

CHAPTER 4. OUTLINE OF THE ALGERIAN PRINCIPAL PORTS

4.1 Typical Cargo Flow through the Algerian Principal Ports

In Algeria, there are 13 commercial ports located along the Mediterranean coast stretching about 1.2 thousand km. These ports are administrated and operated by ten port enterprises. In 1990, the total volume of cargo handled at these ports amounted to about 83 million tons consisting of loaded cargoes of about 66 million tons and unloaded cargoes of about 17 million tons (see Table 4.1).

As for loaded cargoes, hydrocarbons comprising crude petroleum, hydrocarbon gas such as LNG and LPG, refined petroleum, etc. accounted for 97.5% of the total loaded cargoes in the same year. Most of them are shipped from the three ports of Arzew, Skikda and Bejaia. One hundred percent of crude petroleum, 99.6% of hydrocarbon gas and 95.2% of refined petroleum were transported through the three ports in the same year. Most of them are exported to foreign countries and a small part of refined petroleum are transshipped from Arzew and Skikda to other Algerian ports; Algiers, Oran, Annaba and Bejaia, by coastal shipping. In addition to hydrocarbons, fertilizers such as phosphate and manufactured ones are also important exports and shipped mainly from the FERPHOS' terminal or the ASMIDAL's terminal within the Annaba Port.

On the other hand, as for unloaded cargoes, cereals such as wheat and maize accounted for 28.0% of the total in the same year, showing the largest share. Foodstuffs and feed, refined petroleum, cement, manufactures such as machinery and vehicles, metallurgic products such as steel products, agricultural products excluding cereals and solid combustible mineral primarily consisting of coal followed the cereals, accounting for 18.4%, 10.9%, 9.6%, 8.6%, 5.7%, 5.5% and 5.3% of the total, respectively. These cargoes covered 92% of the total discharged cargoes.

Cereals are transported by bulk carriers and discharged at the above principal ports excluding the Arzew Port. Then, the cereals are stored into the silos or loaded directly onto trucks or wagons from the vessels so as to be evacuated outside of the ports. Most of the silos belong to the OAIC, and some of them were conceded from the port enterprises to the OAIC, with the total

storage capacity of 161,000 tons. In 1990, the volume of cereals unloaded at the ports of Algiers, Annaba and Oran accounted for 69.0% of the total. The ports of Skikda, Bejaia, Mostaganem and Ghazaouet are also playing an important role in storing imported cereals and distributing them to the OAIC's mills located in their respective hinterlands.

Foodstuffs and feed comprising sugar, milk, feed, oleaginous products, flour, semolina, coffee, meat, etc. are transported by general cargo vessels, Ro-Ro vessels and bulk carriers. Raw sugar and feed for livestock are transported by bulk carriers. Refined sugar, flour, semolina, coffee, etc. are generally transported by general cargo vessels in sacks. The other commodities are transported by general cargo vessels or Ro-Ro vessels in various package types such as sack, carton, case, pallet and container. These cargoes are discharged at the above principal ports and then distributed to their respective hinterlands. The share of the Port of Algiers in 1990 accounted for 29% of the total, followed by the ports of Bejaia, Oran, Annaba, Mostaganem, Skikda with 13%, 12.8%, 12.2%, 11.0% and 10.0%, respectively.

Most of cement are imported in bulk and partly in sacks. At the ports of Algiers, Oran and Bejaia, floating plants for storing and packing cement are stationing. Cement in bulk is received from vessels to the plants and then stored, packed into sacks and finally evacuated by trucks or wagons. The Cement discharged at the above three ports in 1990 accounted for 91.7% of the total.

Manufactures such as machinery and vehicles discharged at the Port of Algiers in 1990 accounted for 73.3% of the total, and the ports of Oran, Skikda and Annaba followed with 9.0%, 6.3% and 4.7%, respectively. These four ports covered 93.3% of the total.

Metallurgic products primarily consisting of steel products are generally transported by general cargo vessels and discharged at the above Algerian principal ports. The Port of Algiers took the first place in share in 1990 with 31.6% of the total, and followed by the ports of Skikda, Oran, Bejaia, Annaba and Mostaganem with 17.7%, 14.3%, 12.5%, 10.3% and 7.2%, respectively.

Almost 100% of solid combustible mineral primarily consisting of coal is discharged at the Port of Annaba where the SIDER was conceded its terminal

with coal stacking yards from the EPAN. The SIDER imports coal for its steel making factory located in El Hadjar around 12 km south to Annaba.

From the above, major cargo flows by commodity through the Algerian principal ports are shown as follows:

- Cereals, other agricultural products, livestock, foodstuffs and feed: Imported through the most of principal ports,
- Solid combustible mineral: Imported through the Port of Annaba,
- Crude petroleum: Exported through the ports of Arzew/Bethioua and Bejaia,
- Hydrocarbon gas: Exported through the ports of Arzew/Bethioua and Skikda,
- Refined petroleum: Mainly exported through the ports of Arzew/Bethioua and Skikda, and partly transshipped to the ports of Algiers, Oran, Annaba and Bejaia,
- Metallurgic products: Imported through the most of principal ports,
- Cement: Imported through the floating cement plants at the ports of Algiers, Oran and Bejaia,
- Manufactures including machinery, vehicles, etc.: Three fourths of the total is imported through the Port of Algiers.

Out of the above Algerian principal commercial ports, the ports of Algiers, Annaba, Oran, Arzew/Bethioua, Skikda, Bejaia and Mostaganem accounted for 94.8% of the total cargoes discharged in 1990, and 99.9% of the total loaded cargoes. In addition to these ports, a new deep-sea port Djen Djen which was planned to serve a steel making factory to be established in Belara, though not yet materialized, is ready to be in operation. The outline of these ports excluding the three ports of Algiers, Oran and Annaba are described in Appendix A.1. The present conditions and activities of the ports in the study are mentioned in Chapter V - Chapter VII in details.

Table 4.1 Cargo Volume Handled at the Algerian Principal Ports in 1990

Commodities	Unit: Thousand Tons											Share (%)	Unload. Load
	Unloading/Loading	Algiers	Annaba	Oran	Arzew/Bethioua	Skikda	Bejala	Mostaganem	Ghazaouet	Tenes	Jijel		
Cereals	Unloading	1,340	866	1,186	440	523	350	189	11	5	4,910	28.0	
	Share (%)	27.3	17.6	24.1	9.0	10.7	7.1	3.8	0.2	0.1	100.0		
	Loading											92	0.1
Other Agricultural Products & Livestocks	Unloading	302	105	85	119	150	83	44	43	24	955	5.5	
	Share (%)	31.6	11.0	8.9	12.6	15.7	8.6	4.5	4.5	2.5	100.0		
	Loading	0	0	0	5	0	0	0	0	0	6	0.0	
Foodstuffs & Feed	Unloading	938	394	415	327	420	356	142	140	85	3,233	18.4	
	Share (%)	29.0	12.2	12.8	10.1	13.0	11.0	4.4	4.3	2.6	100.0		
	Loading	0	0	4	4	1	20	29			927	5.3	
Solid Combustible Minerals	Unloading		926	1							100.0		
	Share (%)		99.9	0.1							100.0		
	Loading		3								3	0.0	
Crude Petroleum	Unloading			32							32	0.2	
	Share (%)			32	22,036	8,339					30,375	46.1	
	Loading			1	72.5	27.5					100.0		
Hydrocarbon Gas	Unloading	326	16	1	14,977	3,581					18,627	3.1	
	Share (%)		0.4	0.4	80.4	19.2					100.0		
	Loading				264	165					1,911	10.9	
Refined Petroleum	Unloading	18.0	22.2	24.9	13.8	8.6					100.0		
	Share (%)	734	4.8	17	10.3	84.9					15,208	23.1	
	Loading	59	1	3	14	5					107	0.6	
Other Hydrocarbons	Unloading	6	18	3	6						32	0.0	
	Share (%)										58	0.3	
	Loading	8	19	14	3						51	0.1	
Metallurgic Products	Unloading	314	103	148	1	175					995	5.7	
	Share (%)	31.6	10.3	14.8	0.1	17.7					100.0		
	Loading	1	304	0							315	0.5	
Cement	Unloading	697	66	13	270	62					1,687	9.6	
	Share (%)	41.3	4.0	0.9	16.0	3.7					100.0		
	Loading	40	102	36							203	1.2	
Minerals & Other Construction Materials	Unloading	21	66	13	8	8					65	0.1	
	Share (%)	0.0	93.1	0.0	4.5	0.0					140	0.8	
	Loading	65	48	117							849	1.3	
Chemical Products	Unloading	2	0	3							331	1.9	
	Share (%)										9	0.0	
	Loading	1,099	70	135	10	94					1,499	8.6	
Machinery, Vehicles, Manufactures & Other Special Transactions	Unloading	73.3	4.7	9.0	0.7	6.3					100.0		
	Share (%)	134	7	18	2	17					202	0.3	
	Loading	5,545	3,122	2,930	445	1,393					17,523	100.0	
Total	Unloading	31.6	17.8	16.7	2.5	7.9					100.0		
	Share (%)	885	1,212	42	38,630	16,545					65,863	100.0	
	Loading	1.3	1.8	0.1	58.7	25.1					100.0		
Total		6,430	4,334	2,972	39,076	17,938					83,386		

Source: The Ministry of Transport

4.2 Port Administration System in Algeria

4.2.1 Outline

The Ministry of Transport and the Ministry of Equipment are in charge of port administration and construction.

The Ministry of Transport regulates the port enterprises responsible for port administration and operation. A port enterprise is managed by a board of directors that is composed of representatives of related corporations. As an autonomous body, the port enterprise provides the cargo handling equipment, warehouses, transit sheds and tugs necessary for profitable port operations. Additionally, the port enterprise carries out cargo handling services, pilotage and responsibilities as the harbor master.

On the other hand, the Ministry of Equipment is in charge of construction and maintenance of port infrastructures, such as breakwaters, quays and passages, through the civil works department of the 'wilaya', a local office of the national government.

Plans for port facilities made after discussion among the Ministry of Transport, the Ministry of Equipment, the port enterprise, the wilaya and related corporations. Priority is given to plan with clear benefits for the national economy.

4.2.2 Port Enterprise

The Port Enterprises (Entreprise Portuaire--EP) were established on August 14, 1982, as part of a reorganization of the Port Sector. At the same time, personnel and plant equipment were transferred to the new organizations as a financial asset base. The EPs are in charge of management, operation, development of ports within a limited territory. There are ten port enterprises, administrating and managing thirteen commercial ports in Algeria.

The EPs have the following objectives and characteristics:

- they have a monopoly on barge and cargo-handling operations in the port.

- they have a monopoly on the operation of pilotage and tugs.
- they operate equipment and facilities in the port.
- they carry out technical work for the development, maintenance, and improvement of the superstructures in the port.

- with other relevant authorities, they develop technical programs for the development, construction and maintenance of port infrastructures.
- they are responsible for the general security of installations owned by the public sector in a port.
- they adhere to policies on public hygiene and maintain environmental standards.

4.3 Environment Aspects

4.3.1 General

Ports in Algeria are situated all along the coast of Mediterranean sea. Since the Mediterranean sea is closed except at the strait of Gibraltar, water pollution is more sensitive compared to the ocean.

Sources of water pollution to the sea water are;

- natural discharge water from the land, mostly by rivers
- sewage of cities
- discharge and spillage water from industries
- discharge from vessels and ports
- fishing activities

Water quality at a port is particularly vulnerable because the major ports are located at the coast of densely populated areas, where volume of waste water of various sources is large.

4.3.2 Water quality in the major ports

The major commercial ports in Algeria, namely, Algiers, Oran and Annaba are no exception to above mentioned condition. All these three ports have well protected basins where ships can berth safely. Consequently, the water in the harbor is comparatively stagnant and vulnerable to contamination.

The major source of water pollution in the Algerian ports at present seems to come from sewage water from cities and discharge from industries. In the case at Algiers, sewage and discharge from industries cause serious results. One of the main city sewage outlets is located at the Mustapha basin (Bassin de Mustapha) at Quay No.24. The water quality from the sewage is bad because it is not at all treated.

At the port of Oran, the city sewage is directly discharged into the harbor basin at Quays No.11,15,19 and 21. One of the sewage outlets is located at the outside of the breakwater at the old harbor. Due to its discharge, water color of the sea changes along the outside of the breakwater but this discharge

does not affect the harbor seriously.

At the port of Annaba, there is no major sewage outlet in the harbor.

Discharge from industries around the port area is one of the major sources of contaminant to the harbor. This is particularly noticed in the port of Algiers, because of existence of a detergent factory with discharge outlet into the harbor at Quay No.36. The water from the duct is stained with white suspension.

Discharge and drainage from the quay area is normally not observed unless it is raining. Surface of the quay in these three major ports in Algeria are heavily polluted and stained by various oil, chemicals and foodstuffs spilled from cargoes as well as cargo handling equipment. There is no treatment facility for the surface drainage water from the quay. Consequently, when rain falls, rainwater over the quay area washes all the polluted substances on the surface of the quay into the harbor thus damages to the water quality of the harbor.

Degree of water pollution inside the harbor at the port of Algiers is so bad that ships mates refuse to take ballast water from the harbor after emptying their cargo. This endangers the of navigation at rough weather. Other major ports are not yet so seriously polluted as in the case of Algiers.

Discharge from ships in the harbor is not observed which may probably be due to the introduction of MARPOL convention.

4.3.3 MARPOL Convention

Since introduction and ratification of the MARPOL Convention and other related protocol by the Algerian Government, water quality control within the port limit is normally observed by vessels. The immediate pollution by hydrocarbons caused by vessels are not recognizable in the major ports. There exists, however, many tasks to be done in order to achieve objectives of such international rules.

According to the MARPOL convention, ship can not dump or discharge its ballast, bilge and tank cleaning waters containing hydrocarbon directly into the sea. Consequently, the ports have to provide reception facilities for these

waters. The ports, then, have to process such waters into harmless clean waters before returning them into the sea.

Needs for such facilities are well recognized among the ports in Algeria and installation of oil-water separating plants are planned but not yet fully accommodated. Refusal of waste water from reception ships at a port may give an excuse for dumping such water at high sea by the ships.

4.3.4 Solid waste

Reception of solid waste from ships including garbage and other inflammable waste are accepted at the ports in Algeria. They are treated as normal city waste and are sent to the city dumps.

4.3.5 Pollution of harbor sea bed

Sedimentation in the harbor is another factor of pollution. With accumulation of sediment caused by drainage from various sources, sediment material in the harbor is seriously contaminated in Algerian ports.

Particularly, in the port of Algiers, the bottom soil in the harbor is reportedly contaminated by various toxic materials including mercury, PCB as well as hydrocarbons. The degree of contamination is exceeding beyond the level of acceptable limit for ocean disposal and dredged soils must be placed to the specially prepared filling site along the coast.

A dumping site for such dredged material is planned along the coast east of the harbor entrance some 1.5km away. The dike to enclose this area will be built by rock mound with impermeable filter layer at the back of the dike so that the contaminated materials should not escape to the environment.

Similar situation is reported at the port of Annaba. According to the recent study for proposed dredging plan, dredged material need to be placed to the filling ground as similar to the case of Algiers. Relatively high content of toxic materials such as mercury, cadmium, PCB are detected besides large quantity of hydrocarbons and other organic materials.

CHAPTER 5 THE PORT OF ALGIERS

5.1 Port Facilities

5.1.1 Infrastructures and Superstructures

(1) Breakwaters

Breakwaters with a total length of more than 4,000 m protect the basins from violent waves attacking the port in the winter season. The breakwaters consist of the following:

- Jetee Kheir-Eddine
- Jetee Du Vieux Port
- Jetee Du l'Agha
- Jetee Du Mustapha
- Brise-Lames Est

(2) Access Channels

There are two access channels; Passe Nord and Passe Sud, at the Port of Algiers. Breadth and water depths at the entrances are as follows:

- Passe Nord: breadth of 176 m, a water depth of 22 m,
- Passe Sud: breadth of 240 m, a water depth of 16 m.

(3) Basins

Basins protected by the above breakwaters have a total area of 184 ha, and are composed of the following three basins:

- Bassin Du Vieux Port: area of 74ha and water depths of 7-20 m,
- Bassin Du Agha Port: area of 35ha and water depths of 6.5-15 m,
- Bassin Du Mustapha Port: area of 75ha and water depths of 7-11 m.

(4) Quays

1) Outline

The total quay length of the Port of Algiers is 9,734 m and allocated as follows (see Table 5.1.1):

- Quays No.1-No.4 with a total length of 577 m are used for fishing boats.
- Quay No.12 with a length of 136 m is used for tugboats.
- Quays No.13-No.16 are used for repairs of floating ships, and Quays from No.13 to the center of No.15 are for the Navy and the remaining is for the ERENAV. A total length is 681 m.
- The North half of Quay No.17 is used for tugboats.
- The west half of Quay No.26 is used by the Wilaya's maritime works division and the SONATRAM.
- Mole de Guelma with a total length of 560 m and a water depth of less than 9 m is used for stationing of bunker barges. Fuel tanks at the wharf are seldom used.
- Excluding the above quays, the remaining with a total length of around 7,500 m are used for loading and unloading of port cargoes.

2) Quays for discharging or loading port cargoes

The port areas are divided into three zones; the north, central and south zones. There is no internal road which connects the north zone and the other two zones; the central and south zones. The compounds of the Navy and the ERENAV separates the north zone from the central and south zones. Hence, trucks or tractor-trailer units need to use a common road to transfer port cargoes between the separated zones. The common road runs along the outside of the bonded areas enclosed by fences, and is usually heavily congested.

