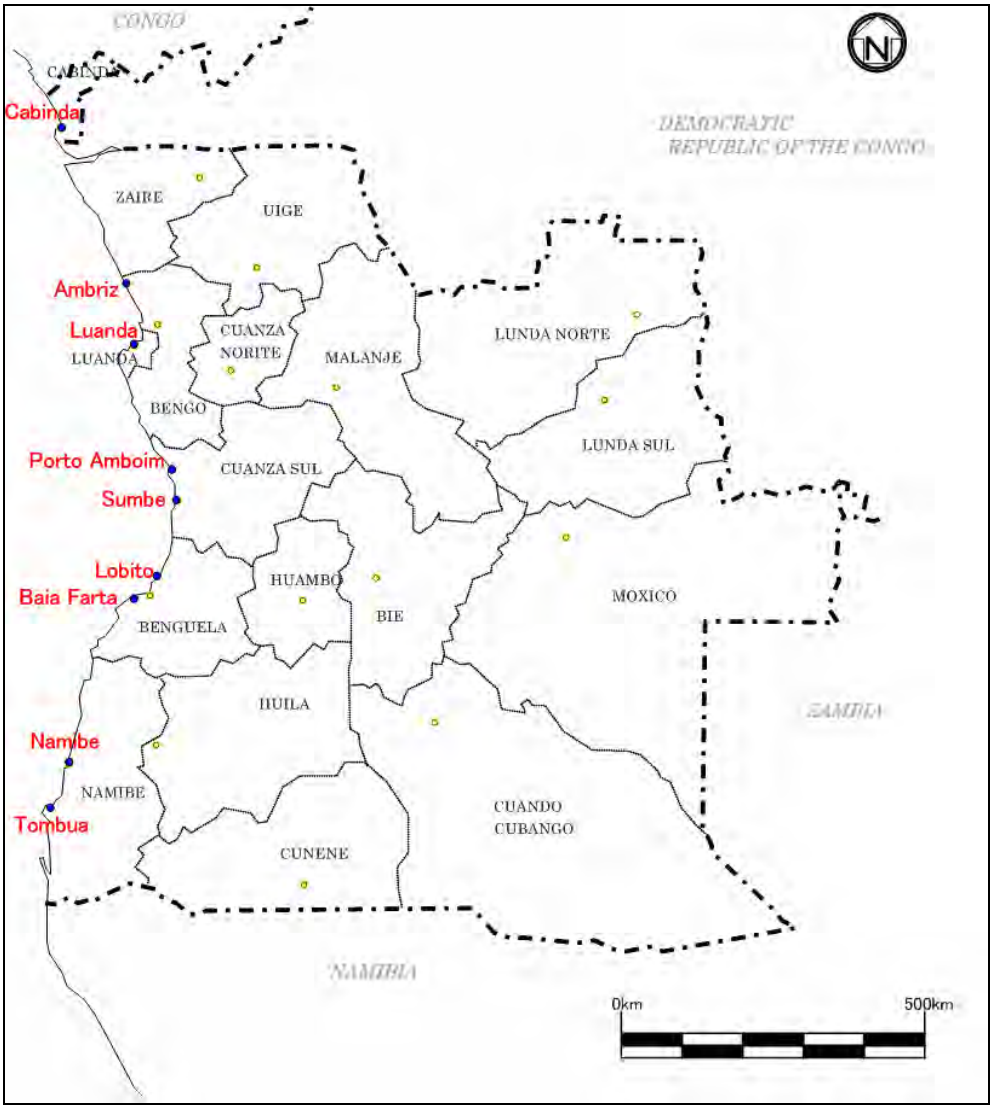


Figure 4-11 Location Map of Ports

2) Fishery Ports

The big fishery ports have jetties that can accommodate fishing boats of hundreds of tons. But small fishery ports have no berthing facilities. The natural beach slope is used for unloading the fish. The beach also has the role of market place.

Fishery ports (or, a part of the commercial port) that have quays are Ann Blitz, Luanda, Sumbe, Lobito, Baia Farta, Namibe, and Tombua. Namibe is number one in a haul of fish, and exports fish meal. Though there is a large-scale cold store behind the Namibe port, it is not used now because the power supply is unstable.

Tombua had a lot of canneries in old times. However, only one is operational at present. In this factory, 17,000 cans of sardine are produced during the year. There is no water supply, and necessary water for the factory is supplied by the water wagon.

Baia Farta produces a lot of dry fish. The fresh fish markets stand on the beaches in the vicinity of the big city. Various fresh fish such as squid, octopus, prawn, sea crayfish, crab, Lagos, sea bass, the scabbard fish, herrings, sea bream and mackerel are abundantly handled.

4.3 Regional Transport Corridor

4.3.1 SADC

In the Southern African region, plenty of natural resources and agricultural products have been transported from the inland area to ports and shipped to EU or other various countries for hundreds of years. Many roads and railways have been constructed from ports to the inland area. This network reaches to landlocked counties such as Zimbabwe or Zambia.

This transport system, which consists of ports, roads and railways and connects overseas countries with the inland region, is called a transport corridor. Developing and using the transport corridor, donor countries can provide their assistance materials smoothly and SADC countries can export their natural resources and agricultural products to other countries and activate their economies. On the SADC home page, the importance of the transport corridor is described as follows; there has also been considerable interest in the transport corridors in a wider development perspective, with ports and their connecting road and rail systems developed in conjunction with investment in industry, mining, agriculture and tourism. The most successful of these initiatives is the Maputo Development Corridor. The concept has been introduced to the other corridors linking regional ports with their hinterlands, and is being rolled out all over the region.

On the SADC home page, ten transport corridors are introduced as key transport corridors. Among then, Namibe, Lobito and Malanje corridors are relevant to Angola and this study.

North – South Corridor;
Maputo Development Corridor;
Beira Corridor;
Nacala Corridor;
Mtwara Corridor;
Dar es Salaam Corridor;
Walvis Bay Corridor;
Namibe Development Corridor;
Lobito Corridor; and
Malanje Development Corridor.

Figure 4-12 SADC Regional Transport Corridor

4.3.2 Lobito Corridor

Before it fell into disuse during the civil war, many commodities were transported from the inland region of Angola, Zambia and DRC through the Lobito corridor. Zambia and DRC have requested Angola to restore the Lobito corridor and the Angolan government is making efforts to comply with that request.

According to the SADC, major changes in traffic flows are expected when the Caminho de Ferro de Benguela in Angola is re-opened and the port of Lobito is rehabilitated.

5. Present Status and Issues of the Target Ports

5.1 Port of Luanda

5.1.1 Overview

The Port of Luanda is the biggest port in Angola located in the capital Luanda which has a population of 3 million. Opened by Portugal in 1576, it is now the physical distribution base of the North West area of the country. This port has been famous for its natural fine port since it is located at the head of the bay where is deep in water and calm surrounded by sand bank. This port handles 3/4 of ocean cargoes in Angola except crude oil and it is functioned as gateway to other areas by importing general cargoes, food and industrial commodities from overseas. The port is now becoming narrower due to a rapid increase in cargo throughput since the end of civil war. General Cargo Terminal and Multi-Purpose Terminal have been privatized under the 20 years concession contract, Port Authority manages channel, basin and navigation aid. Figure 5-1 shows the layout of the Port of Luanda and Photo 5-1 shows a panoramic view of the Port of Luanda.

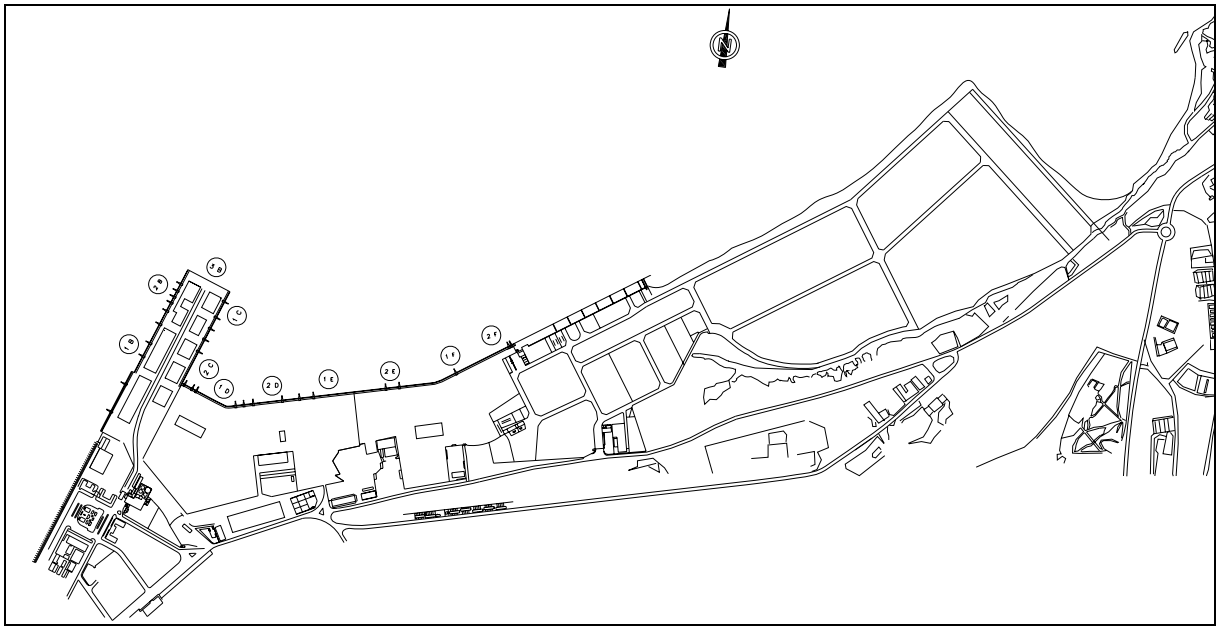
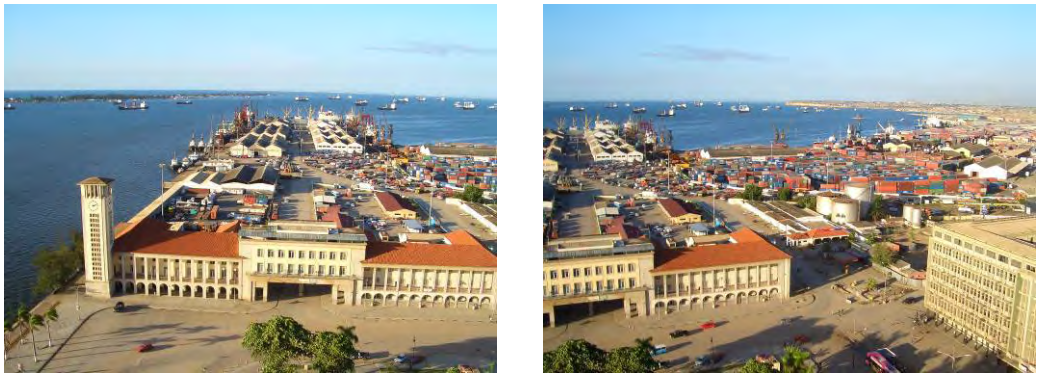