Table 5.1.1 Dimensions and Utilization of the Quays

Name of Quay	No. of Berths	Basin	Water Depth (m)	Length (m)	Remarks
1	Trawler	Vieux Port	3.75	140	Specialized for fishing boats
2	Trawler	Vieux Port	5.90	38	Specialized for fishing boats
3	Trawler	Vieux Port	3.75	121	Specialized for fishing boats
4	Trawler	Vieux Port	6.10	278	Specialized for fishing boats
5	1	Vieux Port	7.20	178	Priority use for Ro-Ro
6	1	Vieux Port	9.60	137	Priority use for foodstuffs
7	1	Vieux Port	7.80	185	Priority use for Ro-Ro
8	1	Vieux Port	8.00	262	Priority use for foodstuffs
9	2	Vieux Port	8.66-10.60	288	Priority use for foodstuffs & Ro-Ro
10	1	Vieux Port	10.50	125	General cargo
11	2	Vieux Port	10.50-11.00	300	Specialized for car ferries
12	-	Vieux Port	6.00	136	Tugboats
13	1	Vieux Port	4.40	185	Repairs for floating vessels
14	1	Vieux Port	6.80	175	Repairs for floating vessels
Guelna	3	Vieux Port	9.00	560	Specialized for petroleum products
15	1	Agha	8.00	125	No available
16	2	Agha	8.40	216	Repairs for floating vessels
17	1	Agha	6.30	220	Specialized for heavy goods such as marble gravels
18	2	Agha	6.80-7.50	276	Priority use for Ro-Ro
19	1	Agha	6.60	175	General cargo
20	2	Agha	7.50-9.00	270	Priority use for Ro-Ro
21	1	Agha	6.50	190	General cargo
22	4	Agha	8.00-9.00	560	One berth for Ro-Ro
22P/Coupe	1	Agha	9.00	145	General cargo
23P/Coupe	1				
23	3	Mustapha	7.60	410	One berth for Ro-Ro
24	1	Mustapha	8.50	100	Specialized for Ro-Ro
25	1	Mustapha	8.50	100	Specialized for Ro-Ro
26	1	Mustapha	6.20	300	Specialized for solid bulk such as soya
27	2	Mustapha	6.00-8.25	240	Specialized for fuel oil and bitumen
28	1	Mustapha	6.00	174	General cargo
29	2	Mustapha	7.00-8.50	308	Priority use for Ro-Ro
30	1	Mustapha	9.30	160	General cargo
31	3	Mustapha	8.5-10.00	456	Priority use for Ro-Ro and oil tankers
32	1	Mustapha	7.50	170	Specialized for containers and oil
33	3	Mustapha	8.00-10.00	430	Priority use for wood, iron and containers
34	1	Mustapha	11.00	170	Priority use for cement
35	3	Mustapha	9.5-10.50	475	Specialized for cereal carriers
36	1	Mustapha	9.00	160	Priority use for oil tankers
37	3	Mustapha	10.5-11.00	606	Specialized for petroleum tankers

Source: the EPAL

- The north zone:

- Quay No.5 (Mole El Djefna)

- Water depth: 7.20 m

- Length: 178 m

- Equipped with a Ro-Ro ramp at the bottom of the wharf

- Utilization: The quay is used predominantly for receiving general cargo vessels from which flour or semolina in sacks imported mainly by the ENIAL is discharged directly onto trucks for swift evacuation from the port limits.

- Quay No.6 (Mole El Djefna)

- Water depth: 9.60 m

- Length: 137 m

- Utilization: The quay is used mainly for receiving general cargo vessels from which sacked foodstuffs such as coffee and sugar are discharged.

- Quay No.7 (Mole El Djefna)

- Water depth: 7.80 m

- Length: 185 m

- Equipped with a Ro-Ro ramp at the bottom of the wharf

- Utilization: The quay is used mainly for receiving Ro-Ro vessels which carries general cargoes such as machinery, spareparts, foodstuffs, construction materials, textile, vehicles, etc. When transporting these cargoes by Ro-Ro vessels, various kinds of packages such as pallets, containers, cases, etc. are used. Containers are usually laid directly on decks and unloaded by forklifts in the same way as pallets and cases. Larger portion of containers is transported by Ro-Ro in such way than in the case of general cargo vessels. Only a small portion of cargoes are transported by trailers or trucks apart from the case where tractor-trailers units or trucks themselves are transported as cargoes. After being discharged from the vessels, these cargoes are stored in open yards or sheds for necessary procedures including customs clearance. Average dwelling times of such general cargoes are around two months except for some perishable cargoes such as foodstuffs stipulated by the customs regulation.

- Quay No.8
 - Water depth: 8.00 m
 - Length: 262 m
 - Utilization: The quay is used mainly for unloading foodstuffs such as semolina and flour in sacks.

- Quay No.9 (Mole El Djazair)
 - Water depth: 8.66-10.6 m
 - Length: 288 m
 - Number of berths: 2
 - Equipped with a Ro-Ro ramp at the bottom of the wharf
 - Utilization: The quay is also used mainly for unloading foodstuffs such as semolina, flour, sugar, milk, potatoes. These sacked cargoes are often transported by one lot and evacuated swiftly from the port.

- Quay No.10 (Mole El Djazair)
 - Water depth: 10.5 m
 - Length: 125 m
 - Utilization: General cargoes

- Quay No.11 (Mole El Djazair)
 - Water depth: 10.5-11.0 m
 - Length: 288 m
 - Number of berths: 2
 - Equipped with a Ro-Ro ramp at the bottom of the wharf
 - Utilization: The quay has two berths and the second berth equipped with a Ro-Ro ramp serves for car ferries that are plying between Algeria and countries along the Mediterranean Coast. Behind the quay, there is a maritime terminal for passengers and lots are prepared for the vehicles. There is a gate behind the Ro-Ro ramp. Great congestions are observed at and around this gate at each arrival and departure of car ferries. On the other hand, the first berth of the quay is often used to unload flour imported by the ENIAL. The quay is also used for large car carriers with side rampways coming from Japan, etc.

- The central and south zones
 - Quay No.17
 - Water depth: 6.3 m
 - Length: 220 m
 - Utilization: As mentioned previously, the north half of the quay is used for mooring of tugboats. Behind the remaining south portion of the quay, the ENAMARBRE has yard for storing marble's gravel mainly transported by domestic coastal shipping. The enterprise has also its own quay cranes of 4 tons lifting capacity of grab type. Thus, the quay is used on a priority base for the enterprise.
 - Quay No.18 (Mole Ghara Djebilet)
 - Water depth: 6.8-7.5 m
 - Length: 276 m
 - Number of berths: 2
 - Equipped with a Ro-Ro ramp at the bottom of the wharf
 - Utilization: Just behind the quay, there is a open yard without any shed. Hence, the quay is often used to discharge bulky and heavy cargoes such as wood, steel products and nonferrous metal. Chemical products such as pharmaceutical products and soda are also handled there.
 - Quay No.19:(Mole Ghara Djebilet)
 - Water depth: 6.6 m
 - Length: 175 m
 - Utilization: The quay is used for general cargoes. The quay is located at the tip of the wharf, there is no space for storage behind the quay.
 - Quay No.20 (Mole Ghara Djebilet)
 - Water depth: 7.5-9.0 m
 - Length: 270 m
 - Number of berths: 2
 - Equipped with a Ro-Ro ramp at the bottom of the wharf
 - Utilization: Though Ro-Ro ramp is installed at the second berth of the quay, the berth is used for both Ro-Ro vessels and general cargo vessels. The quay is also used to receive large car carriers equipped

with side rampways as there is some open yard adjacent to the wharf though not so spacious.

- Quay No.21
 - Water depth: 6.5 m
 - Length: 190 m
 - Utilization: As there is an open yard behind the quay, bulky and heavy cargoes such as wood and steel products are handled. Foodstuffs such as butter in carton and chemical products such as resin in one lot are also discharged there. Because of insufficient water depth, only vessels of small size can be received.

- Quay No.22 (Mole Bologhine)
 - Water depth: 8.0-9.0 m
 - Length: 550 m
 - Number of berths: 4
 - Equipped with a Ro-Ro ramp at the bottom of the wharf
 - Utilization: The fourth berth equipped with a Ro-Ro ramp is used predominantly for Ro-Ro vessels. As mentioned previously, major package types are container, pallet and case in Ro-Ro vessels. Containers are stacked on the open yard near the fourth berth, namely the yard behind the quay No.21. The remaining three berths are used for general cargo vessels. Foodstuffs such as milk, tomato, green peppers, coffee, tobacco are observed to be discharged. These cargoes are often transported by one lot by general cargo vessels of comparatively small size under 5,000 DWT. Behind the quay, there are four sheds besides small open yards around the sheds.

- Quay No.22 P/Coupe (Mole Ghara Djebilet)
 - Water depth: 9 m
 - Length: 145 m
 - Utilization: General cargoes

- Quay No.23 (Mole Ghara Djebilet)
 - Water depth: 7.6 m
 - Length: 410 m
 - Number of berths: 4
 - Equipped with a Ro-Ro ramp at the bottom of the wharf

- Utilization: The quay is used to cater mainly for general cargo vessels. The fourth berth equipped with a Ro-Ro ramp is sometimes used for Ro-Ro vessels but not predominantly.
- Quay No.24 and No.25
 - Water depth: 8.5 m
 - Length: 200 m
 - Number of berths: one each and total two
 - Equipped with one Ro-Ro ramp each
 - Utilization: The quays with two Ro-Ro ramps are specialized for Ro-Ro vessels and they are unusable for vessels of other types due to structural restriction. After being brought out from Ro-Ro vessels' decks, containers are stacked in the open yards behind the two quays.
- Quay No.26
 - Water depth: 6.2 m
 - Length: 300 m
 - Utilization: Approximately the east half of the quay is specialized for handling solid bulk such as grains for feed. The quay was conceded to the ONAB and the enterprise has its own cranes and is presently constructing a silo behind the quay. Soya is major grains imported from foreign countries such as the United States.
- Quay No.27
 - Water depth: 6.0-8.25 m
 - Length: 240 m
 - Number of berths: 2
 - Utilization: The NAFTAL has a petroleum pipe connecting the quay and tanks installed in its conceded compound behind the quay mainly for loading fuel oil. The quay is also used by Ro-Ro vessels. The fact is that containers are mainly transported by Ro-Ro vessels and near the quay, there is an open yard which is used for stacking containers.
- Quay No.28
 - Water depth: 6.0 m
 - Length: 174 m
 - Utilization: The quay is for handling general cargoes. Though there

is no Ro-Ro ramp, sometimes Ro-Ro vessels use this quay mooring rectangularly to the berth line, which is quite unnatural. The reason is the same as the Quay No.27.

- Quay No.29 (Mole El Hadjar)
 - Water depth: 7.0-8.5 m
 - Length: 308 m
 - Number of berths: 2
 - Equipped with a Ro-Ro ramp at the bottom of the quay
 - Utilization: Ro-Ro vessels which transport cargoes in containers as major cargoes use predominantly the second berth of the quay. After discharging, containers are transferred to the container yard near the berth mentioned above. On the other hand, the first berth is used for general cargo vessels and many cases are also found where cargoes in containers are discharged.

- Quay No.30 (Mole El Hadjar)
 - Water depth: 9.3 m
 - Length: 160 m
 - Utilization: The quay is for handling general cargoes. The quay doesn't seem to be well utilized due to the fact that it is located at the tip of the wharf.

- Quay No.31 (Mole El Hadjar)
 - Water depth: 8.5-10.0 m
 - Length: 456 m
 - Number of berths: 3
 - Utilization: Conditions of utilization of the quay is similar to that of Quay No.29.

- Quay No.32 (Mole El Hadjar)
 - Water depth: 7.5 m
 - Length: 170 m
 - Utilization: The ENCG has rubber hose connecting between the quay and tanks for storing vegetable oil and animal fat installed in its compound within the port area. In addition to tankers transporting such oil, the quay is also used for both general cargo vessels and Ro-Ro.

- Quay No.33 (Mole de Skikda)
 - Water depth: 8.0-10.0 m
 - Length: 430 m
 - Number of berths: 3
 - Utilization: There is no sheds on the wharf, and therefore, the quay is used for bulky and heavy cargoes such as steel products and wood. Sometimes the quay receives cereal carriers to cope with the shortage of the capacity of Quay No. 35 specialized for cereal carriers.

- Quay No.34 (Mole de Skikda)
 - Water depth: 11.0 m
 - Length: 170 m
 - Utilization: A cement plant floating barge for storing bulk cement and packing it into bags is stationing along the quay.

- Quay No.35 (Mole de Skikda)
 - Water depth: 9.5-10.5 m
 - Length: 475 m
 - Number of berths: 3
 - Utilization: The quay is specialized for the use of handling cereals mainly wheat and partly maize. Such cereals are carried by cereal carriers in bulk and discharged by rail-mounted pneumatic cranes installed along from the second to the third berths. Then, they are stored into silos of 30,000 tons capacity or partly loaded onto trucks or wagons to be evacuated directly to the outside of the port. When discharging at the first berth, mobile pneumatic unloaders are used to load directly onto trucks.

- Quay No.36
 - Water depth: 9 m
 - Length: 160 m
 - Utilization: The ENCG uses the quay to unload vegetable oil or animal fat for their production. There is also connecting hose at the Quay No.36. The quay is used for other vessels besides oil tankers.

- Quay No.37 (Brise Lames Est)
 - Water depth: 10.5-11.0 m
 - Length: 606 m

- Number of berths: 3
- Utilization: The use of the quay is specialized for discharging hydrocarbons such as butane, gasoline, diesel oil, and kerosene or loading fuel oil. The NAFTAL conducts these operations.

3) Storage Facilities

There are 23 transit sheds with a total floor area of around 73,000 sq. m within the port limits enclosed with fences. Open storage yards with a total area of around 274,000 sq. m are also allocated within the limits (see Fig. 5.1.1 and Table 5.1.2). Compared with a total land area of around 126 ha in the port, the area prepared for storage of port cargoes seems considerably small. The fact is that a large portion of the port area is occupied by many concessionaires. Most of the transit sheds are installed close to berth lines on the wharves of a finger type, and consequently, aprons used for cargo-handling operations between vessels and quay sides are narrow. Open storage yards are allocated on and behind the wharves. The yards behind the wharves are mainly used for containers and vehicles. There is a yard specialized for stacking containers behind the wharves of El Hadjar and Skikda managed by the container section of the EPAL. As presently, however, vessels specialized for containers are not yet calling at the port, containers are discharged or loaded from Ro-Ro or general cargo vessels along with other cargoes at many berths. Consequently, containers are found almost all over the port, in some cases even on aprons in spite of the effort by the section to gather containers to the container yard. As for the north zone, there are few open yard. As mentioned previously, the OAIC has silos of capacity of 30,000 tons behind No.3 berth of No.35 Quay.

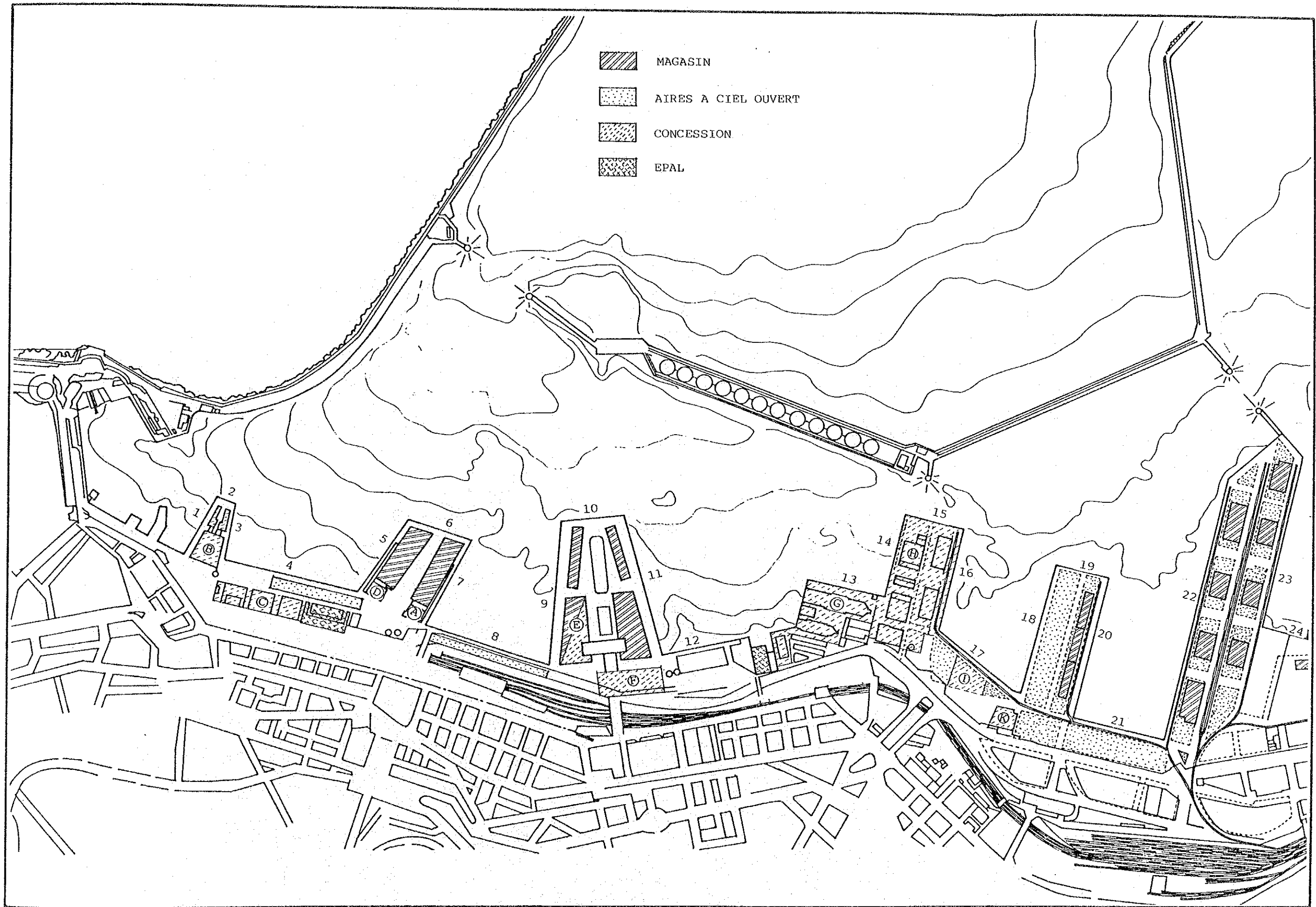


Fig. 5.1.1-a IMPLANTATION ACTUELLE DES ABRIS ET AIRES A CIEL OUVERT DANS LE PORT D' ALGER

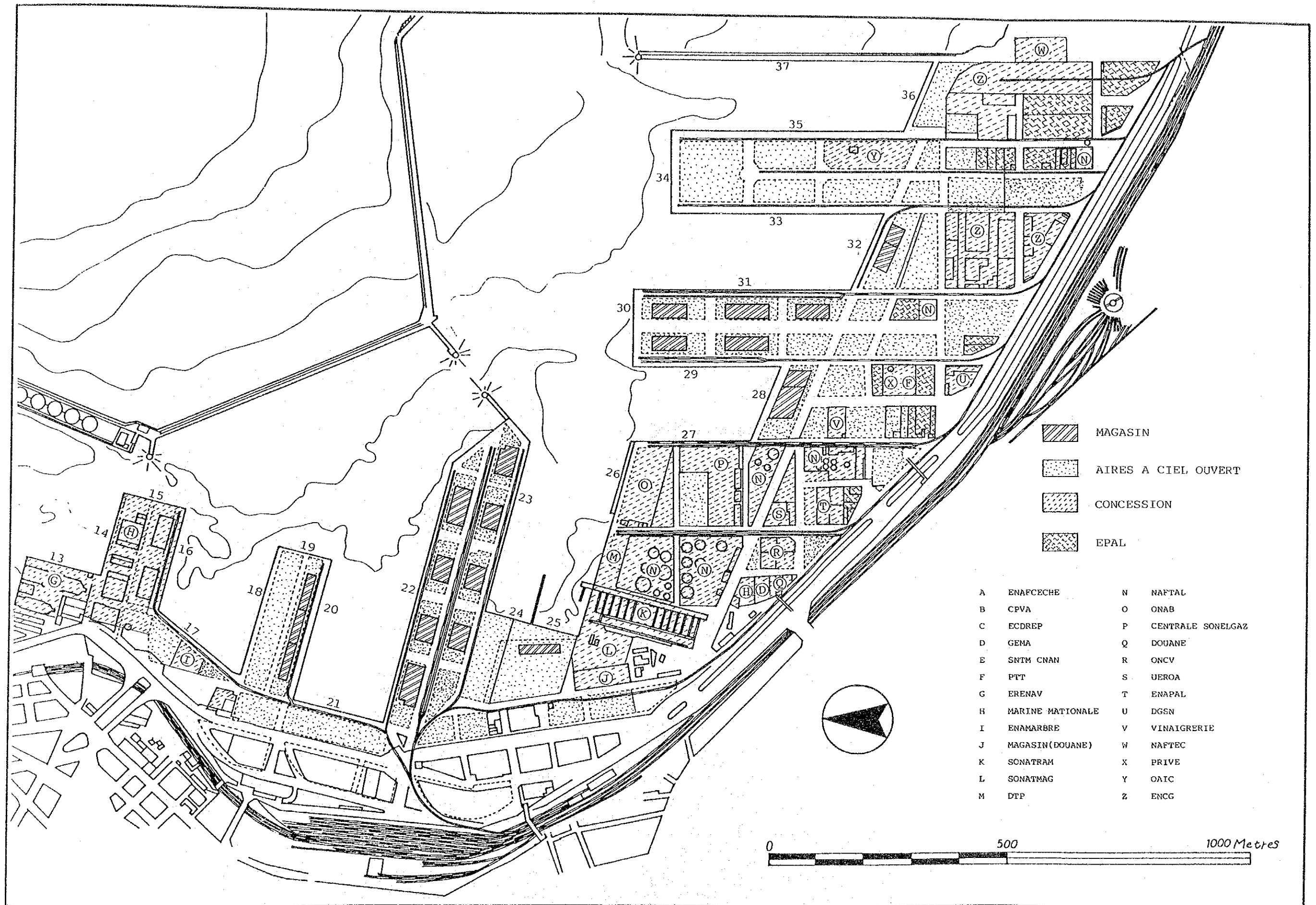


Fig. 5.1.1-b IMPLANTATION ACTUELLE DES ABRIS ET AIRES A CIEL OUVERT DANS LE PORT D' ALGER

Table 5.1.2-a Location and Area of Transit Sheds and Open Yaeds
Northern Zone

Mole	Quay No.	Berth No.	Transit Shed				Open Yard	
			Built Year	Floor Space(m ²)	Height (m)	Capacity (m ³)	Code No.	Area (m ²)
	4						1	4500
Mole el Djefna	5	1	1930	5720	6	34320		
	6							
	7	1	1920	3875	6	23250		
Total				9595		57570		
	8						2	2500
Mole el Djazair	9	1 (1F)	1953	(2500)	6	15000		
		(2F)	1953	(2500)	5	12500		
		2 (1F)	1953	(3682)	6	22092		
		(2F)	1953		5	-		
	Total			8682		49592		
	10							
Total	11	1 (1F)	1953	(2000)	6	12000		
		(2F)	1953	(2000)	5	10000		
		2 (1F)	1953	(1952)	6	11712		
		(2F)	1953	(1952)	5	9760		
Total			7904		43472			
Total				16586		93064		
	12							
	13	ERENAV						
	14	ERENAV						
	15	ERENAV						
	16	ERENAV						
S.Total				26181		150634		7000

Source : Estimated by the Study Team based on the EPAL's Data and General Plan of Algiers Port

Table 5.1.2-b Location and Area of Transit Sheds and Open Yaeds
Central and Southern Zone

Mole	Quay No.	Berth No	Transit Shed				Open Yard		
			Built Year	Floor Space(m ²)	Height (m)	Capacity (m ³)	Code No.	Area (m ²)	
	17						3	4087	
	18						4	12298	
	19								
Ghara Djibilet	20	1	1920	(1184)	6.25	7400			
		2	1920	(1005)	6.25	6281.25			
		3	1920	(1184)	6.25	7400			
	Toatl			3373		21081.25	5	4100	
Total				3373		34762.5		16398	
Behind Ghara Dibilet							6	4860	
	21						7	10148	
Mole Bologhine	22	1 (1F)	1936	(2168)	6.5	14092		8	900
		1 (2F)	1936	(2168)	6	13008	9	2106	
		2 (1F)	1936	(1464)	6.5	9516			
		2 (2F)	1936	(1464)	6	8784	10	2310	
		3 (1F)	1936	(1464)	6.5	9516			
		3 (2F)	1936	(1464)	6	8784	11	2310	
		4 (1F)	1936	(2168)	6.5	14092			
		4 (2F)	1936	(2168)	6	13008	12	2040	
	Toatl			14528		90800	13	299	
	23	1 (1F)	1936	(1557)	6.5	10120.5			
		1 (2F)	1936	(1556)	6	9336	14	2253	
		2 (1F)	1936	(1554)	6.5	10101			
		2 (2F)	1936	(1554)	6	9324	15	3089	
		3 (1F)	1936	(1554)	6.5	10101			
3 (2F)		1936	(1554)	6	9324	16	2501		
4 (1F)		1936	(1554)	6.5	10101				
4 (2F)	1936	(1554)	6	9324	17	2501			
Total				12437		77731.5	18	3393	
Total				26965		168531.5		23702	
	24	1	1954				19	19580	
	25			1800	6	10800	20	11840	
Total				1800		10800		31420	
Behind Quay No. 24/25							21	2736	
							22	2784	
							23	3600	
							24	4500	
Total								13620	
S.Total				32138		248856.5		104235	

Source : Estimated by the Study Team based on the EPAL's Data and General Plan of Algiers Port

Table 5.1.2-c Location and Area of Transit Sheds and Open Yaeds
Central and Southern Zone

Mole	Quay No.	Berth No.	Transit Shed			Open Yard	
			Built Year	Floor Space(m ²)	Height (m)	Capacity (m ³)	Code No.
	26						
Within Factory Area							25 6384
							26 990
							27 2112
							28 5160
Total							14646
	27						
	28						4360
Behind Quay No. 28							30 3565
							31 5480
							32 5440
	Total						14465
Mole el Hadjar	29	1	1949	(2012)	9.5	19114	33 3630
		2	1959	(2586)	9.5	24587	34 3030
							35 3875
	Total			4598		43681	10335
Total	30	1	1939	(2037)	9	18333	36 3370
		2	1939	(2587)	9	23283	37 2770
		3	1939	(2036)	9	18324	38 2983
	Total			6660		59940	9123
Total			11258		103621	19458	
Behind Mole el Hadjar							39 2925
							40 2925
							41 5400
	Total						42 11804
	32			2700	6	16200	43 16600
Mole de Skikda	33	1					44 8450
		2					45 8600
		3					46 8000
	Total						23050
Total	34	1					47 8450
		2					48 7920
		3	Ceraels Berth				
	Total						16370
Total						39420	
Behind Mole de Skikda							49 4000
							50 13100
							51 2220
	Total						52 2860
	36						53 11550
	37	Tanker Berth					
S.Total			13958		119821		165733
Grand Total			72277		519311.5		276968

Source : Estimated by the Study Team based on the EPAL's Data and General Plan of Algiers Port

5.1.2 Cargo-Handling Facilities

(1) General

Generally, cargo handling facilities of the port mainly consists of quay cranes, mobile cranes, fork-lifts, and others. For grains unloading, different types of unloaders, such as pneumatic type, vertical screw conveyor type, and tyre-mounted pneumatic type, are used.

(2) Quay Crane

The Algiers port has 32 quay cranes for cargo handling and their capacity varies from 3 to 10 ton. The details of quay cranes are shown on tables 5.1.3 and 5.1.4.

Eighteen (18) quay cranes (60% of the total quay cranes) were constructed and installed in 1959 and 1960. This means that they have been under use for 30 years or more, which largely exceed the normal life time of cranes. Besides that, these cranes have not been kept in good working condition because of absence of insufficiency of maintenance. As a result, the performance capacity of these cranes is very much lowered compared with their nominal capacity.

The detailed inspection of the quay cranes revealed that their electric parts and operating devices are increasingly corroded. These cranes are actually operated under unbelievably dangerous condition.

Table 5.1.3 Working Condition of Quay Cranes at E.P.AL

Designation	Rated Capacity	Year	Maker	No.	Working condition			Used Year
					Good	Norm	Bad	
Quay crane	3t/22m. 6t/8m	1959	CAIUARD	11		5	6	32
	3t/22m. 6t/8m	1960	CAIUARD	7			7	31
	5t/32m.10t/18m	1980	STOHIERT	14	10		4	11
Total				32	10	5	17	

Table 5.1.4 Detail of Working Condition of Quay at E.P.AL

No. of Crane	Year	Capacity (ton)	Maker	Quay Number	Condition			Remarks
					Good	Norm	Bad	
701	1959	3/6	CAILLARD	9	*			Lowered performance
702	:	:	:	9	*			Lowered performance
703	:	:	:	11			*	Out of order
704	:	:	:	11	*			Lowered performance
706	:	:	:	11	*			Lowered performance
707	:	:	:	9			*	Out of order
708	:	:	:	9	*			Lowered performance
709	:	:	:	22			*	Out of order
710	:	:	:	22			*	Out of order
711	:	:	:	22			*	Out of order
712	:	:	:	22			*	Out of order
713	1960	3/6	:	23			*	Out of order
714	:	:	:	23			*	Out of order
715	:	:	:	23			*	Out of order
716	:	:	:	23			*	Out of order
717	:	:	:	23			*	Out of order
718	:	:	:	22			*	Out of order
719	:	:	:	22			*	Out of order
801	1980	5/10	STOTHER & PITT	29	*			Lowered performance
802	:	:	:	29	*			Lowered performance
803	:	:	:	29	*			Lowered performance
804	:	:	:	29	*			Lowered performance
805	:	:	:	31	*			Lowered performance
806	:	:	:	31	*			Lowered performance
807	:	:	:	31		*		Under repair
808	:	:	:	31	*			Lowered performance
809	:	:	:	31	*			Lowered performance
810	:	:	:	33		*		Under repair
811	:	:	:	33	*			Lowered performance
812	:	:	:	33	*			Lowered performance
813	:	:	:	33		*		To be transferred
814	:	:	:	33		*		To be transfer

Norm: requires some minor repairs.

Bad : almost unrepairable.

(3) Mobile Crane

In order to increase the unloading capacity of the port, the E.P.AL placed 17 mobile cranes as detailed in the table 5.1.5. These mobile cranes do not have major operational problems.

Table 5.1.5 Working Condition of Mobile Cranes at E.P.AL

Designation	Rated Capacity	Installed Year	Maker	No.	Working condition			Used Year
					Good	Norm	Bad	
Mobile crane	35 ton / 30 m	1974	COLESHYDRA	1		1		18
	12 ton / 25 m	1975	PETTI-BONE	1		1		17
	300ton / 97.5m	1976	P & H	1			1	16
	15 ton / 32 m	1976	GOTTWALD	4		3	1	16
	28 ton / 24 m	1980	PENGUELY	1		1		12
	20 ton / 23 m	1981	DEMARG	3	3			11
	40 ton / 35 m	1981	KATO	2	2			11
	120ton / 50 m	1985	KATO	1	1			7
	90 ton / 32 m	1985	TADANO	1	1			7
	140ton / 45 m	1985	LIEBHERR	2	1		1	7
Total				17	8	6	3	

(4) Grain Unloader

The grains represent roughly 30% of the total cargoes imported to Algeria via Algiers port. The grains are unloaded by the following unloaders as detailed in the table 5.1.6

1. Pneumatic type unloader
2. Vertical screw conveyor type unloader
3. Tyre-monted pneumatic type unloader (mobil type)
4. Grab bucked type unloader

Unloaded grains are transported to the grain silo having the coapacity of 30,000 tons by means of chain conveyors and the bucket elevators.

Table 5.1.6 Working Condition of Grain Unloaders at E.P.AL

Designation	Rated Capacity	Year	Maker	No.	working condition			Used Year
					Good	Norm	Bad	
Grain Unloader	Vacuume 200t/h	1983	STOLZ *1	1	1			9
	Vacuume 300t/h	1970	MIYAG *2	1	1			22
	Mobile 120t/h	1980	VIGAN *3	2	2			12
	Total				4	4		

Note: *1: Owned by OAIC.

*2: Owned by OAIC, and equipped with two 150 t/h suction pipes.

*3: Owned by E.P.AL

(5) Fork-Lift

The Algiers port has 277 fork-lifts for cargo handling as shown in the tables 5.1.7 and 5.1.8. These fork-lifts have been under use for more than ten years and their actual performance is much lower than their nominal capacity because of aging. The reparation and maintenance cost increases according to the age of the equipments but the E.P.AL is obliged to use those aged fork-lifts despite of increased maintenance cost which exceeds the economical limit line.

Table 5.1.7 Working Condition of Fork-Lifts at E.P.AL

Designation	Rated Capacity	Year	Maker	No.	Working condition			Used Year
					Good	Norm	Bad	
Fork-Lift	7t. 10t. 32t	1977	CLANET	9		7	2	15
	3t	1979	SALV	2		2		13
	3t - 36t	1980	STEMSCOT	25		18	7	12
	3t - 10t	1981	TOYOTA	204		143	61	11
	3t	1988	ENMTP	7		7		4
	3t - 10t	1989	HYSTER	30	30			3
Total				277	30	172	75	

Table 5.1.8 Classification of Fork-Lifts by Purchase Year at E.P.AL

Maker	Inst all year	con- dit- ion	Loading Capacity (ton)													Total	
			3	4	5	6	7	8	10	18	19	28	30	32	36		
CLANET	1977	Good Norm Bad					4		3						2		2 7
SALV	1979	Good Norm Bad	2														2
STEMSOCT HYSTER	1980	Good Norm Bad	6	2		2	2			3		2				1	18 7
TOYOTA	1981	Good Norm Bad	11 5	29 16	49 23		26 6	9 5	19 6								143 61
ENMTP	1988	Good Norm Bad	7														7
HYSTER	1989	Good Norm Bad	15						6		3	3	3				30
Sub-Total		Good Norm Bad	15 26 5	31 16	49 23	2	28 10	9 5	19 9	3 1	3	3 2 1	3		2	1 5	30 172 75
Total			46	47	72	2	38	14	34	4	3	6	3	2	6		277

Note: Good : In good operation condition : 10 %
Norm : Requires some miner repair : 62 %
Bad : In bad operating condition : 28 %

The breakdown of the forklifts requiring repair and maintenance is as follows:

1. Fork-lifts requiring repair of the engine 29%
2. Fork-lifts requiring repair of driving devices 29%
3. Fork-lifts requiring repair of hydraulic parts 17%
4. Fork-lifts requiring repair of brakes and tyres 15%
5. Fork-lifts requiring repair of elctric parts 10%

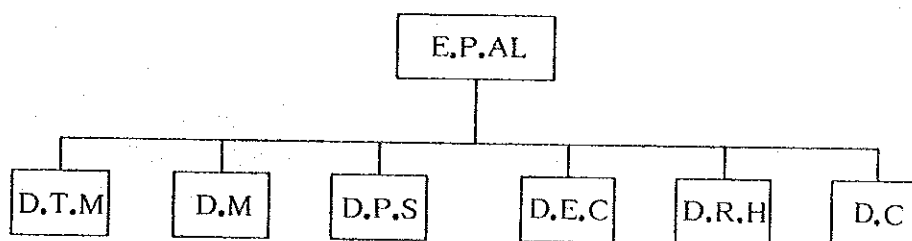
It is assumed that damages caused to the fork-lifts are due to overuse because their real working time is estimated to be 2 times more than that in normal working conditions throughout the whole year. This means that those fork-lifts have been used, in reality, for 20 years or more and that they are completely depreciated. Therefore, if E.P.AL continues to use these fork-lifts, they will have to spend enormous amount of money in their repair and maintenance which is largely above the economical limit line.

(6) Maintenance system

1) Organization

1. Position of D.T.M

The E.P.AL consists of six directions as shown in the figure 5-1-1. The maintenance of equipments is carried out by the Direction des Travaux et de Maintenance which has 6 departments.

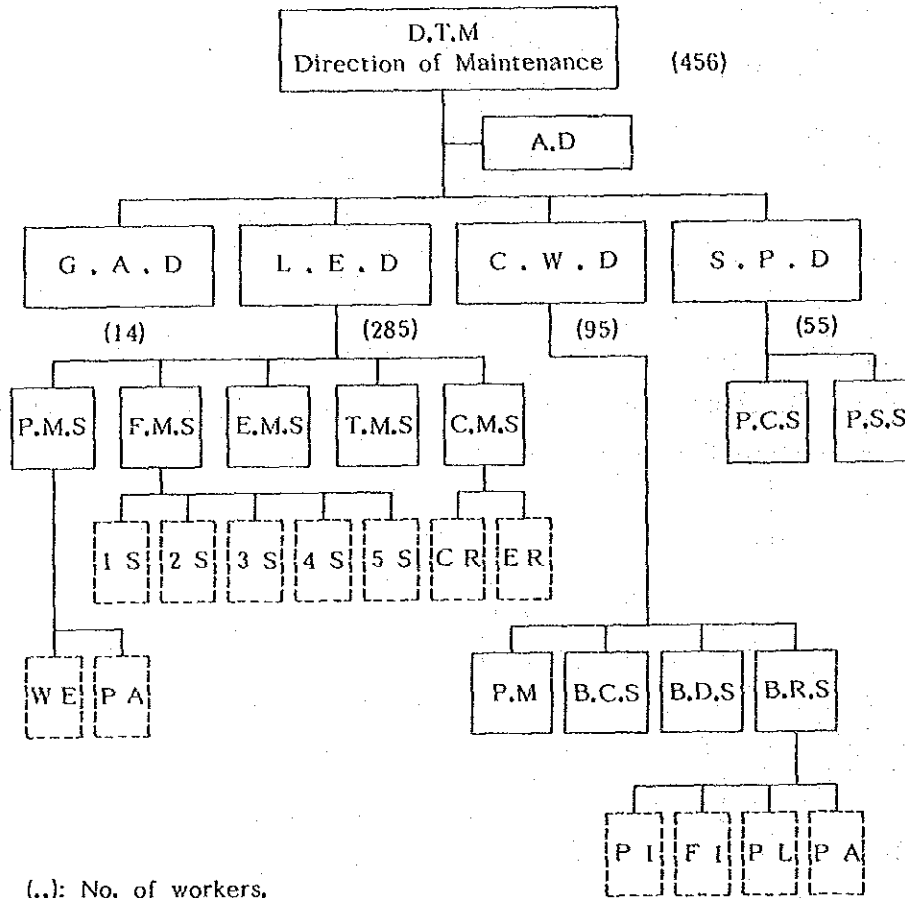


- note: D.T.M is the direction of maintenance.
D.M is the direction of cargo handling.
D.P.S is the direction of planning.
D.E.C is the direction of commercial operation.
D.R.H is the direction of personnel.
D.C is the harbor master.