Figure 5-1 Present Layout of the Port of Luanda



Cabotage and Multipurpose Terminal Multipurpose and Container Terminal

Photo 5-1 Panoramic View of the Port of Luanda (2005)

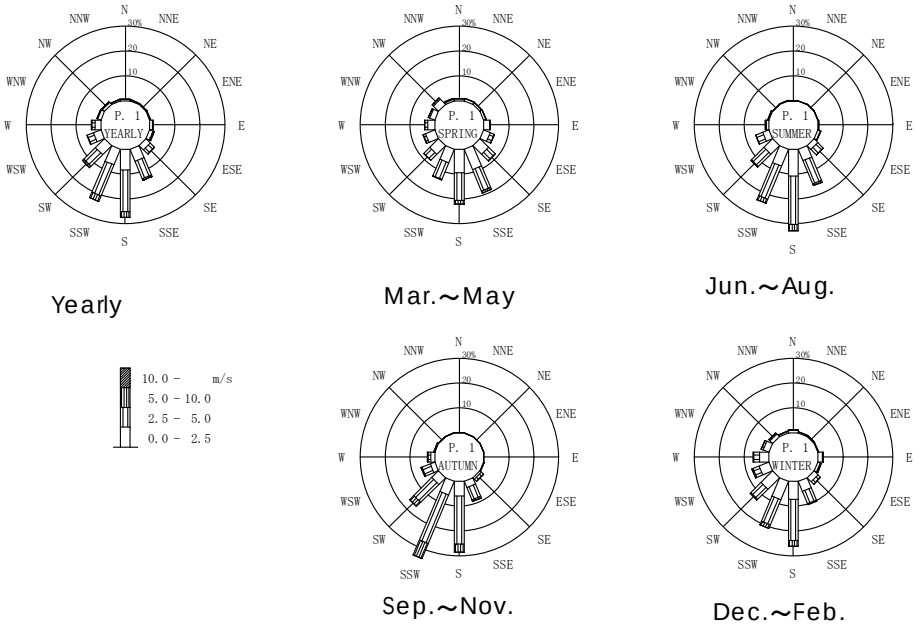
5.1.2 Natural Condition

1) Meteorological Conditions

Meteorological information was obtained through the National Institute of Meteorology and Geophysics (INAMET). Wind data was obtained through the Meteorological Agency in Japan. Republic of Angola is located in the equatorial tropical region, its climate being tempered by sea and altitude. Luanda belongs to steppe climate zone which is dry tropical.

i) Wind Direction and Wind Speed

Figure 5-2 shows wind rose and wind direction. Luanda is in the low latitude of southeastern trade wind zone, and annual mean wind speed is approximately from 2.5m/s to 5.0m/s. Wind direction is predominantly from SSE to SE.



Source : Meteorological Agency in Japan (2001～2004)

Figure 5-2 Wind Rose

ii) Temperature

The difference between annual mean high and mean low in air temperature is small like approximately 5 degrees as shown in Table 5-1, and mean high is over 30 degrees from February to April. It becomes below 20 degrees as mean low temperature in August.

Table 5-1 Monthly Mean Temperature (Centigrade)

Temperature \ Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum	29.7	30.7	31.0	30.6	29.3	26.6	24.9	24.7	26.0	27.8	28.8	29.4
Minimum	24.8	25.4	25.8	25.2	24.2	21.9	20.0	19.8	20.7	23.0	24.2	24.5
Average	27.2	28.0	28.4	27.9	26.7	24.3	22.4	22.2	23.4	25.4	26.5	27.0

Source : the Institute of National Meteorology and Geophysics in Angola(1991～2004)

iii) Humidity

The mean humidity through a year is from 71% to 78% as shown in Table 5-2. It becomes over 78% in July and August in spite of a few precipitation.