Fig 5.1.1 Organization of the E.P.AL

2. Organization of D.T.M

The organization of the Direction des travaux et de Maintenance is as follows (fig 5.1.2). The Direction des travaux et de Maintenance and Administrative Department control 4 departments, 11 services which are under the controle of the 4 departments, and 13 teams belong to the 11 services.



Note:

A.D : Administration Dept.

G.A.S : General Affairs Dept.

L.E.S : Loading Equipment Dept.

C.W.D : Construction Dept.

S.P.D : Spire Parts Dept.

P.M.S : Parts Maintenance Service.

F.M.S : Fork-Lift Maintenance Service.

E.M.S : Electric Maintenance Service.

T.M.S : Truck Maintenance Service.

C.M.S : Crane Maintenance Service.

P.C.S : Parts Charge Service.

P.S.S : Parts Supply Service.

P.M : Project Manager.

B.C.S : Building Construction Service.

1S, 2S, 3S, 4S, 5S : No. of Repair Shop.

WE : Welding Team.

ER : Electric Team.

CR : Crane Repair Term.

PI : Piping Team.

FI : Fitting Team.

PL : Plasterer Team.

PA : Painting Team.

Fig.5-1-2 Organization chart of D.T.M

2) Maintenance

1. Working time

Keeping the cargo handling equipments in good condition so as to place them at the disposal of users at any time is one of the most important missions of the port. Therefore the role of the D.T.M is very important. The employees of this direction were working very hard all through the year.

The work in two shifts with the following time table:

1st shift : from 07h00 to 13h00

2nd shift : from 10h00 to 19h00

2. Maintenance condition

There are many problems in order to keep the equipments in good working conditions especially when these equipments are aged and being used beyond their life time. The cargo handling equipments being used in very severe conditions, they are aged in a very short time and as a result of which their maintenance cost is highly increased in to such a extent as to exceed the economical limit.

We observed the following problems as a consequence of the severe working conditions imposed on cargo handling equipments :

1. Consumption of great amount of spare parts for every equipment.
2. Impossibility to ensure the regular maintenance of equipment.

These problems create disharmonious and uneconomical maintenance conditions.

5.1.3 Port Service and Utilities

(1) Pilot Service

The port has compulsory pilotage system which is available day and night and pilot boards vessel about 0.5 miles from the end of Watier jetty.

(2) Tug service

The EPAL has four tugs boats and vessels over 1,500 G/T are obligated to employ one tug, and car ferries are required to have one additional tug.

Table 5.1.9 Particulars of tug Boat

Name	Built Year	HP	LOA	Breadth
ISSER I	1982	1,700 CV	28.00m	9.00m
CHELIF I	1971	1,500 CV	25.88m	7.62m
RHUMMEL 1	1971	1,000 CV	21.86m	7.00m
RHUMMEL 3	1971	1,000 CV	21.86m	7.00m

(3) Communication System

It is possible to communicate with the harbor master by VHF on CH. 16 and 12.

(4) Utility facilities

There is water pipelines for replenishment for vessels at quays.

5.1.4 Superannuation of Port Facilities

It is evident that ports with a long history have more superannuation. Taking into account the state of maintenance and reparation and the disasters encountered, the superannuation should be studied from two aspects, i.e. economical aspect and outmodedness, resulting from changes in port utilization. The former is physical aging, to be judged by the index of life time of each facility. The latter is the degree of inadaptedness viewed from the standpoint of evolution of the mode of transportation, such as larger size of vessels, increased quantity of cargoes to be handled and changes in the manner of cargo conditioning.

The situation of superannuation viewed from the above standpoint is briefly described hereafter.

The construction of the port of Algiers, who has 160 years of history, was started in 1830. Its history can be divided into 4 phases. The 1st phase covers 60 years from 1830 to 1890. The second phase represents 25 years from 1890 to 1914. the third phase is 25 years from 1914 to 1939 and the fourth phase is from 1939 to 1954 (15 years). During the 37 years which follow the year 1954, there have been no significant investments regarding the basic port facilities, except the regular maintenance and repairs. The auxiliary port facilities, such as buildings and warehouses, were constructed during the third and the fourth phases (1930 to 1954).

Looking at the degree of superannuation from the physical point of view, taking into account the economical life time of the facilities, the breakwaters, except those in the Mustapha zone, can ensure their function of water breaking by carrying out reasonable maintenance and reparation, although their degree of superannuation is advanced.

If we estimate that the economical life time of the quay wall is 50 years, all the quay walls including their buildings and warehouses show certain degree of superannuation. However, because of the dynamic system of the quay walls of each zone, we judge that they can ensure the required functions.

On the other hand, when we look at the aspect of outmodedness (inadaptability) of the port facilities, there are some zones to be improved

because of the increased traffic volume and the changes in quay utilization. We would like to designate the zones to be improved through a synthetic study taking account of the port operation.

5.2 Port-Related Industries

5.2.1 Concessionaires within the Port Limits

Over 20 enterprises were conceded sites within the port limits. The list of concessionaires and the locations of their sites are shown Fig. 5.1.1. The major concessionaires are the OAIC, NAFTAL, ENCG, ONAB, SONELGAZ, ERENAV and SONATRAM. An outline of their activities within the port is as follows:

- OAIC: Activity within the port is discharging, storage and distribution of imported cereals. The cereals are brought out to its inland mills from the port.
- NAFTAL: Activity is discharging, loading, storage and distribution of hydrocarbons. Pipelines connect the port and its inland refineries. Fuel oil is transported mainly from the inland refineries to the port.
- ENCG: Activity is production of soap, edible oil, etc. Materials for the production such as vegetable oil and animal fat are discharged at the port.
- ONAB: The enterprise discharges, stores and distributes mainly feed for cattle.
- SONELGAZ: The enterprise has a power plant within the port. Fuel is provided by the NAFTAL. The plant has sea water intake and outlet for its coolant in the harbor basin
- ERENAV: The enterprise has repair facilities within the port.
- SONATRAM: The enterprise has a storage yard for maritime construction.

5.3 Cargo Traffic through the Port

5.3.1 Handling Volume and Commodities

The port of Algiers acts as a pivotal cargo distribution terminal, serving the central region of Algeria, including the Algiers metropolitan area.

Port traffic in 1990 was 6.37 million tons with 5.48 million tons of unloading and 0.88 million tons of loading. The share of domestic traffic is very small with 12% in unloading and 15% in loading.

The port of Algiers is the largest commercial port in the country with general cargo traffic of 3.33 million tons, accounting for 41% of the total general cargo traffic of the nation.

Apart from general cargo traffic, the traffic of liquid bulk and solid bulk cargoes amounted to 1.71 million tons and 1.33 million tons respectively. Liquid bulk cargo comprises liquefied hydrocarbon gas and refined petroleum products (loading and unloading), and solid bulk cargo consists mainly of cereals (unloading).

The movement of cargo traffic in the past decade is as shown in Table 5.3.1. Port traffic reached a peak in 1984 of 7.26 million tons, with 5.9 million tons of unloading and 1.36 million tons of loading. In accordance with the intensified restrictions placed on imports following the decrease in revenue in foreign currency due to the decline of hydrocarbon prices, port traffic showed continuous decline from 1985 to 1987. However, since 1988, port traffic has showed a considerable recovery, and in 1990 exceeded the traffic level in 1987 by as much as 115%.

Cargo traffic by category of commodity is shown in Table 5.3.2. The agricultural products had shown an increasing share since 1985, reaching a peak of 1,873,972 tons in 1988, 1.45 times as much as that of 1987. However it has shown gradual decrease since 1988, but it still remained high level of 1.63 million tons in 1990.

Containerization of general cargo progressed slowly and container cargo traffic reached to 36,744 TEUs or 243,305 tons in 1990 (As shown in Table 5.3.3). The ratio of container cargo to general cargo has shown gradual increase from 5.5% in 1982 to 7.3% in 1990. It is expected that the port will handle 100,000 TEUs after the construction of new terminals being financed by the World Bank, and the ratio of containerization will increase to about 30%.

Table 5.3.1 The movement of cargo traffic (Port of Algiers)

Unloaded				U: tons
	Liquid bulk	Solid bulk	G.cargo	Total
1981	976,761	673,001	2,955,942	4,605,704
1982	707,948	810,755	3,442,281	4,960,984
1983	767,315	851,707	3,891,980	5,511,002
1984	931,592	1,086,152	3,883,189	5,900,933
1985	1,038,753	1,168,960	3,233,799	5,441,512
1986	1,257,272	1,220,282	2,888,413	5,365,967
1987	1,010,322	1,216,660	2,295,285	4,522,267
1988	949,563	1,657,206	2,305,785	4,912,554
1989	1,198,647	1,420,168	3,200,741	5,819,556
1990	966,887	1,321,504	3,193,222	5,481,613

Loaded				
	Liquid bulk	Solid bulk	G.cargo	Total
1981	1,315,549	32,469	95,308	1,443,326
1982	1,081,175	38,250	89,946	1,209,371
1983	933,051	48,549	104,782	1,086,382
1984	1,171,393	67,705	116,413	1,355,511
1985	929,751	94,063	153,521	1,177,335
1986	991,621	96,199	139,991	1,227,811
1987	832,933	74,856	127,200	1,034,989
1988	1,010,136	66,195	140,531	1,216,862
1989	870,889	13,113	127,449	1,011,451
1990	740,097	8,428	136,194	884,719

Total				
	Liquid bulk	Solid bulk	G.cargo	Total
1981	2,292,310	705,470	3,051,250	6,049,030
1982	1,789,123	849,005	3,532,227	6,170,355
1983	1,700,366	900,256	3,996,762	6,597,384
1984	2,102,985	1,153,857	3,999,602	7,256,444
1985	1,968,504	1,263,023	3,387,320	6,618,847
1986	2,248,893	1,316,481	3,028,404	6,593,778
1987	1,843,255	1,291,516	2,422,485	5,557,256
1988	1,959,699	1,723,401	2,446,316	6,129,416
1989	2,069,536	1,433,281	3,328,190	6,831,007
1990	1,706,984	1,329,932	3,329,416	6,366,332

Source: E.P.AL, ANNUAIRE STATISTIQUES 1982-1990

The movement of cargo traffic
(Port of Algiers)

U: million tons

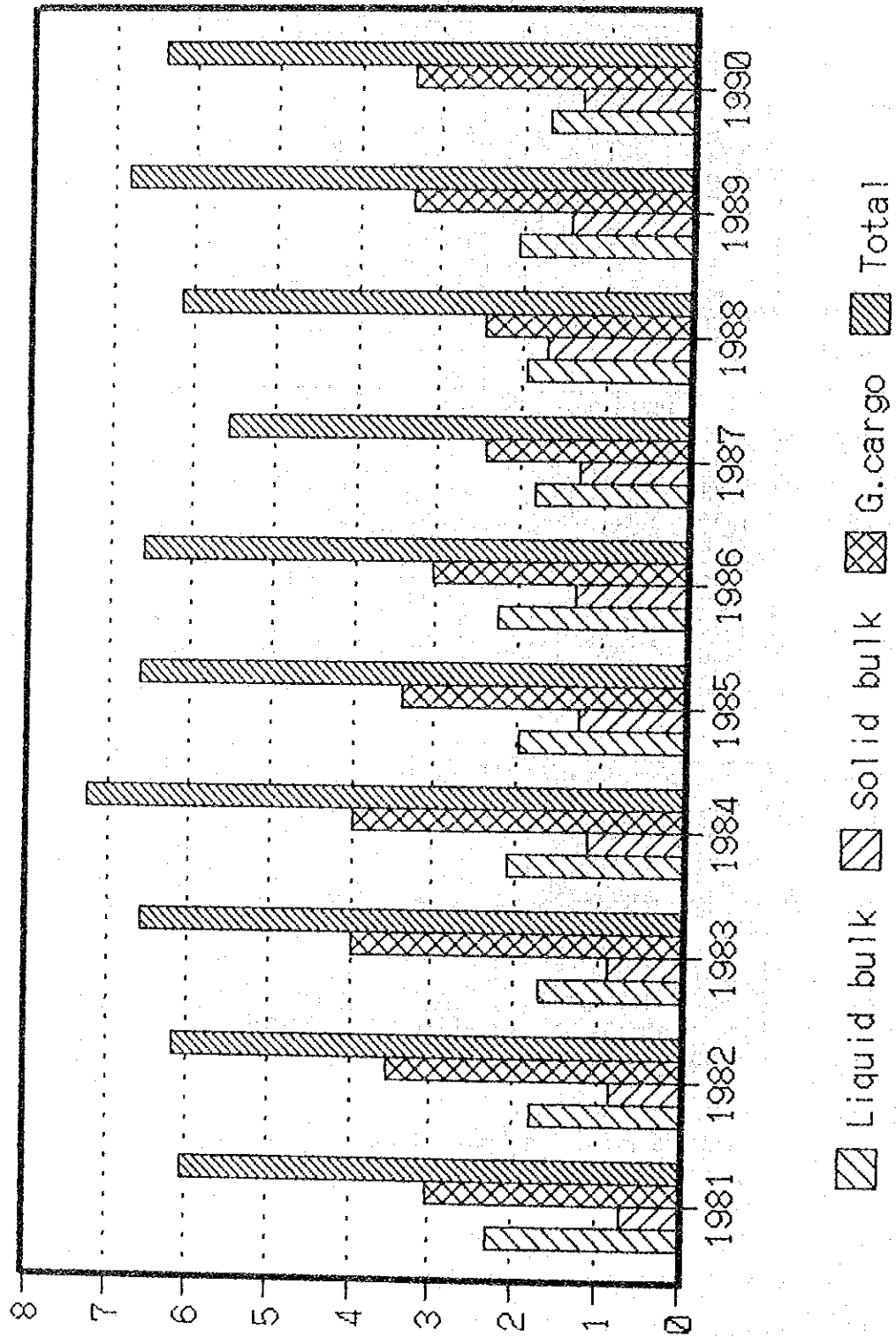


Table 5.3.2 Cargo traffic by category of commodity 1985 - 1990
(Port of Algiers)

	AGRICULTURAL PRODUCT	FOODSTUFF	COMBUSTIBLE MINERAL PRODUCT	PETROLEUM PRODUCT	METALLURGICAL SCRAP PRODUCTS	METAL PRODUCTS	FERTILIZERS ON METERS	CONSTRUCTIVE PRODUCTS	CHEMICAL PRODUCT	OTHERS	TOTAL
1985	UNLOAD	1,342,448	802,845	382	724,723	925	301,681	704,822	28,073	104,856	1,430,757
	LOAD	3,197	36,307		893,444	94,063			1,047	149,277	1,177,395
	TOTAL	1,345,645	839,152	382	1,618,167	94,988	301,681	704,822	28,073	105,903	1,580,034
	%	20%	13%	0%	24%	1%	5%	11%	0%	2%	24%
1986	UNLOAD	1,377,535	867,132		933,494		374,093	612,821	59,872	77,976	1,093,044
	LOAD	5,455	6,703		884,991	96,199	5			536	133,922
	TOTAL	1,382,990	873,835	0	1,818,485	96,199	374,098	612,821	59,872	78,512	1,226,966
	%	21%	13%	0%	28%	1%	6%	9%	1%	1%	19%
1987	UNLOAD	1,312,222	836,259		647,267		249,609	403,212	40,419	80,794	952,485
	LOAD	14,661	7,766		825,167	74,856	3,704			80	108,755
	TOTAL	1,326,883	844,025	0	1,472,434	74,856	253,313	403,212	40,419	80,874	1,061,240
	%	24%	15%	0%	26%	1%	5%	7%	1%	1%	19%
1988	UNLOAD	1,870,881	880,484		551,607		278,711	263,143	22,576	74,944	970,228
	LOAD	3,091	2,844		1,007,302	66,195	1,951			664	134,815
	TOTAL	1,873,972	883,308	0	1,558,909	66,195	280,662	263,143	22,576	75,608	1,105,043
	%	31%	14%	0%	25%	1%	5%	4%	0%	1%	18%
1989	UNLOAD	1,727,534	896,262		879,860		304,627	846,620	33,775	95,396	1,032,482
	LOAD	150	11,248		859,944	13,113	2,242			979	123,775
	TOTAL	1,727,684	909,510	0	1,739,804	13,113	306,869	846,620	33,775	96,375	1,157,257
	%	25%	13%	0%	25%	0%	4%	12%	0%	1%	17%
1990	UNLOAD	1,628,969	896,843		728,628		305,487	736,841	20,652	65,405	1,098,788
	LOAD	365	266		740,097	8,428	548			1,512	133,503
	TOTAL	1,629,334	897,109	0	1,468,725	8,428	306,035	736,841	20,652	66,917	1,232,291
	%	26%	14%	0%	23%	0%	5%	12%	0%	1%	19%

Source: E.P.AL, ANNAIRE STATISTIQUES 1985-1990

Table 5.3.3.1 Container Traffic (Port of Algiers)

	ENTRY			DEPARTURE			TOTAL		
	1988	1989	1990	1988	1989	1990	1988	1989	1990
NUMBER	19,709	19,566	19,649	16,842	16,953	17,095	36,551	36,519	36,744
FULL	17,603	18,046	17,613	4,948	2,896	4,018	22,551	21,942	21,631
EMPTY	2,106	520	2,036	11,894	14,057	13,077	14,000	14,577	15,113
TONNAGE	179,885	202,087	185,187	59,636	54,230	58,118	239,521	256,317	243,305
FULL	175,316	200,923	180,460	32,631	21,327	28,485	207,947	222,250	208,945
EMPTY	4,569	1,164	4,727	27,005	32,903	29,633	31,574	34,067	34,360
N.T./NUM.	9.96	10.55	10.25	6.59	7.36	7.08	9.22	10.13	9.66

Source: E.P.AL, ANNUAIRE STATISTIQUES 1988-1990

Table 5.3.3.2 Movement of containerization (Port of Algiers)

	1982	1983	1984	1985	1986	1987	1988	1989	1990
Container Number	28,614	32,151	33,481	35,675	32,285	25,911	36,551	36,519	36,744
Traffic Tonnage(1)	194,157	221,503	227,685	235,971	222,280	199,673	239,521	256,317	243,305
General Cargo(2)	3,532,227	3,996,762	3,999,602	3,387,320	3,028,404	2,422,455	2,446,316	3,328,190	3,329,416
(1)/(2)	5.5%	5.5%	5.7%	7.0%	7.3%	8.2%	9.8%	7.7%	7.3%

Source: E.P.AL, ANNUAIRE STATISTIQUES 1982-1990

5.3.2 Trading Counterparts by regions

Trading Counterparts by regions is shown in Table 5.3.4. The share of West Europe is about 54% of total cargo traffic, and it consists mainly of unloaded cereals, foodstuffs, construction materials, and manufactured products as well as loaded hydrocarbon products. The share of North America is about 22% of total cargo traffic and it includes mainly unloaded cereals.

5.3.3 Passenger Traffic

The movement of passenger traffic in the past two decades is shown in Table 5.3.5. In recent years, it shows a downward trend from the peak in 1985.

Table 5.3.4 Trading Counterparts by regions 1985 - 1990
(Port of Algiers)

		DOMESTIC COAST	MEDITERRANEAN NATIONS	WEST AFRICA	EAST EUROPE	WEST EUROPE	NORTH AMERICA	SOUTH AMERICA	ASIA	TOTAL
1985	UNLOAD	661,137	103,334	18,637	326,628	2,992,523	1,023,304	214,563	101,386	5,441,512
	LOAD	184,625	4,856	10,580	24,152	888,501	64,620		1	1,177,335
	TOTAL	845,762	108,190	29,217	350,780	3,881,024	1,087,924	214,563	101,387	6,618,847
	%	13%	2%	0%	5%	59%	16%	3%	2%	100%
1986	UNLOAD	934,487	151,376	17,008	319,744	2,411,637	1,047,021	401,925	112,769	5,395,967
	LOAD	194,104	5,018	4,566	7,158	891,238	25,601	85	41	1,127,811
	TOTAL	1,128,591	156,394	21,574	326,902	3,302,875	1,072,622	402,010	112,810	6,523,778
	%	17%	2%	0%	5%	51%	16%	6%	2%	100%
1987	UNLOAD	629,667	156,992	2,414	352,886	1,900,429	1,182,395	205,150	92,334	4,522,267
	LOAD	175,781	16,115	2,811	16,499	781,641	40,965		1,178	1,034,990
	TOTAL	805,448	173,107	5,225	369,385	2,682,070	1,223,360	205,150	93,512	5,557,257
	%	14%	3%	0%	7%	48%	22%	4%	2%	100%
1988	UNLOAD	541,311	233,828	9,917	291,815	2,043,921	1,636,208	93,299	62,255	4,912,554
	LOAD	193,986	16,041	751	37,034	731,165	237,861	4		1,216,862
	TOTAL	735,297	249,869	10,668	328,849	2,775,086	1,874,069	93,303	62,255	6,129,416
	%	12%	4%	0%	5%	45%	31%	2%	1%	100%
1989	UNLOAD	834,926	209,892	3,357	409,815	2,740,293	1,371,136	146,347	103,790	5,819,556
	LOAD	139,089	7,960	7	36,222	765,998	41,273	20,086	816	1,011,451
	TOTAL	974,015	217,852	3,364	446,037	3,506,291	1,412,409	166,433	104,606	6,831,007
	%	14%	3%	0%	7%	51%	21%	2%	2%	100%
1990	UNLOAD	674,376	153,186	5,334	245,626	2,799,852	1,348,423	129,912	123,904	5,481,613
	LOAD	133,147	10,032	400	39,844	658,137	43,129		30	884,719
	TOTAL	807,523	163,218	5,734	285,470	3,457,989	1,392,552	129,912	123,934	6,366,332
	%	13%	3%	0%	4%	54%	22%	2%	2%	100%

Source: E.P.A.L, ANNUAIRE STATISTIQUES 1985-1990

Table 5.3.5 Passenger Traffic (Port of Algiers)

	PASSENGER		
	DISEMBARK	EMBARK	TOTAL
1971	76,753	62,139	138,892
1972	82,718	59,731	142,449
1973	81,362	56,728	138,090
1974	85,601	56,554	142,155
1975	103,554	46,547	149,101
1976	99,578	44,057	143,635
1977	162,481	70,043	232,524
1978	115,262	71,590	186,852
1979	122,062	84,480	206,542
1980	138,266	91,097	229,363
1981	162,901	126,814	289,715
1982	139,741	95,763	235,504
1983	170,388	101,485	271,873
1984	192,636	144,380	337,016
1985	222,630	157,046	379,676
1986	146,398	92,486	238,884
1987	117,260	84,561	201,821
1988	127,261	98,748	226,009
1989	140,875	98,299	239,174
1990	115,288	72,967	188,255

Source: E.P.AL, ANNUAIRE STATISTIQUES 1990

MOT, ANALYSE DES PRINCIPAUX RESULTATS DU TRAFFIC

5.4 Port Activities

5.4.1 Vessels Calling at the Ports

According to the EPAL's classification, vessels calling at the Port of Algiers are divided into five types; general cargo vessel, Ro-Ro vessel, cereal carrier, tanker and car ferry. The general cargo vessels are further divided into two categories. One is vessel laden with various kinds of cargoes and the other is vessel laded with one kind of commodity.

According to the actual record in 1990, around 1,800 vessels called at the port. Almost a half of vessels that called at the port are general cargo vessels accounting for 45.7% of the total number. Almost half of them are the vessels laden with one kind of commodity. Ro-Ro vessels, tankers, car ferries, cereal carriers followed the general cargo vessels, accounting for 21.6%, 16.8%, 12.6%, 3.3% of the total. In terms of the volume of cargoes discharged at the port, the general cargo vessels accounted for 50.3% of the total volume. Around two thirds of the volume were transported by the vessels of the latter category, namely monocommodity. Cereal carriers and tankers followed the general cargo vessels, taking account of 25.2% and 17.3%. Share of the volume of cargoes transported by Ro-Ro is low, despite a comparatively large portion of the number of vessels, accounting for 7.3%. On the other hand, in terms of loading cargoes from the port apart from empty container boxes, 86.4% of the total volume was transported by tankers as major exported commodity was fuel oil.

Average off-shore waiting days of cereal carriers reached to 8.1 days in the same year, clearly showing long period. General cargo vessels of the two categories accounted for 1.3 and 2.6 days. Considering seasonal fluctuation, the periods seems to be also long. The off-shore waiting times of Ro-Ro vessels and tankers were short, owing to the existing berths specialized for them and berth allocation on priority basis. Major commodity transported by these vessels were listed in the Table 5.4.1.

As for sizes of vessels called at the port, the detailed record in 1990 is attached in Annex (see Table A.5.1). According the record, the range of sizes by vessel type is shown as follows:

- General cargo vessels laden with various cargoes: 498-15,570 GT,

- General cargo vessels laden with one kind of commodity: 396-22,571 GT
- Ro-Ro vessels: 927-9368 GT
- Car carriers: 19,533-42,477 GT
- Cereal carriers: 14,330-18,824 GT
- Tankers: 2,756-6,521 GT
- Car ferries: 3,410-14,958 GT

Table 5.4.1 Record of Mooring and Cargo-handling by Vessel Type at the Port of Algiers in 1990

Vessel Type	Commodities	Total Cargo-Handling Volume				No. of Vessels	Average Values per Calling Vessels				Off-shore Waiting Days		
		Unloaded (tons)		Loaded (tons)			Arrival Interval (days)	Mooring Period (days)	Cargo-handling Productivity (tons/hr)	Total (tons)			
		Unloaded (tons)	Loaded (tons)	Unloaded (tons)	Loaded (tons)								
General Cargo	Various Cargoes	750,882	53,876	804,758	12.7	425	1,767	127	1,894	0.8	2.4	9.7	1.3
	L	535,194	0	535,194		25	21,408	0	21,408	9.9	6.0	149.3	1.5
	H	126,746	0	126,746		11	11,522	0	11,522	7.7	2.9	168.3	0.7
	S	34,401	40	34,441		13	2,646	3	2,649	28.8	8.3	13.3	1.3
	Sub-total	696,341	40	696,381	11.0	49	14,211	1	14,212				
General Cargo (Monocommodity)	Other Foodstuffs	232,526	2,590	235,116	3.7	131	1,775	20	1,795	2.6	12.2	7.1	1.5
	Wood	248,251	0	248,251	3.9	49	5,066	0	5,066	7.1	8.1	26.0	1.7
	Steel products	199,788	1,200	200,988	3.2	43	4,646	23	4,674	7.5	8.6	22.6	3.0
	Sugar	198,026	0	198,026	3.1	18	12,377	0	12,377	18.3	37.3	13.8	2.4
	Semolina, Flour	146,699	62	146,761	2.3	73	2,010	1	2,010	4.8	14.8	5.7	7.2
	Animal feed	91,542	0	91,542	1.4	6	15,257	0	15,257	23.6	41.2	14.4	8.8
	Others	138,513	4,000	142,513	2.2	62	2,234	65	2,299	5.7	8.5	11.3	0.8
Ro-Ro	Various Cargoes	428,225	12,776	441,001	6.9	403	1,063	32	1,094	0.9	4.8	9.6	0.5
Cereal Carrier	Cereals	1,401,580	110	1,401,790	22.1	61	22,978	2	22,980	6.0	18.2	52.6	8.1
(Hydrocarbon excl. bitumen)	Butan, Diesel, Gasoline Fuel (unloaded)	677,748	9,567	687,315	10.8	146	4,642	66	4,708	2.5	3.2	80.2	0.5
	L	5,082	579,436	584,518		33	154	17,559	17,713	10.9	1.9	384.0	0.6
	S	0	87,550	87,550		34	0	2,575	2,575	9.9	2.4	44.1	0.2
	Sub-total	5,082	666,986	672,068	10.6	67	76	9,955	10,031				
Tanker (Other oils)	Oil & Fat of Animal & Vegetable Molasses, etc.	200,967	0	200,967	3.2	65	3,092	0	3,092	5.6	3.9	29.3	1.0
	Bitumen	25,341	0	25,341	0.4	10	2,534	0	2,534		14.2	7.4	
	Bitumen	53,983	6,300	60,283	0.9	26	2,076	242	2,318	8.1	2.0	48.6	0.4
Car Ferry	Passengers & Vehicles	65,064	32,756	97,820	1.5	235	277	139	416	1.8	1.0	18.4	0.1
	Grand Total	6,560,658	790,263	7,350,921	100.0	1,867							

Source: Analysis by the Study Team based on data of the EPAL

5.4.2 Cargo Handling System

(1) Cargo handling system

1) General cargo

a) Unloading of cargo

The general cargo vessels called at the Port of Algiers are classified into 2 types, "vessel laden with one kind of cargo such as foodstuffs packed in sacks" and "vessel co-stowed with various kinds of general cargo.

General cargo vessel laden with sacked cargo in lot

The imported sugar, semolina and flour in sacks are generally stowed in break bulk, and cargoes unitized with preslings are very little.

The vessels are mainly allocated to the quay Nos.5, 6, 7, 8, 9 and 10, and the cargoes are unloaded by ship cargo gears together with quay cranes and/or mobile cranes with rope and/or belt slings and all of the cargoes are directly landed onto trucks arranged by consignees and brought out from the port.

The cargo handling work has been sometimes halted for awaiting trucks and traffic congestion in narrow aprons, particularly when the quays in the Mole el Djefna are fully occupied by vessels simultaneously. Due to such condition, productivity of cargo handling operation is low.

General cargo vessel co-stowed with various kinds of general cargo

There is no particularly assigned berths for such general cargo vessels in the Port of Algiers, and the vessels are mostly handled at the berths in the central and southern zone. The berth allocation for vessels depends on kind and volume of cargo loaded on vessels.

The unloading work from vessels is done by ship cargo gears together with quay cranes and mobile cranes. Since a capacity of quay cranes is only 6 - 10 tones, heavy cargoes such as bulky plant cargo are unloaded by ship's cargo gear and/or mobile cranes with large lifting capacity. The unloaded cargoes are

handled by forklifts at aprons, except for some cargoes which are directly landed onto trucks or rail wagons, e.g. foodstuffs and cement in bags. Almost all of the unloaded cargoes are forwarded and stacked in open yard and some cargoes are stacked in open spaces in aprons until the time of delivery to consignees. Only perishable and valuable cargoes are stored in sheds.

Most part of cargoes carried by general cargo vessels is palletized, and, though that portion is small, some containers are also laden (See table 5.4.2). Though there is no designated berth for handling containers, they are mainly allocated to the berths in Nos. 32, 33 and 36 quay near the container storage yards. The full load containers are unloaded by ship cargo gears and/or mobile cranes with wire slings, and handled by forklifts owned by the EPAL, and most containers are forwarded to and stacked in 2 tiers in the container storage yards by forklifts. However, some are still placed on open spaces in moles until the time of delivery to consignees from time to time.

When these berths are occupied by other vessels or vessels laden with less than 12 units of containers, these vessels are often allocated to other berths far from the container storage yards. In that case, it is planned that the containers will be unloaded at the berth and then transferred to the container storage yard by trucks, or after shifting of vessels the containers will be unloaded at the berth near the container storage yards. As a matter of fact, almost all of the containers are unloaded at berths far from the container storage yards, and stacked in open spaces near berths.

Almost all of the cargoes in containers are delivered to consignees without unpacking in the Port.

Ro-Ro vessel

Currently, the Ro-Ro vessels are active in the Algerian Ports, and almost all of them have only one ramp way at their right stern. There is nine designated berths for accommodating Ro-Ro vessels in the port.

Major packing types of cargoes carried by Ro-Ro vessels are containers, pallets and cases, and trailers and vehicles are few (see Tables 5.4.3). The cargoes, except trailers and vehicles, are unloaded and transferred to open yards near berths by forklifts of various capacities through the vessel's ramp way.

The trailers are pulled out by tractors, and the vehicles are driven out by own power through the ramp way. Some cargo stowed on vessel's weather decks is unloaded by ship crane or mobile cranes. After landing, the cargoes are handled and delivered in a similar manners to the general cargo vessel mentioned above.

b) Loading of cargo

Eighty per cent of the general cargo for loading are brought into open yards in the port by trucks and rail wagons and the remaining 20 % of cargo is directly brought alongside to vessels by trucks and loaded onto vessels as usual manners.

Present cargo flow of general cargoes in the port are shown in Fig.5.4.1.

2) Bulk solid cargo

a) Cereals

Cereals in bulk is unloaded by means of 3 types of handling equipment, "Traveling rail-mounted pneumatic unloader", "Tire-mounted pneumatic unloader" and "Grab bucket".

By traveling rail-mounted pneumatic unloader

Nos. 1, 2 and 3 berth in No. 35 quay are exclusively used for accommodating vessels laden with cereals in bulk. The OAIC which are sole importer in Algeria has a cereals storage silo of 30,000 tonnes capacity and 2 units of traveling rail-mounted pneumatic unloaders with belt conveyer at No.3 berth in this quay. At No.3 berth almost all of the cargo is unloaded by pneumatic unloaders and directly put into the silo through belt conveyer system, and forwarded to hinterland by trucks and rail wagons.

By tire-mounted pneumatic unloader

At No. 1 berth, the cargo is unloaded by 3 units of tire-mounted pneumatic unloaders owned by the EPAL and directly loaded onto trucks through delivery nozzle fitted on the unloader and forwarded to hinterland.

By grab bucket

The No. 33 quay is also handled the cereals in bulk and the cargoes are unloaded by ship cargo gears and/or mobile cranes with grab buckets and movable hoppers, and directly landed on to trucks and forwarded to hinterland.

Present cargo flow is shown in Fig 5.4.2.

b) Feed

The cargoes are unloaded by means of 2 units of traveling transfer cranes with grab buckets at No.26 quay, and directly landed onto trucks through movable hoppers, and brought out from the port.

c) Marble gravel

The cargo is imported once or twice a month and handled at a berth in No. 17 quay by means of quay cranes with grab buckets. The cargo is directly unloaded to the storage yard behind the berth apron and then delivered.

d) Cement

Cement is imported either in bags or in bulk. Cement in bags are carried by general cargo vessels. Cement in bulk carried by cement carriers is unloaded into the cement plant barge moored at No.34 quay by means of piping system connecting between the transporting vessels and the cement plant barge and packed in bags on board the cement plant barge. The bagged cement is transferred by means of belt conveyers from the barge to shore and directly landed on trucks for forwarding to hinterland.

3) Liquid cargo in bulk

a) Special berth

There are three tanker berths at No.37 quay for unloading of LPG, Gasoline, Naphtha, Fuel Oil, Crude Oil, etc. The cargo handling is done by piping systems which are leading from berths to inland storage tanks per kind of oil.

b) Pipeline for petroleum products

The mouths of pipelines for unloading and loading of fuel and gas oil are installed at Nos,26 and 27 quays. Subterranean pipelines are laid from the quays to storage tanks in the port. The cargo handling is done through rubber hoses connecting between vessel's pipeline and the mouths of shore pipelines.

c) Pipeline for bitumen

A subterranean pipeline is laid from storage tanks within the port to a berth in No.27 quay, and the cargo is unloaded through rubber hose connecting between vessel's pipeline and the mouth of shore pipeline.

d) Pipeline for vegetable oil

Pipelines are leading from the factory of ENCG in the port at Nos,32 and 36 quays and the cargo is discharged through a rubber hose connecting between vessel's pipeline and the mouth of the shore pipe.