Table 5-2 Monthly Mean Humidity (%)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Humidity	73.5	71.2	74.8	77.8	76.8	75.9	78.3	78.7	77.3	76.4	74.9	74.4

Source : the Institute of National Meteorology and Geophysics in Angola(1991～2004)

iv) Precipitation

Table 5-3 shows the monthly precipitation from 1991 to 2004. It is observed relatively heavier rain fall than Lobito and Namibe, because Luanda is located at north than Lobito and Namibe. Rainy season is commenced from November and ended in April and the monthly mean precipitation of more than 90mm appears in March and April. However, it is observed a few precipitations in dry season from May to October. It is not observed tropical storm in Angola.

Table 5-3 Monthly Mean Precipitation (mm)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall	22.0	40.7	98.9	95.3	3.4	2.4	0.2	0.9	1.5	10.7	34.8	27.8

Source : the Institute of National Meteorology and Geophysics in Angola(1991～2004)

2) Hydrographic Conditions

i) Tide

Port of Luanda does not observe tide level, however the value of their tide table is very similar one with Admiralty Tide Table which issued by The UK Hydrographic Office. Tide level at Port of Luanda provided by the UK Hydrographic Office is shown in Figure 5-3.

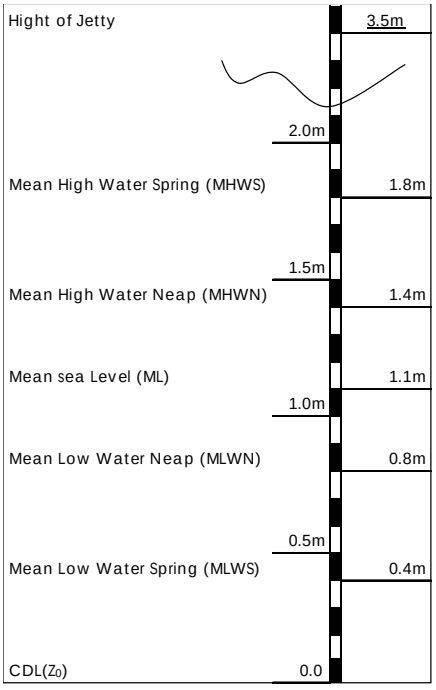


Figure 5-3 Tide Condition at Port of Luanda

ii) Tidal Current

Port of Luanda has small impact on tidal current, because Port of Luanda is located at head of Luanda bay. However, tidal current is generated at the entrance of Luanda Bay. It is considered that certain current is generated from head of bay to port of Luanda in rainy season, because rainwater and sewage water flow into Luanda Bay.

iii) Ocean Waves

The Study on Improvement of Port of Luanda and Development in 1993 by the World Bank reported that offshore wave has wave height of 2 meters when it arrived at point of Luanda island and it was attenuated 6 centimeter at the point of 500 meters from cabotage wharf in Port of Luanda. Port of Luanda is seldom affected by waves and calm. Luanda Bay has been very calm from March to June by observation.

Development Study by the World Bank described 10 second class long-period waves. Frequency of occurrence of 11.2 second period waves is the most and the share is 16.2%.

3) Topography and Bathymetry

i) Topography

There are many buildings around Luanda Bay, and rain water and domestic wasted water flow into Luanda Bay. Therefore, we observe deposited sand around mouth of drainage. There is a bridge connecting between Luanda Island and Luanda City, but now the bridge underneath was filled up and became a continued land. Also, 2 domestic waste water drainages go into the bay behind SONILS (Sonangol Integrated Logistic Services) area.

ii) Bathymetry

A continental shelf extends from the coast to 50 km offshore along Luanda area with a depth of 200 meters. Luanda Bay has a depth of 20 - 30meters, but the entrance has a depth of 15 – 17 meters. It is considered that shallow area in head of the Luanda Bay was built up by littoral drift from south before Luanda Island being connected to the land.

More than 10 meters water depth is kept around the wharf with the exception of front side of cabotage wharf. The front basin of container terminal was dredged and has a depth of ten meters. Figure 5-4 shows sounding survey results in front of the cabotage wharf.

The black dotted line indicates sounding's survey in 1993 by World Bank and the red line indicates sounding's surveyed in May 2005 in Figure 5-4. The depth contours of 1.0, 2.0 and 3 meters come closer to wharf at Zone 1 of Sector A where planned depth was 3.5 meters. Depth of Zone 2 of Sector A, which planned depth was 5.5 meters, has also become shallow. It is therefore necessary to implement periodical water depth survey by using echo sounder and estimate the volume of sedimentation. Based on the estimation, maintenance dredging shall be carried out to clear the basin and keep the design depth.

The Study Team carried out sounding survey in cooperation with DNMMP and Port of Luanda. The Study Team also made a lecture on maintenance dredging and sounding survey based on the manual with participation of technical staff members of DNMMP and Port of Luanda. As 27th PMAWCA annual council held in January 2005 recommended to build technical capacities in terms of processing of oceanographic, hydrographic and hydro-sedimentary data, and lectures have been held in this line.

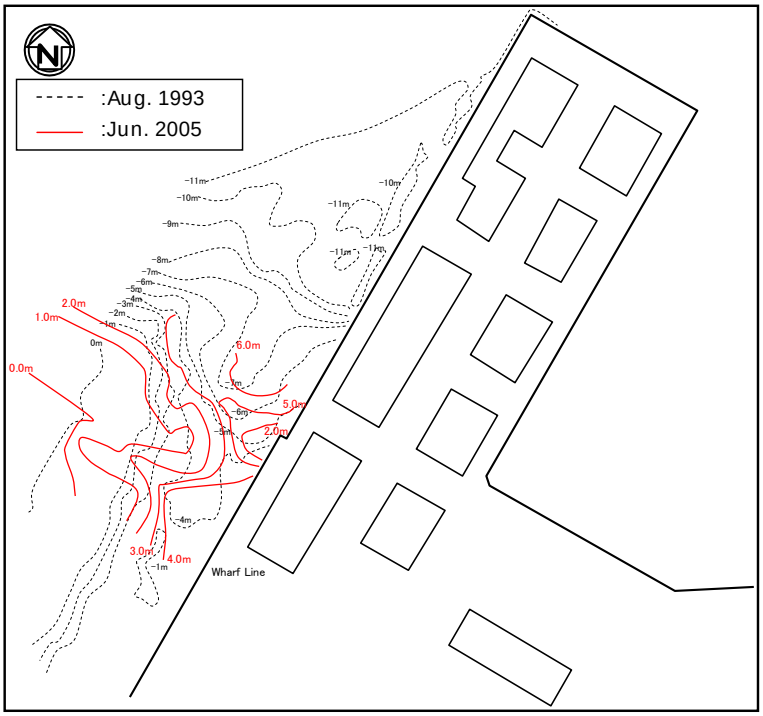


Figure 5-4 3.5m wharf sounding chart (Dotted line: 1993, Red Line: 2005)

4) Soil Conditions

According to National Institute of Geology in Angola, the basement rock of Luanda reaches to recent quaternary deposit and chalk bed with 100 meter depth from ground. Cliff around Luanda constitutes of block sandstone and partly sandstone shale. Soil condition around Port of Luanda is sandy soil and laterite.

5.1.3 Port Facilities

According to the "Directório Mar e Portos 2004", the Port of Luanda has the following aspects;

Latitude: 8^{o} 47' S – Longitude: 13^{o} 16' E – Time Zone: GMT +1h

Approach Channel: Depth at entrance is between 24 and 33 meters. No operational navigation marks exist.

Anchorage Area: Vessels can obtain safe anchorage at Luanda Bay. Good holding ground, sand and mud bottom are seen. Depth at anchorage area is between 15 and 30 meters.

Berths: There are berths for large freighters with depths of 10.5 meters. Alongside them one finger pier with width of 300 meters and 350 meters exists. The transversal ending point of the pier is 150 meters long. In addition, there are six berths exceeding 1150 meters in length.

Storage: The port of Luanda has a total surface area of about 450,000 m^2, including twenty warehouses with a total area of about 50,000 m^2. They are in poor state of repair and cargo is stored at the owner's own risk.

Cranes: Cranes are only available for discharge of bagged or palletized cargo and loading of empty containers. There are about 40 quay cranes with a capacity ranging from 3 to 45 tons. In addition, there are privately hired mobile cranes with a capacity up to 70 tons.

Container Facilities: Containers are handled at container terminals and discharged by ship's gear or privately hired mobile cranes. There are three terminals with six berths for six vessels.

1) Navigational Aids

The Port of Luanda has three navigational aids: two are in front of the Cabotage Terminal and one is in front of the Container Terminal. The findings are described as follows;

While the north navigational aid located in front of the Cabotage Terminal is a floating buoy type, the south one is a fixed type. The former has much rust on its steel members and is severely dented, while the latter is installed on shoal patches with a depth of around 1 meter. During night-time observation, lights of both of them were found to be nonfunctional.

The navigational aid in front of the Container Terminal was checked by getting on it. It was equipped with solar battery system, but the surface of its solar panel was severely tainted by bird droppings. During night-time observation, the light was found to be nonfunctional.

Three navigational buoys were found to be landed on the Cabotage Terminal. All of them were not solar-powered but battery-operated. Age-related degradations of the top marks were found in all buoys, but damage to any of the floaters was not found.

A light house on the port side is located on the hill of the port entrance, and that on the starboard side is on the tip of the sand bank of the port entrance.

2) Berthing Basin

As for the berthing basin, the water depth was measured by use of a portable echo sounding machine. The findings are described as follows;

As for the Cabotage Terminal, the water depth was -3 meters, less than the original design of -3.5 meters. Regarding the General Cargo Terminal and the Container Terminal, water depths were -5.80 meters and -11.50 meters respectively.

3) Wreckage

Many sunken and stranded vessels were found in Luanda Bay, but there was no buoy indicating their locations. In addition to that, discarded fishing crafts and unused freighters were also observed (see Photo 5-2).