Table 5.4.2 Share of Imported Cargos Transported by General Cargo Vessels by Kind of Packages

Vessel No.	Total Weight (Kg)		Containers(full)		Vehicles		Pallets		Cases		Others	
	No.	Weight	No.	Net Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight
C1	Total	2,265,148	12	118,969	1	1,040	2,500	1,705,387	192	177,620		262,132
	Average			9,914		1,040		682		925		0
	Share	1.000		0.053		0.000		0.753		0.078		0.116
C2	Total	1,830,266	0	0	0	0	1,062	1,166,840	12	4,133		659,293
	Average			0		0		1,099		344		0
	Share	1.000		0.000		0.000		0.638		0.002		0.360
C3	Total	710,841	3	29,831	0	0	1,148	563,043	52	92,174		25,793
	Average			9,944		0		490		1,773		0
	Share	1.000		0.042		0.000		0.792		0.130		0.036
C4	Total	2,049,753	31	127,939	2	1,830	707	695,356	28	6,391		1,218,237
	Average			4,127		915		984		228		0
	Share	1.000		0.062		0.001		0.339		0.003		0.594
C6	Total	3,409,730	31	97,852	0	0	241	237,181	28	57,828		3,016,869
	Average			0		0		0		2,065		0
	Share	1.000		0.029		0.000		0.070		0.017		0.885
C7	Total	145,820	0	0	0	0	0	0	0	0		145,820
	Average			0		0		0		0		0
	Share	1.000		0.000		0.000		0.000		0.000		1.000
C9	Total	1,475,744	0	0	0	0	233	141,050	528	373,547		961,251
	Average			0		0		605		707		0
	Share	1.000		0.000		0.000		0.096		0.253		0.651
C10	Total	469,220	0	0	0	0	580	469,220	0	0		0
	Average			0		0		809		0		0
	Share	1.000		0.000		0.000		1.000		0.000		0.000
C11	Total	2,440,242	32	282,594	10	68,000	1,695	1,223,839	421	330,723		535,086
	Average			8,831		6,800		722		786		0
	Share	1.000		0.116		0.028		0.502		0.136		0.219
Grand Total	14,796,764	109	657,185	13	70,870	8,166	6,201,916	1,261	1,042,416		6,824,481	
Average			6,029		5,452		759		827		0	
Share(%)	100.0		4.4		0.5		41.9		7.0		46.1	

Source: Analysis by the Study Team based on the Data in 1990 of EPAL

Table 5.4.3 Share of Imported Cargos Transported by Ro-Ro by Kind of Package

Vessel No.	Total Weight (Kg)	Containers(full)		Trailers		Trucks		Vehicles		Pallets		Cases		Others	
		No.	Net Weight	No.	Cargos	No.	Cargos	No.	Weight	No.	Weight	No.	Weight	No.	Weight
R1	974,041	102	965,688	0	0	0	0	6	5,815	0	0	14	2,538	0	0
Average			9,468						969				181		
Share	1.000		0.991		0.000		0.000		0.006		0.000		0.003		0.000
R2	346,940	2	20,045	1	11,420	0	0	6	23,045	202	108,989	129	134,672	48,769	
Average			10,023		11,420				3,841		540		1,044		
Share	1.000		0.058		0.033		0.000		0.066		0.314		0.388		0.141
R3	969,467	1	10,070	0	0	0	0	0	0	1,045	542,998	706	258,149	158,250	
Average			10,070								520		366		
Share	1.000		0.010		0.000		0.000		0.000		0.560		0.266		0.163
R4	442,586	23	194,538	2	14,800	0	0	18	135,220	61	23,305	151	55,743	18,980	
Average			8,458		7,400				7,512		382		369		
Share	1.000		0.440		0.033		0.000		0.306		0.053		0.126		0.043
R6	1,128,620	35	177,235	4	43,518	5	33,473	33	89,895	233	170,416	810	471,715	142,368	
Average			5,064		10,880		6,695		2,724		731		582		
Share	1.000		0.157		0.039		0.030		0.080		0.151		0.418		0.126
R7	758,295	21	151,289	0	0	0	0	36	98,180	119	90,563	795	415,026	3,237	
Average			7,204						2,727		761		522		
Share	1.000		0.200		0.000		0.000		0.129		0.119		0.547		0.004
R8	1,832,730	21	170,115	0	0	0	0	33	206,700	1,261	617,097	67	53,541	785,277	
Average			8,101						6,264		489		789		
Share	1.000		0.093		0.000		0.000		0.113		0.337		0.029		0.428
R9	1,369,056	15	67,357	6	102,800	3	79,978	5	5,220	25	24,200	934	839,081	250,420	
Average			4,490		17,133		26,659		1,044		968		898		
Share	1.000		0.049		0.075		0.058		0.004		0.018		0.613		0.183
R10	423,348	1	5,360	2	38,600	1	2,180	2	2,150	81	77,251	146	130,454	167,353	
Average			5,360		19,300		2,180		1,075		954		894		
Share	1.000		0.013		0.091		0.005		0.005		0.182		0.306		0.395
R11	404,562	12	65,657	0	0	0	0	0	0	304	138,054	4	3,189	197,662	
Average			5,471		7,400						454		797		
Share	1.000		0.162		0.000		0.000		0.000		0.341		0.008		0.489
Grand Total	8,649,645	233	1,827,354	15	211,138	9	115,631	139	566,225	3,331	1,792,873	3,756	2,384,108	1,772,316	
Average			7,843		14,076		12,848		4,074		538		629		
Share(%)	100.0		21.1		2.4		1.3		6.5		20.7		27.3		20.5

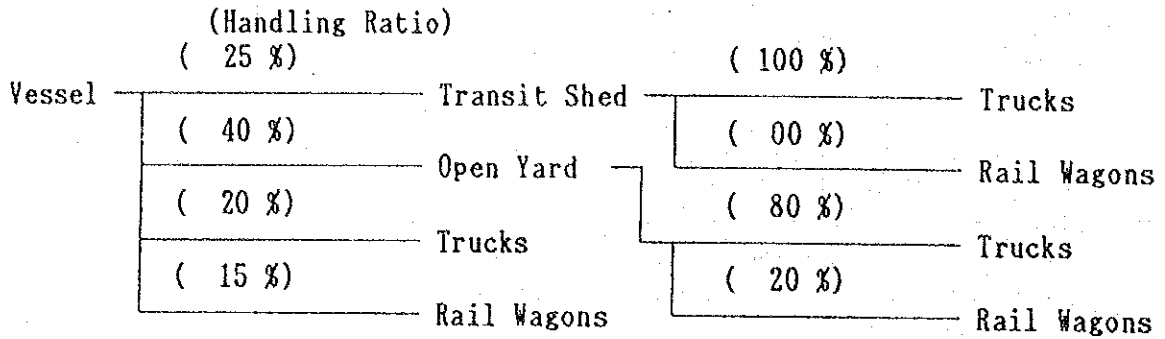
Source: Analysis by the Study Team based on the Data in 1990 of EPAL

Algiers Port

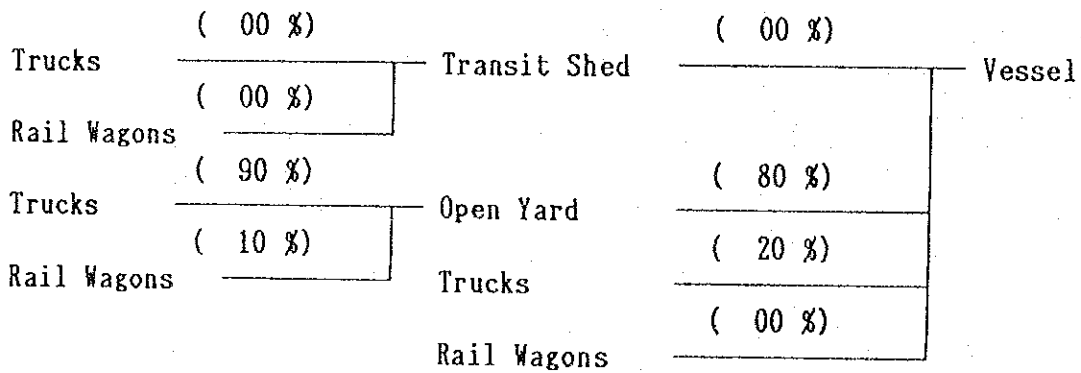
Fig. 5.4.2 Present Cargo Flow in Port

General Cargo

(1) Discharging



(2) Loading

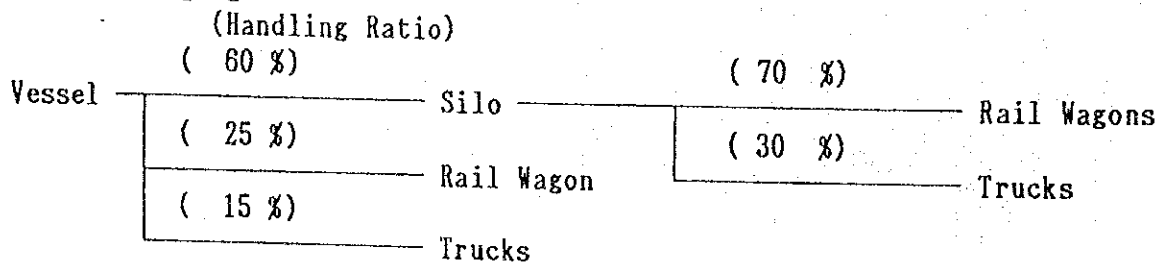


Source : The EPAL

Fig. 5.4.3 Present Cargo Flow in Port

Cereals in Bulk

(1) Discharging



Source : The OAIC

(2) Cargo-Handling Productivity

Cargo-handling productivity at the port was computed based on the actual record of the operation in 1990. The productivity was calculated in the definition that the numerator is the volume of cargo discharged or unloaded and the denominator is mooring time including non operational time after the first and second shifts from 7:00 to 19:00, Friday and holiday. The productivity was computed by each vessel that called in the year, totaling to around 1,800 vessels, and then sorted and averaged by vessel type and berth. The result is shown in Table 5.4.1. The cargo-handling productivity of the general cargo vessels laden with various kinds of cargoes was 9.7 tons per hour on an average. The productivity of the general cargo vessels laden with monocommodity was 24.1 tons per hour. That of Ro-Ro vessels was lower compared with the general cargo vessels probably due to stowed conditions using various package types mentioned previously and a right stern ramp is generally the only connection between a Ro-Ro vessel and a berth.

As for cereals' discharging, the average productivity was 52.6 tons per hour. Considering that the capacity of existing unloaders of the OAIC and the EPAL, namely varying from 120-300 tons per hour (nominal capacity) per one unit, and two units are usable simultaneously, the actual productivity seems to be very low. The fact causes long mooring days over two weeks on an average, and subsequently, long off-shore waiting days of almost one week as mentioned previously. However, apparently low productivity of discharging cereals is induced by shortage of storage capacity of the existing silos and also by low productivity of evacuation from the port by railway wagons or trucks.

5.4.3 Storage Condition

(1) Storage Condition

a) General Cargo

Almost all of the general cargoes discharged from vessels are stacked in tiers in open yard by means of forklifts, except sacked cargo to be directly delivered to consignees.

In principle the cargoes discharged from vessels planned to be stored in open yard near the berth allocated to the vessel, and piled in a block per type of cargo, per lot and per vessel. The sheds are only used for storage of a perishable and valuable cargo.

The present open yard is divided into many small sections by roads and rail ways, and the cargo is tightly stored and there is no space between piles. Many cargoes are piled up on the road areas over the border line of open storage yard causing the road traffic disturbance. Since the condition of pavement on open yards is desolated and uneven here and there, the piled cargoes especially palletized cargoes are easily toppled down. A forklift handling is also disturbed.

Besides the above, open spaces on aprons are occupied with cargoes stored tightly, and there are only narrow spaces for cargo marshaling. The cargo handling (not only discharging from vessel but loading of other cargo onto trucks for bringing out) is carried out simultaneously in these narrow space.

Many deteriorated cargoes in various conditions ; breakage and tearing of outer packages, wet stained, spillage, leakage, deformed, rusted, dusted, are conspicuously found among the stored cargoes in the every open yard in the port. A large amount of contents are run out, spilled out from many broken and torn packages and scattered here and there in open yards, consequently storage capacity is more decreased and all cargo handling operation are disturbed.

The deterioration of the cargoes seems to be caused by improper handling during discharging and/or storing operation rather than by marine damage during sea transportation, and that is results from lack of adequate cargo handling tool, such as slings, spreaders, and attachment for forklifts, and also improper

use of forklifts taking into consideration the types of cargoes, and other reason is considered to the condition of open storage yard and marshaling space at aprons mentioned above.

b) Container

Containers are planned to be transferred and stacked in container storage yards located near Mole de Skikda. However many containers are stacked in other open yards or on aprons. The full load containers transferred to the container yard are stacked in 2 tiers, in 2 rows of 1 line by means of forklifts. The space between stacking lines is some 10 m. Empty containers are separately stacked in blocks, in 3 tiers per shipping company.

c) Trailer

There is no specially designated parking lot for trailers. The trailers are however parked in group in open yards.

(2) Dwelling Time within the Port Limit

Dwelling time of cargoes discharged from vessels depends on kinds of commodities. Some commodities such as cereals and perishable foodstuffs can be brought out from the port in exceptional simple procedure of a short time according to the customs regulation. Hence, a great part of them are immediately evacuated from the port after being loaded on trucks or wagons directly from vessels. On the other hand, general cargoes stay for considerably long period of around 50 days. Several reasons of the long stay are listed. It seems likely that one of the major reasons is the delay of preparation of documents before submission to the customs office by consignees. Moreover, after customs clearance, some of cargoes are left in the port limits without being received by consignees for long period due to the lack of warehouses of consignees. Shortage of trucks or wagons also seems to cause the long dwelling time.

- Average dwelling times in 1990 are shown as follows:
 - General cargoes: Transit sheds: 50 days
 - Open storage yards: 50 days
 - Containers: 52 days
 - Trailers: 48 days
 - Wood: 16 days
 - Cereals in silos: 10 days

5.4.4 Utilization of Berths

There are 49 berths used for loading and unloading commercial cargoes excluding those served for fishing boats, tugboats, etc. According to the actual record of cargo-handling operations in 1990, an average percentage of berth occupancy reached to high value of 75%. Taking account of seasonal fluctuation of vessel calling, it seems that the port is close to the saturation in capacity. In fact, in the first half of the same year, the berth occupancy ratio exceeded 80%. The high berth occupancy ratio has a linkage with low cargo-handling productivity (see Table 5.4.4). At the berths mainly receiving general cargoes including cargoes transported by Ro-Ro, the individual productivity is under around 15 tons per hour, and many of them do not exceed even 10 tons per hour. As a result of that, on the contrary, many of the individual berth occupancy ratio exceeded 80%, showing high values.

It seems likely that the major reasons of apparently low cargo-handling productivity of general cargoes are shortage of the existing storage facilities and long dwelling times of cargoes within the port limits. The shortage of the storage facilities clearly disturbs smooth cargo-handling operations due to the difficulty of finding vacant space near a berth where cargo-handling is in operation. On the other hand, No.35 Quay specialized for cereal-handling is already saturated in the capacity, showing berth occupancy ratio of almost 100%.

Table 5.4.4 Utilization of Berths at the Port of Algiers in 1990

Berth No.	Volume of Cargoes			Berth Occupancy Ratio	Berth Throughput (tons/m/year)	Cargo-handling Productivity (tons/hr)
	Discharged (tons)	Loaded (tons)	Total (tons)			
No.5	63,284	0	63,284	100%	356	6.9
No.6	77,095	0	77,095	92%	563	9.6
No.7	63,804	200	64,004	63%	346	11.6
No.8	64,108	520	64,628	89%	247	8.3
No.9-1	105,338	0	105,338	86%	732	13.9
No.9-2	63,667	0	63,667	88%	442	8.3
No.10	57,626	62	57,688	88%	462	7.5
No.11-1	52,550	829	53,379	95%	356	6.4
No.11-2	73,082	31,572	104,654	57%	698	20.9
No.16	5,657	110	5,767	-	-	-
No.17	94,359	208	94,567	93%	430	11.6
No.18-1	78,441	240	78,681	55%	570	16.2
No.18-2	93,427	1,478	94,905	68%	688	15.9
No.19	28,024	0	28,024	73%	160	4.4
No.20-1	69,508	1,500	71,008	72%	526	11.3
No.20-2	74,212	190	74,402	100%	551	7.9
No.21	54,960	450	55,410	85%	292	7.5
No.22-1	65,386	0	65,386	74%	467	10.1
No.22-2	42,324	110	42,434	63%	303	7.7
No.22-3	33,303	400	33,703	47%	241	8.2
No.22-4	59,663	3,020	62,683	77%	448	9.3
No.22-PC	38,254	3,550	41,804	54%	288	8.9
No.23-1	65,425	0	65,425	96%	559	7.8
No.23-2	29,536	2,100	31,636	38%	270	9.5
No.23-3	51,484	160	51,644	82%	441	7.2
No.23-PC	16,227	3,200	19,427	54%	324	4.1
No.24	60,681	908	61,589	93%	616	8.0
No.25	40,949	710	41,659	48%	417	9.9
No.26	108,097	25,550	133,647	91%	891	16.8
No.27-1	83,500	80,041	163,541	38%	1,363	49.2
No.27-2	104,946	12,869	117,815	62%	982	21.8
No.28	16,627	4,400	21,027	33%	121	7.4
No.29-1	67,795	8,260	76,055	100%	494	8.4
No.29-2	57,837	7,087	64,924	90%	422	8.2
No.30	55,312	350	55,662	67%	348	9.5
No.31-1	60,814	0	60,814	83%	400	8.4
No.31-2	86,287	5,791	92,078	90%	606	11.7
No.31-3	66,530	2,360	68,890	67%	453	11.7
No.32	107,747	1,360	109,107	71%	642	17.6
No.33-1	361,644	230	361,874	100%	2,531	38.0
No.33-2	29,350	1,540	30,890	21%	216	17.2
No.33-3	99,189	22,595	121,784	62%	852	22.3
No.34	661,940	0	661,940	49%	3,894	154.0
No.35-1	650,155	110	650,265	100%	4,116	51.3
No.35-3	583,118	140	583,258	100%	3,692	60.8
No.36	97,262	0	97,262	42%	608	26.2
No.37-1	217,366	523,236	740,602	34%	3,666	250.3
No.37-2	283,805	22,827	306,632	88%	1,518	39.7
No.37-3	108,227	0	108,227	15%	536	83.8
Guelma	19,905	20,000	39,905	1%	71	691.6
Unknown	10,831	0	10,831	-	-	-
Total	5,560,658	790,263	6,350,921	Average:75%	-	-

5.5 Port Management and Operatoinis

5.5.1 Organization Structure and Function

EPAL has a authority to operate and administrate the port such as berth allocation, pilotage, tugs, cargo handling, storage and delivery.

Organization structure of the EPAL is shown in Fig. 5.5.1. The flow chart of port operation and related departments is shown in Fig. 5.5.2. The function of each department is as follows:

(1) Human Resources and General Affairs Dept.

This department is composed of four divisions with responsibility for personnel affairs, salary/wage payment, social benefit, employee training programs and general affairs.

(2) Financial and Accounting Department

In the department, three divisions are in charge of financial affairs, accounting, analysis of accounting and the preparation of budget.

(3) Planning and System Department

The department is divided into three divisions with following function.

1) Planning Division

- port planning and annual planning

2) Research and Computer System Division

- annual statistics
- introduction and development of computer system and application programs

3) Information Processing Division

- to operate application programs and utilize machines in optimum efficiency
- to maintain programs and machines

(4) Harbor Master Department

The department is divided into two divisions with following function.

1) Navigation Assistance Division

- pilotage, line handling, tugs, launch boats service

2) Security Division

- port security and prevention

(5) Cargo Handling Department

This department is composed of three divisions with following function.

1) Cargo Handling Division

- stevedoring (seven wharves) and cargo statistics

2) Equipments Arrangement Division

- arrangement of cargo handling and transportation equipments.

3) General Administration Division

- personnel, wage payment and general affairs

(6) Commercial Department

The department is composed of three divisions with following function.