Wreckage in front of SONILS

Discarded fishing crafts

Photo 5-2 Wreckage and Discarded Crafts

4) Landside Facilities

i) Cabotage Terminal

A part of precast concrete deck slab was found to have fallen down. The reason for this punching failure is assumed not to be the result of a heavy concentrated load acting on the deck slab

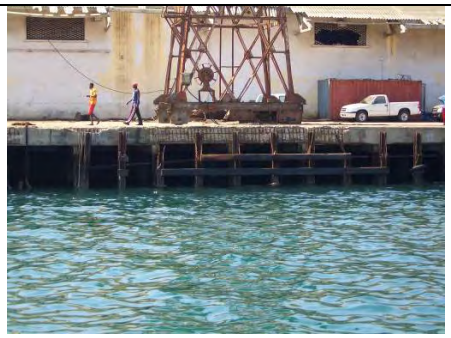
but that the precast concrete deck slab was not installed accurately on the underneath supporting beam. According to the hearing with Luanda Port Corporation, there was already a system to repair this defect. In addition, as for the side surface of the deck slab, spalling of cover concrete and exposure of reinforcing bars were observed (see Photo 5-3).

The structure of the Cabotage Terminal was found to be a jetty supported by steel piles made by welding four rails. The same piles driven at the front of the berth were connected by horizontal steel members to function as a ship berthing and mooring facility. All steel piles above water level were severely corroded, and some gaps between rails due to poor welding were observed. Punching failure of precast deck slab and damage of electric conduit were also observed (see Photo 5-4).

Most of the sprayed area did not change in color when the carbonation diagnosis was conducted by spraying phenolphthalein solution on the chipped concrete surface. This clearly indicates that the carbonation of the deck slab concrete is in a highly advanced stage. The exposed reinforcing bars were severely corroded. The measurement of the remaining wall thickness of steel piles was also carried out. At the thinnest portion of the steel pile, the remaining wall thickness was recorded at 4 mm (see Photo 5-5).

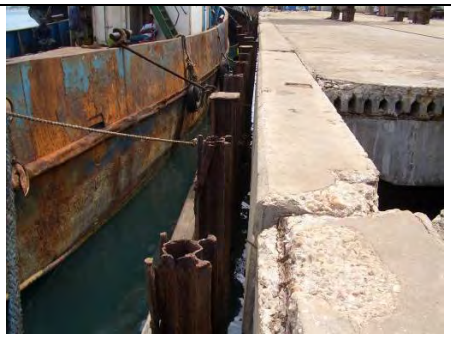
Two traveling quay cranes of 3 ton capacity manufactured in 1948 were located at the Cabotage Terminal. One of them was found to be still in operation. The rail gauge was approximately 3 meters (see Photo 5-6).

Punching failure of precast deck slab



Exposure of reinforcing bars

Photo 5-3 Damaged Condition of the Cabotage Terminal -1



Piles for ship berthing and mooring

Punching failure of precast deck slab and damage of electric conduit

Photo 5-4 Damaged Condition of the Cabotage Terminal -2

	
Spraying carbonation diagnosis indicator The pink portion remains alkaline	Measurement of wall thickness of steel material

Photo 5-5 Deterioration Survey of the Cabotage Terminal

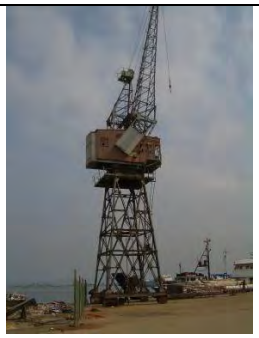
	
Quay Crane	Manufactured in 1948, maximum load of 3 tons

Photo 5-6 Quay Crane of the Cabotage Terminal

ii) General Cargo Terminal

Settlement, stripping and unevenness of the block pavement caused by wheel loads of heavy trucks and trailers were found in the west side of the General Cargo Terminal. The maximum settlement of 50 cm was observed between crane rails. In addition, extraordinary inclination of the apron pavement was found in the tip of the General Cargo Terminal, and the quay crane located there seemed to be inclining (see Photo 5-7).

As for the tip of the General Cargo Terminal, repair works of the pavement have already been finished and condition of the pavement was quite good. Cargo handling was carried out by the ship's gear because there was no quay crane there.

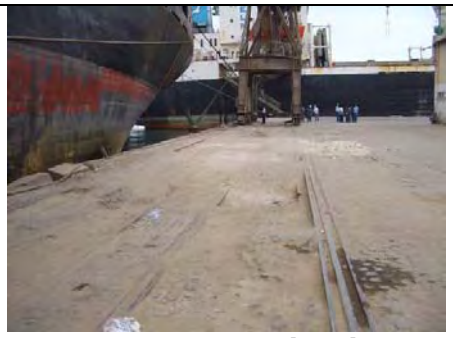
	
Settlement of pavement between crane rails	Stripping, unevenness and inclination of block pavement

Photo 5-7 West Part of General Cargo Terminal

Unevenness of pavement and railway was found in many places on the east side of the General Cargo Terminal. In addition, a turntable facility for railway, which was thought to be used some time ago, was found at the base of the east side of the General Cargo Terminal. Many waste containers and materials were also found scattered there (see Photo 5-8).

As for the south side of the General Cargo terminal, the former warehouse No.11 was demolished to construct a new container stacking yard. In addition, almost all rubber fenders, manufactured by Bridge Stone, installed on the quay wall of the General Cargo Terminal were found to be damaged and unserviceable. Impact of ships during cargo handling operations was considered to be the main reason for this collapse of rubber fenders (see Photo 5-9).