1) Cargo Division

- assignment of storage yard and shed for loaded/unloaded cargo

- preparing invoice

2) Domain Division

- management of specialized wharves, facilities and equipments

3) Legal Division

- legal matters

(7) Technical Works and Maintenance Department

The department is composed of three divisions with following function.

1) Technical Works Division

- civil engineering, architecture and electrical works

2) Maintenance Division

- maintenance of vehicles, cargo handling equipments and quay cranes

3) Supply Division

- purchase and stock of necessary parts and materials for repair

Port of Algiers

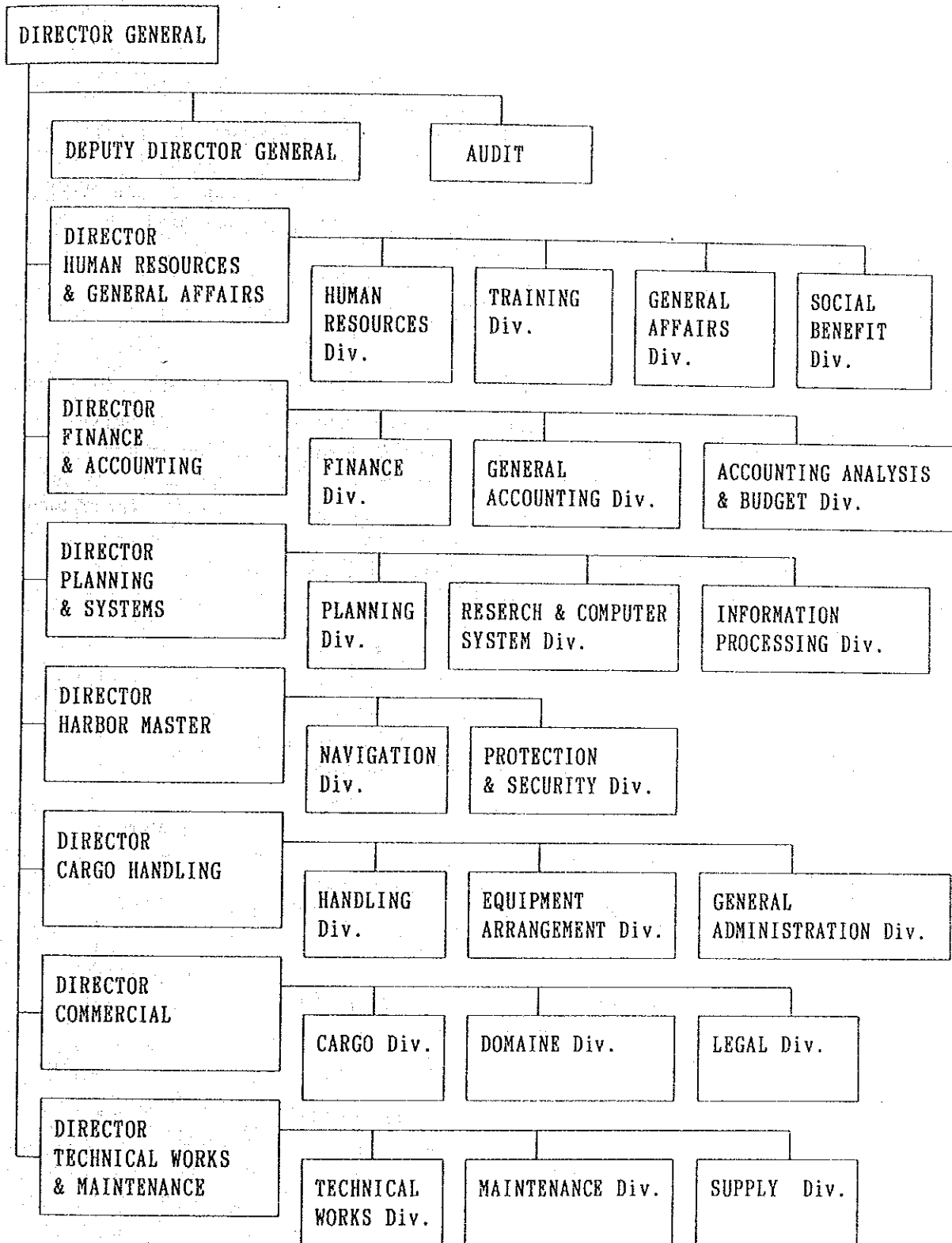


Fig. 5.5.1 Organization Chart

Port of Algiers

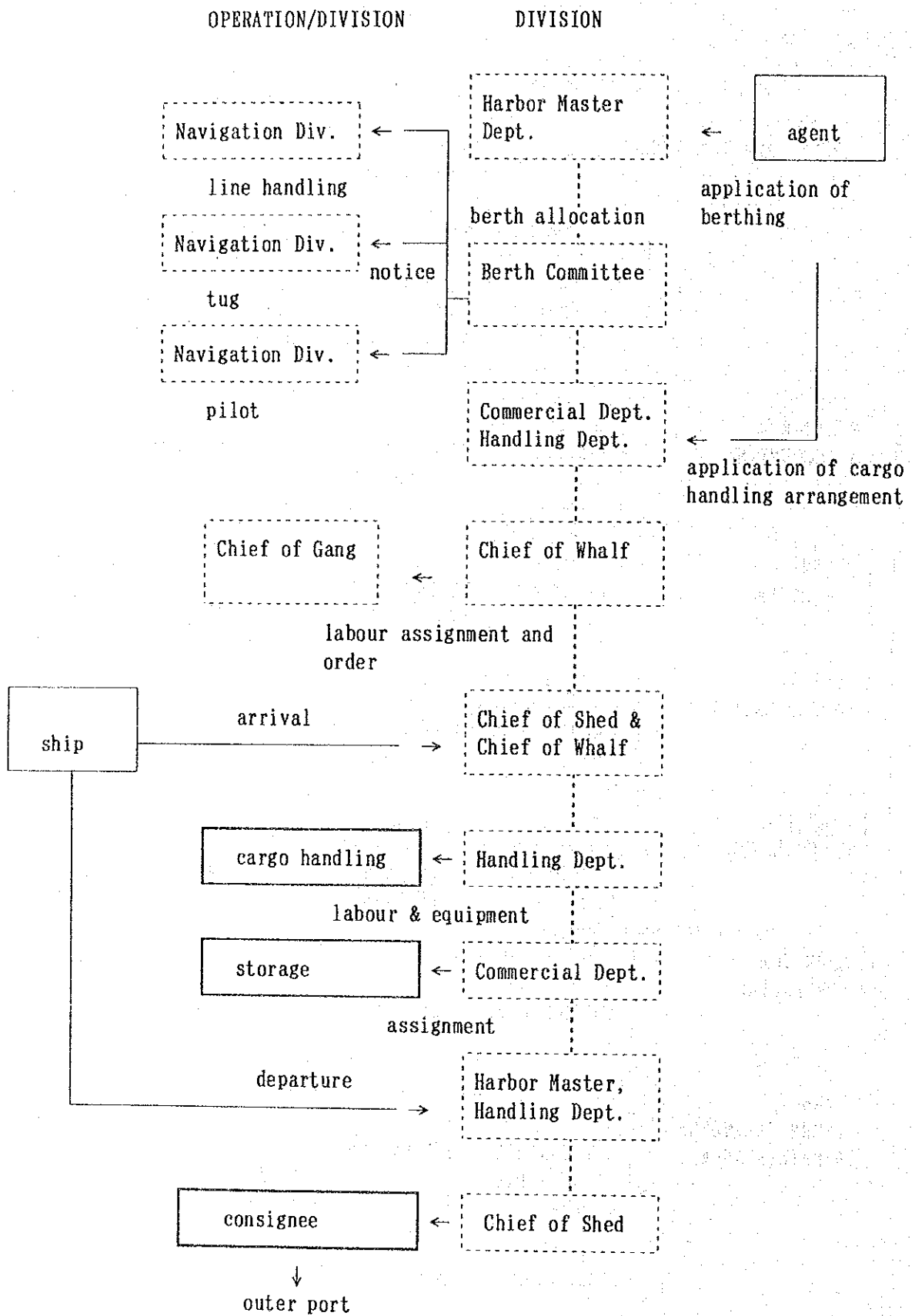


Fig. 5.5.2 Flow of Port Operation

5.5.2 Employee Breakdown

Number of employees at the EPAL is shown in Table 5.5.2. In the table, employees are classified into four categories as follows:

Cadres Superieurs : executive
Cadres : middle management
Maitrise : chief of workers
Execution : worker

EPAL has been making effort to decrease its employees and the result is shown in Table 5.5.1. Total number of employees is decreased by 25% from 1985 to 1990. This constant decrease has been achieved without dismissal of workers but means of not filling up the vacancy of retired workers.

Table 5.5.1 Number of Employees of EPAL 1985 - 1990

categ/year	1985	1986	1987	1988	1989	1990
Cadre	310	302	272	261	257	224
Maitrise	928	891	856	787	787	1397
Execution	4274	4112	3716	3398	3112	2539
Total	5512	5302	4844	4446	4156	4160

Table 5.5.2 Employee Breakdown of EPAL

Dept./Category	as on Dec. 1990				Total
	Cadres Superieur	Cadres	Maitrise	Execution	
DIRECTOR GENERAL	11	3	8	2	24
HUMAN RESOURCES & GENERAL AFFAIRS	6	21	101	134	262
FINANCE & ACCOUNTING	5	15	32	3	55
PLANNING & SYSTEMS	4	15	10	7	36
HARBOR MASTER	3	65	129	211	408
CARGO HANDLING	4	17	875	1,487	2,383
COMMERCIAL	5	28	112	388	533
TECHNICAL WORKS & MAINTENANCE	4	26	192	237	459
TOTAL	42	190	1,459	2,469	4,160

5.5.3 Port Services Performance

Emerformance of the port Services in 1990, such as pilotage, tugs and water supply are as follows.

(1) Pilotage

Number of persons in the section: 99 persons

Number of pilots: 20 persons

Pilot boats: using exclusive boats

Number of crews on pilot boat
including captain: 7 crews and 2 pilots

Total number of pilots who went
out for service in last year: 4,681 persons

Purchased year and price of pilot
boats: 5 boats 1987 price 500,000 DA
1 boat 1978
1 boat 1958

Average cost of fuel for a pilot
boat at one service: 7 DA

(2) Tugs

Number of persons in the section: 103 persons

Average number of crews par boat
including captain: 7 crews

Total number of tug boats which
went out for service in last year: 6,321 persons

Purchased year of tug boats: 1 boat 1982
3 boats 1971

Average cost of fuel for a tug
boat at one service: 54 DA

(3) Water supply

Number of persons in the section: 7 persons

Average number of persons par gang
for water supply: 2 persons

Total number of ships which got
the supply in last year: 1,330 ships

Actual service time: 8:00 - 17:30

Purchased price of water par m³: 2.5 DA

Revenue by water supply in last
year: 1,399,256.32 DA

5.5.4 Financial Condition

(1) Income Statements

The EPAL's Income Statements 1987-1990 are shown in table 5.5.3. The table was prepared to check the amount of operating profit of the last four years. Every year's total revenue, total expense and net income -before tax are shown in the line chart of Fig. 5.5.3. Operating revenue, operating expense and operating profit are shown in Fig. 5.5.4.

The number of employees and personnel expense in each year are shown in the line chart of Fig. 5.5.5. The graph showing an increase of personnel expense and a decrease of number of employees clearly indicates that the amount of wages and salaries per person is rapidly increasing.

(2) Operation Revenue

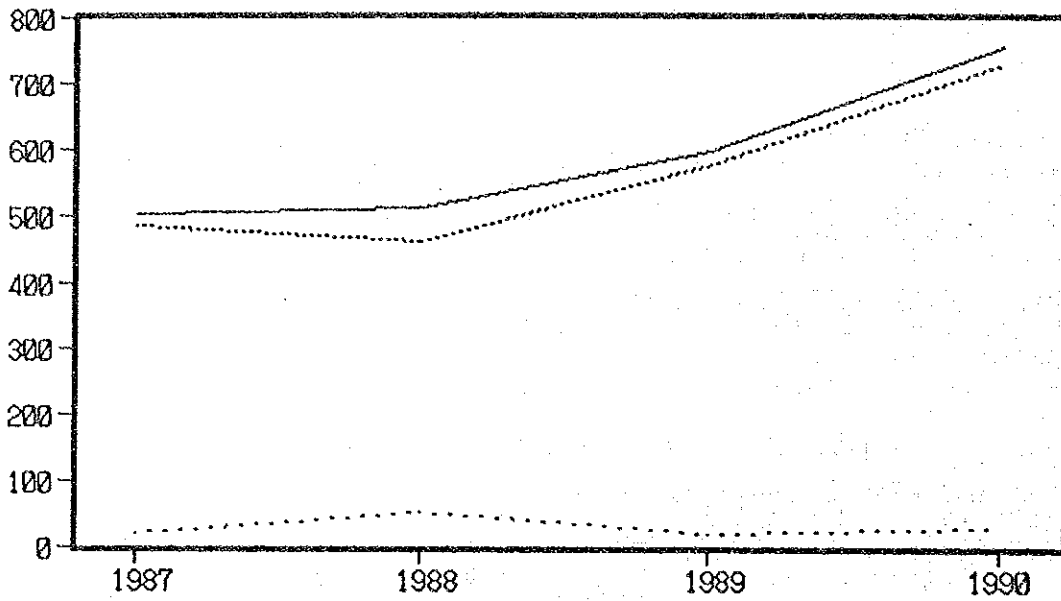
The EPAL's operation revenue in 1990 is listed in Table 5.5.4. The percentages of four categories of revenue classified by the EPAL are shown in Fig. 5.5.6. Additionally, the percentages of major charges are shown in Fig. 5.5.7.

The revenue is composed of about 88% of cargo handling and storage charges, 5.9% of tugs and pilot services and 6.3% of other charges. The revenue from cargo handling and storage is 574 million DA and 84% of this revenue were spent as personnel expense amounting to 484 million DA.

Table 5.5.3 Port Enterprise of Algiers - Income Statement 1987 - 1990

	million DA			
	1987	1988	1989	1990
Operating Revenue				
Operation	362.9	411.1	503.5	654.8
Other	17.1	20.2	33.6	29.5
Total Revenue	<u>380.0</u>	<u>431.3</u>	<u>537.1</u>	<u>684.3</u>
Operating Expenses				
Wages and salaries	238.1	215.2	285.8	371.5
Social Benefits	81.6	53.6	71.1	112.6
Subtotal staff costs	<u>319.7</u>	<u>268.8</u>	<u>356.9</u>	<u>484.1</u>
Depreciation	60.7	49.1	81.3	72.6
Maintenance and repairs	21.6	39.4	37.0	17.1
Materials and supplies	13.4	19.4	21.7	19.9
Insurance	4.8	4.8	2.5	2.9
Indirect taxation	51.9	56.7	69.4	100.8
Other	1.8	6.1	5.5	6.8
Subtotal	<u>154.2</u>	<u>175.4</u>	<u>217.4</u>	<u>220.0</u>
Total expense	<u>473.9</u>	<u>444.2</u>	<u>574.2</u>	<u>704.1</u>
Operating Profit	<u>-93.9</u>	<u>-12.9</u>	<u>-37.1</u>	<u>-19.9</u>
Non-operating Revenue				
Financial	3.1	6.4	8.3	9.8
Other	119.8	74.4	50.9	62.6
Subtotal	<u>122.9</u>	<u>80.9</u>	<u>59.2</u>	<u>72.4</u>
Non-operating Expense				
Financial	7.3	4.0	4.1	7.3
Other	2.0	12.1	-4.1	16.6
Subtotal	<u>9.4</u>	<u>16.1</u>	<u>0.0</u>	<u>23.9</u>
Net Income (before Tax)	<u>19.7</u>	<u>51.8</u>	<u>22.1</u>	<u>28.7</u>
Operating ratio	1.25	1.03	1.07	1.03
Working ratio	1.09	0.92	0.92	0.92
Staff cost as % of operating expenses	67	61	62	69