	
Unevenness of the apron pavement	Former turntable for railway

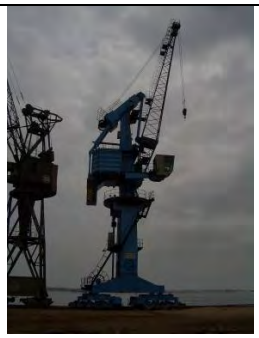
Photo 5-8 Conditions of East Side of the General Cargo Terminal

	
Construction of container yard (former warehouse No.11)	Almost all rubber fender were terribly damaged

Photo 5-9 Conditions of South Side of the General Cargo Terminal

Most of the quay cranes installed at the General Cargo Terminal were out of commission. Two of them were replaced by new quay cranes with load capacity of 22 tons, but they were reported to be scarcely used because, while they are capable of lifting cargo, the unevenness of the crane rails makes it difficult for them to move (see Photo 5-10).

Unserviceable quay cranes



Quay crane of 22 tons capacity

Photo 5-10 Cranes of the General Cargo Terminal

iii) Container Terminal

Oils were found to be poured on all over the surface of the pavement of the Container Terminal. This was reported to be the countermeasure against gyrating dust. The surface of the pavement was very slippery and smelled very bad. Unevenness of the pavement was found everywhere and some holes were also observed. Very closely stacked containers and many parked cars seemed to affect the passage of trailers (see Photo 5-11).

Oil on the pavement surface

Holes on the pavement

Photo 5-11 Condition of Container Yard

As for the quay wall of the Container Terminal, many damaged parts were observed in the coping concrete and concrete spalling and exposure of reinforcing bars were also found. Because the rubber fenders installed on the quay wall were found to be severely damaged, used tires hanging from the coping concrete were substituted as a stopgap measure (see Photo 5-12).

Damages of quay wall

Rubber fender

Photo 5-12 Conditions of Quay Wall and Rubber Fenders

Most of the quay cranes installed at the Container Terminal were out of commission. One of them was replaced by the new quay cranes with load capacity of 22 tons, but it was reported to be

scarcely used because, while they are capable of lifting cargo, the unevenness of the crane rails makes it difficult for them to move. In addition, a transfer crane located at boundary with the General Cargo Terminal was reported to be never used (see Photo 5-13).

Unserviceable quay cranes

Transfer crane

Photo 5-13 Cranes of the Container Terminal

5.1.4 Volume of Traffic

Total cargo and container volume trends at Luanda port are shown in Table 5-4 and Table 5-5. Since 2000, both total cargo and container volumes have been increasing at a fast pace. In line with the increase in cargo, number of ships is also increasing. Demand has surpassed Luanda port's capacity, and resulting in inefficient of cargo handling at yard and demurrage. The proportion of container cargo to total cargo in Luanda port is nearly 60%.

Table 5-4 Cargo Throughput of Luanda Port

Year	Unloaded (ton)	Loaded (ton)	Total (ton)	Rate of Increase
1998	1,321,180	166,084	1,487,264	
1999	1,249,049	158,997	1,408,046	-5.3%
2000	1,643,259	224,309	1,867,568	32.6%
2001	1,860,581	259,653	2,120,234	13.5%
2002	2,279,932	325,397	2,605,329	22.9%

Table 5-5 Container Throughput of Luanda Port

Year	Import	Export	Total (unit)	Annual Increase	Total (Metric ton)
1998	49,873	41,063	90,936		800,971
1999	37,617	36,496	74,113	-18.5%	678,766
2000	26,697	23,573	50,270	-32.2%	471,305
2001	67,733	59,237	126,970	152.6%	1,224,576
2002	90,544	75,327	165,871	30.6%	1,527,943

Number and tonnage of full and empty container in 2004 is shown in Table 5-6. Most of the export containers are empty. Average tonnage of one container (unit) is 8.64 ton. In 2004, the movement of container is 288,981 TEU. So the Ratio of TEU to Unit is 1.228 (see Table 5-7). The ratio of tonnage to TEU is 7.042 (ton/TEU).

Table 5-6 Full and Empty Containers in 2004

	(Unit)			(ton)		
	Import	Export	Total	Import	Export	Total
Full	133,379	6,344	139,723	1,721,275	46,985	1,768,260
Empty	19,491	95,688	115,179	313,702	259,819	573,521
Total	152,870	102,032	254,902	2,034,977	306,804	2,341,781

In 2004, 2,645 vessels called Luanda port for commercial operations. 732 vessels are International (deep sea) vessels and 1913 vessels are domestic (cabotage). On average, deep sea vessels stay 4.1 days and domestic vessels stay 2.2 days. Deep sea vessels' berth occupancy rate of Luanda port is shown in Table 5-8. In 2005, many ships were shown waiting for their turns for many days in Luanda Bay.

Table 5-7 TEU and Unit Ratio in Luanda Port

Year	TEU	Unit	TEU/Unit
2004	288,981	235,411	1.228

Table 5-8 Berth Occupancy Ratio of Luanda Port

Year	Berth Occupancy Ratio
2003	75.4%
2004	78.1%
2005 (1st Semester)	86.9%

5.1.5 Cargo Handling and Security Issues

1) Cargo handling at quay side

Since the quay cranes do not have enough power to lift heavy cargo, ship's gear is mostly used for the loading and unloading of containers. The ships which call the Port of Luanda are equipped with heavy-duty cranes that are capable of lifting up to 35~40 tons cargo. Ro-Ro ships also carry containers and cars, and cargo is quickly unloaded. The quay cranes are capable of handling empty containers only but they are not used frequently. Quay cranes are mostly used for the general cargo such as bagged cargo.

Ship cargo handling with a quay crane

Ship cargo handling with a ship gear

2) Cargo handling at the yard

Most of the general cargo is directly loaded onto trucks and carried out from the Port.

There is a transfer crane, but it is not used, possibly due to the uneven ground, the lack of bearing of the pavement, or the unreliable electric supply. The containers are handled in the container yard. Reach stackers are mostly used for the container handling. The stack height of the loaded containers is three high. The reach stacker can move forward holding a container laterally or 45 degrees tangentially. Since the movement of a reach stacker needs space, the number of containers which can be stored in the container yard is less than the case of transfer crane.

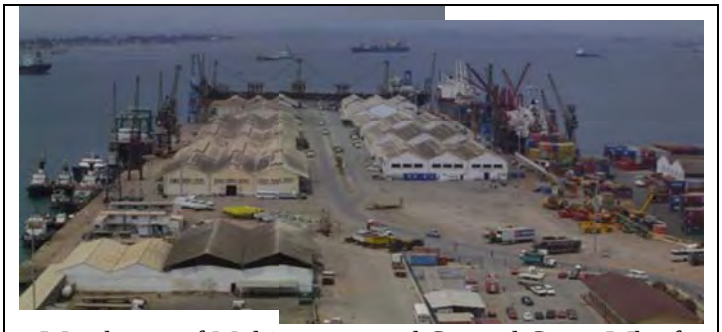
The available yard space is insufficient to cope with the annual handling volume and is responsible for the inefficient container handling operation. The pavement is excessively deteriorated. This results in inefficient container handling and damage to the machines in the form of flat tires, bursts, torsion of frames, bending of the wheel axes, etc.

All the documentation is carried out manually by pen and paper. Electrical documentation is not seen in the yard. This is not only time-consuming but errors often occur. The warehouses in the Port are not used for the storage of cargo but as office space, for the storage of spare parts or as a resting place.

Land cargo handling with a forklift

Land cargo handling with a reach stacker

Devanning in the yard



Warehouse of Multipurpose and General Cargo Wharf

Cargo handling Equipments of the port of Luanda is shown in the following table.

Table 5-9 Cargo handling Equipment of the port of Luanda

Type of Facility	Numbers	Capacity
Quay Crane	37*	3t～22t
Reach Stacker	9	Capacity 45t
Forklift	3	

* of which twenty nine were broken

3) Security Issues

In accordance with the new ISPS Code (International Ship and Port Facility Security Code) which became effective in July 2004, the ports in Angola drafted security and took necessary

measures to comply with the Code. The walls and fences surrounding the port were improved. The information system, firefighting system, electrical system and cranes were also implemented or repaired. The port of Luanda is capable of making a quick response in the event of emergency involving combustibles. Access control is conducted to prohibit the entry of suspicious persons. The uniforms of employees are different in shape and color according to the category of the job. At the port gates, guard men inspect passports or ID. Rolling gates, which have card reader, are commissioned.

The port is not as busy as the airport and thus can easily fulfill its security obligations. Security systems are also in place outside of the port. Therefore, the chance of a terrorist attack in Luanda is very small. On the other hand, many people complain of tripping at the gate. Some improvements are expected to reduce inconvenience.

Table 5-10 he IMO Registration Situation of the Port of Luanda

Port Tag	Luanda Angola		
Facility Name	Commercial Port of Luanda	Sonils	Refinaria de Luanda
Assigned Port Facility Number	0	0	0
Alternative Port Facility Name			
Port Facility Description	General Cargo Containers Palette and Bulk Terminal	Oil Supply Base	
Port Facility Has Alternative Arrangement	No	No	No
Port Facility Has Approved Port Facility Security Plan	Yes	Yes	Yes
Date Of Approval	29/06/2004	29/06/2004	29/06/2004
Port Facility Security Plan Has Been Withdrawn	No	No	No
Withdrawn date			

5.1.6 Summary of Findings

Through the review of present status and issues of the port of Luanda, following 8 points are summarized as findings of this study.

- Due to rapid increase of cargo volume, demurrage occurs
- It takes some months to pick up cargo, due to congestion inside the terminal and documentation procedures
- Some buoys are damaged and inefficient
- Part of the mooring basin (-3m) does not satisfy the required depth (-3.5m) in front of the Cabotage Terminal.
- There are many sunken vessels inside the port, but no buoys to indicate them.
- At the multipurpose terminal, pavement is settled, damaged. Fenders are broken.
- At the container terminal, superstructure of berth is damaged. Pavement is uneven and contains sink holes. Fenders are broken.
- Many quay cranes are out of order.