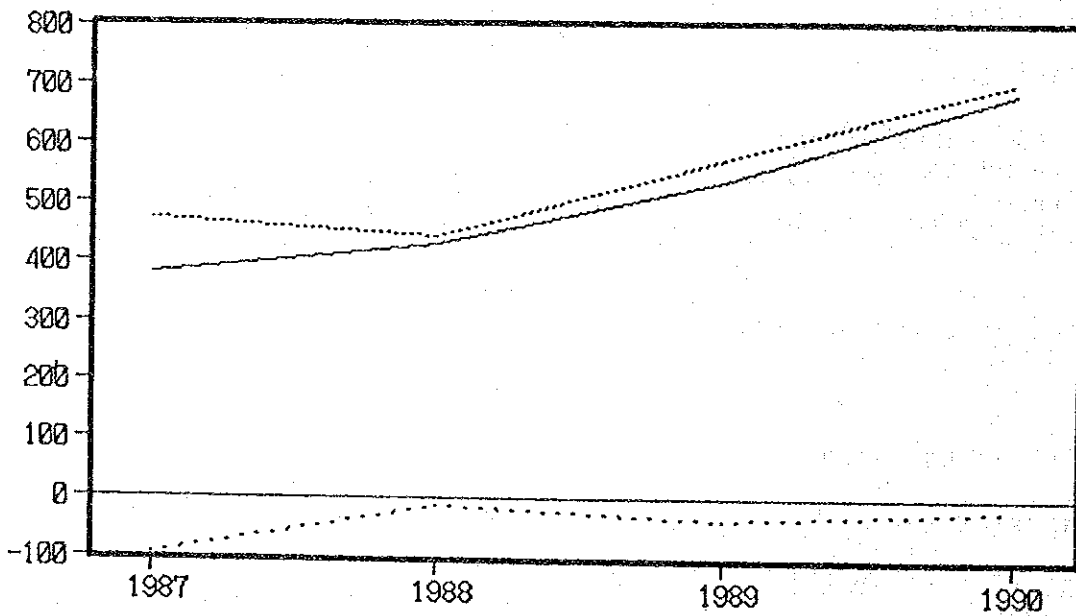
million DA



— Total Revenue Total Expense ... Net Income

Fig. 5.5.3 Net Income (before tax)

million DA



— Operation Revenue Operation Expense ... Operation Profit

Fig. 5.5.4 Operation Profit

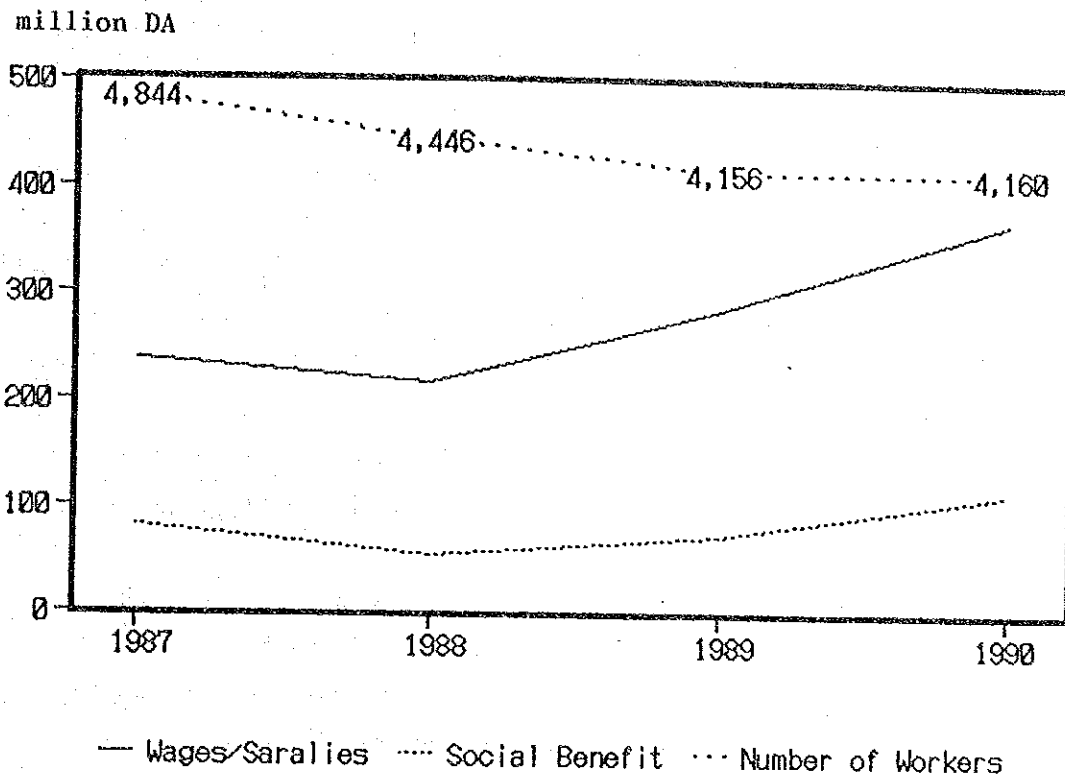


Fig. 5.5.5 Wages/Salaries

Table 5.5.4 EPAL Operation Revenue in 1990

		(DA)	
Charge	Amount	Charge	Amount
Maritime		Cargo Handling	
tugs	17,645,890	unloading	154,715,244
pilot	5,560,960	loading	7,406,796
berthing	3,814,500	extra-charge	104,274,270
side defender	3,207,125	equipments	29,387,055
water supply	1,411,341	cranes	22,444,827
guarding for ship	716,240	trucks	1,078,000
tax for ships	2,969,846	pumps	587,464
others	3,182,773	others	28,407,135
Subtotal	38,508,675	Subtotal	348,300,791
Cargo Storage		Other charge	1,061,126
export tax	19,892,267		
transit tax	9,368,623	Tax Parafiscale	
depot tax	95,683,171	quay tax	21,312,321
guarding for cargo	81,871,903	traffic tax	18,702,953
covering	434,710		
checker	937,163		
others	18,693,869		
Subtotal	226,881,706	Subtotal	41,076,399
Total Revenue	654,767,571		

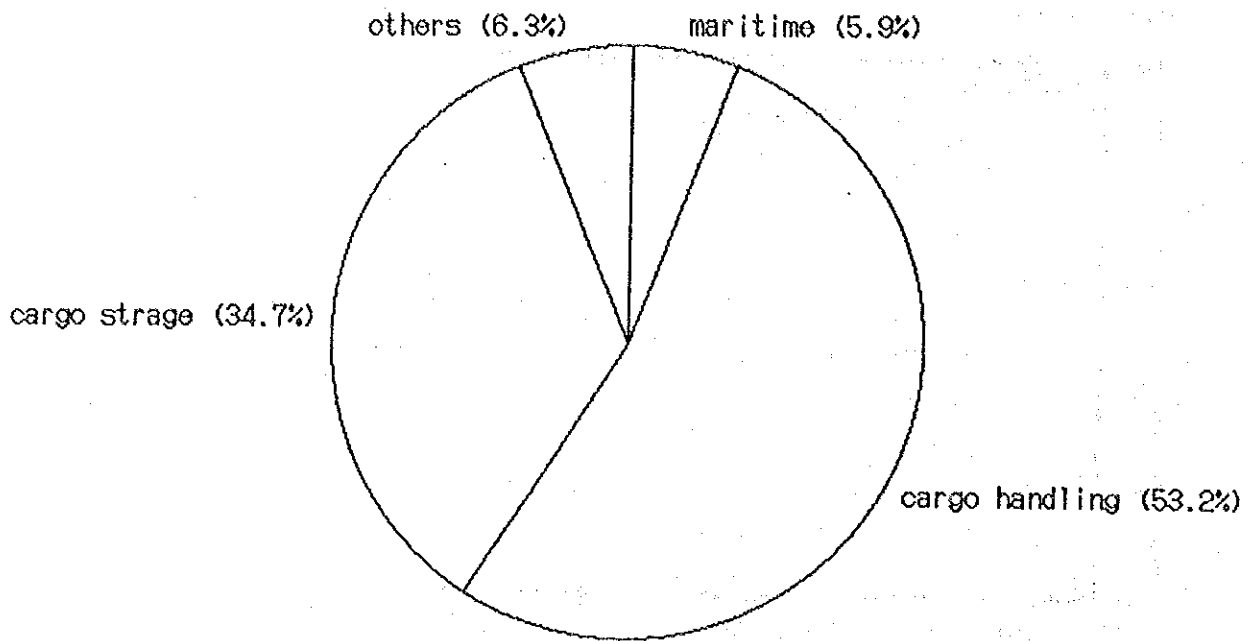


Fig. 5.5.6 Operation Revenue -1

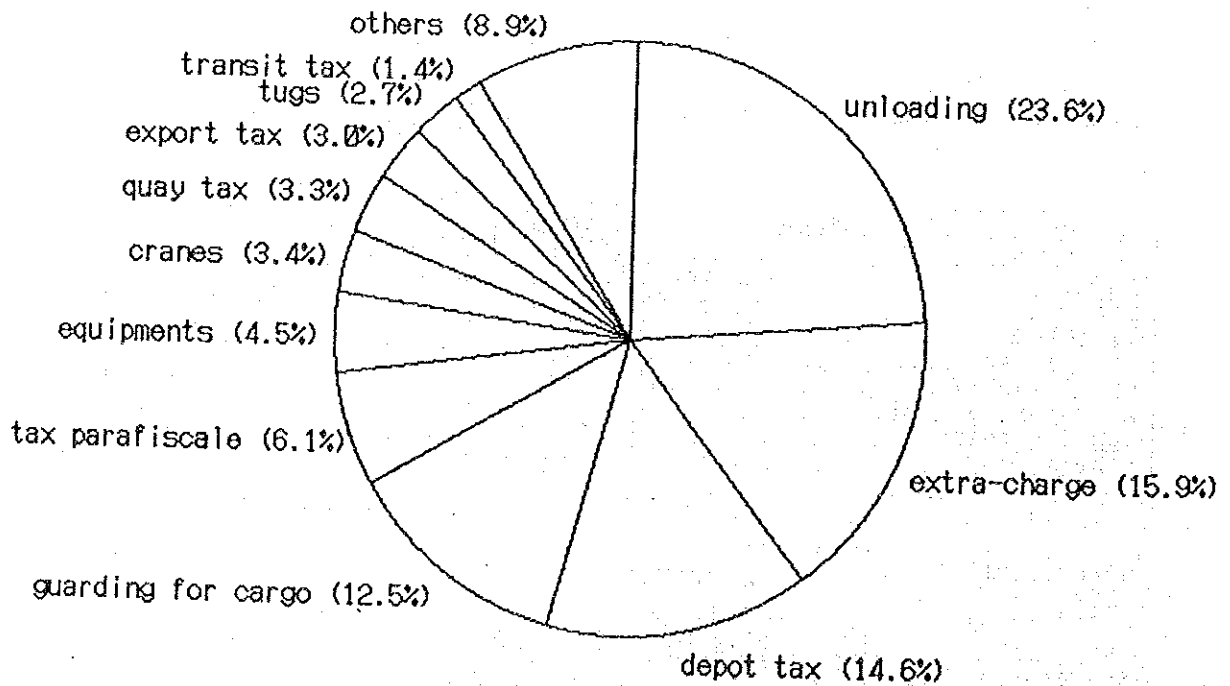


Fig. 5.5.7 Operation Revenue -2

5.6 Review of the Existing Plan

In order to cope with the worldwide containerization, the project of the development of a container terminal to be financed by the IBRD is on-going. The terminal is to be constructed by reclaiming the basin between the Quay No.27 and No. 29. The terminal is planned to be opened by 1994 as a closed container terminal with a gatehouse and enclosed with fences. The target numbers of containers to be handled at the terminal are 100,000 TEUs in 2000, 120,000 TEUs in 2005 and 198,000 TEUs in 2010, respectively. The terminal is also planned to serve fully-cellular container vessels with capacity of 1,200-1,300 TEUs. An outline of the project is as follows:

- Quay with 2 berths: length: 320 m, water depth: 11 m,
1 berth: length: 170 m, water depth: 10.5-11 m,
- Quay Crane: one rail for container gantry cranes to be installed in the future,
- Total area: 17,6 ha,
- Storage capacity: full containers: 3,540 TEUs,
empty containers: 2,280 TEUs,
- Container freight station,
- Administration building,
- Forklifts: 8 of 35 tons capacity,
4 of 10 tons capacity,
- Tractor-trailer units: 10,
- Workshop.

CHAPTER 6 THE PORT OF ORAN

6.1 Port Facilities

The port of Oran is playing an important role as the foreign trade port for the western region of Algeria.

As can be seen from Fig. 6.1.1, the Port is protected by north and east breakwaters. There are seven basins totaling 120 ha; Beni-Saf (4 ha), Skikda (40 ha), Arzew (25 ha), Mostaganem (18 ha), Bejaia (18 ha), Tenes (13 ha) and Ghazaouet (5 ha). The port facilities at Oran include 33 berths with a total length of 4,369 m. There is one approach channel.

6.1.1 Infrastructures and Superstructures

(1) Outer Facilities

The protective facilities are comprised of a northern breakwater and an eastern breakwater; the former has length of 2,800 m and the latter has 520m. The basins are covered by these two breakwaters and its designated water depths vary from -4.0 m to -12.0 m.

(2) Berthing Facilities

The berthing facilities are as indicated in Table 6.1.1.1.

1) The west end basin is called Bassin de Beni Saf which has six quays (No.1, No.3 to No.7). This was the original basin of the harbor when the port was built. It is now used as a fishing port.

2) Quay No.2 is located at the basin of Ghazaouet. This quay, with a total length of 225 m and a water depth of -8.0 m, is mainly used by the harbor master for pilot station, coastal patrol, tugboat mooring and minor repair for such service crafts.

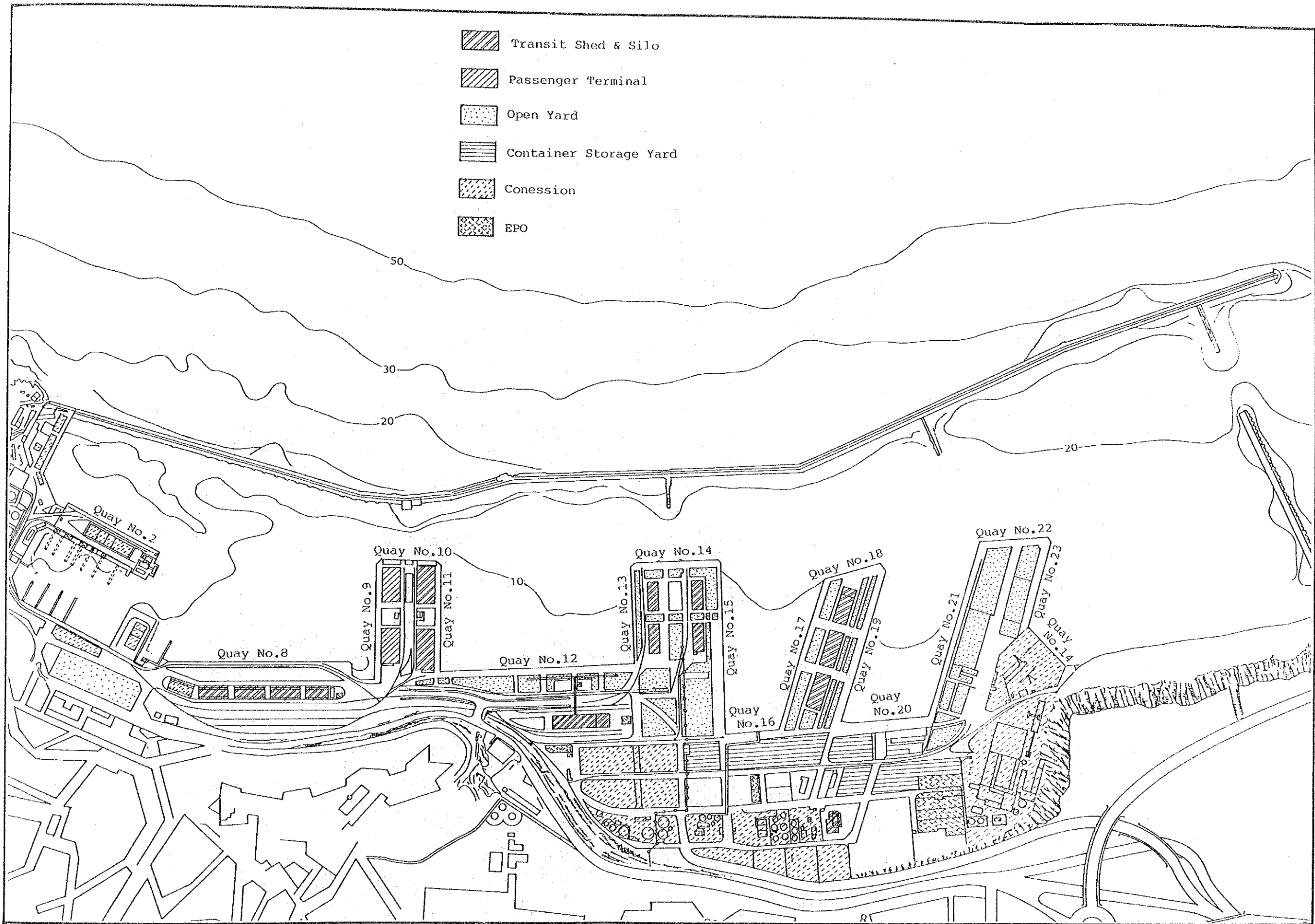


Fig. 6.1.1 Port of Oran

Table 6.1.1 Berthing Facilities at the Port of Oran

OBTFAI

Name of Quay	Berth No.	Basin	Length (m)	Water depth (m)	Structure type	Year of completion
2	1	Ghazaouet	112.5	8.00	Concrete block type	1880
	2		112.5	8.00		"
8	3	Arzew	130.0	9.15	"	1960
	4		130.0	9.15		"
	5		130.0	9.15		"
9	6	Arzew	130.0	7.00	"	1900
	7		130.0	8.20		"
10		Mostaghanem				
11	8	Mostaghanem	140.0	8.60	"	1900
	9		120.0	8.20		"
12	10	Mostaghanem	120.0	7.60	"	1900
	11		50.0	7.50		Concrete sheet pile type
13	12	Mostaghanem	370.0	12.00	"	1982
	14		110.0	7.50		Concrete block type
14	15	Mostaghanem	110.0	9.00	"	1930
	16		200.0	10.00		"
15	17	Tenes	190.0	12.00	"	1984
	18		190.0	9.00		"
16	19	Tenes	120.0	8.00	"	1960
	20		172.5	9.00		Concrete block, steel sheet
17	21	Tenes	172.5	10.50	"	1962
	22		130.0	12.00		Concrete block type
18	23	Bejaia	110.0	10.50	"	1962
	24		120.0	10.50		Concrete sheet pile type
19	25	Bejaia	120.0	9.00	"	"
	26		100.0	8.50		Concrete block type
20	27	Bejaia	100.0	8.50	"	1986
	28		133.0	9.00		"
21	29	Bejaia	133.0	10.00	"	1986
	30		133.0	12.00		"
22	31	Skikda	150.0	12.00	"	1945
	32		140.0	11.00		"
23	33	Skikda	60.0	9.00	"	1945
	24		85.0	4.50		"

Source : EPO

3) Quay No.8 with a total quay length of 390 m and a water depth of -9.15 m is used for general cargo vessels and container vessels.

Bagged cargo and steel wire and steel rods are placed on the quay. A vessel discharging flour was directly loading to trucks on the apron. The shed behind this quay is almost empty and some general cargoes are left there without being delivered.

4) Quay No.9, No.10 and No.11 have a total quay length of 640 m and a water depth of -7.0 m to -8.6 m. No.9 is assigned for ferries embarking for Marseille and Alicante. No.10 and No.11 are used for general cargoes as well as liquid bulk cargo such as edible oil and detergent.

5) Quay No.12 with a total quay length of 420 m and a water depth of -7.5 m (50 m) to -12.0 m (370 m) is mainly used for grain discharge.

The quay is equipped with a 400 tons/h screw unloader and a 200 tons/h pneumatic unloader. Both conveyors are placed on rails and the conveyor can be connected to the belt line of the grain silo (30,000 tons) behind the open space. Another 200 tons/h pneumatic unloader on rubber wheel is placed on the quay which is not connected to the main belt line leading to the grain silo.

6) Quay No.13, No.14, and No.15 with a total length of 800 m and having water depth of -7.5 m to -12.0 m is used for general cargoes. At present, No.15 is under renovation to reinforce its structure and will be completed on March in 1992.

7) Quay No.16 is used for containers and general cargoes, and has a total length of 120 m and a water depth of -8.0 m.

Behind this quay, packs of cardboard are stored.

8) Quay No.17, No.18 and No.19 have a total quay length of 825 m and a water depth of -9.0 m to -12.0 m. No.17 and No.18 are assigned for general cargoes and containers. Two pipes supplying fuel for vessels are installed at No.17. A cement silo-bagging ship is used for mooring at No.19, and the base of this quay is used for Ro-Ro vessels.

9) Quay No.20 with a total quay length of 200 m and a water depth of -8.5 m is used for general cargoes.

10) Quay No.21, No.22 and No.23 whose surface pavement has been damaged are used for bulk cargo and bagged cargo. The grain is discharged at No.21 by grabs.

11) Quay No.24 is used as repair-shop of SONATRAM. A new container terminal is planned at the area from No.21 to No.24 and will have paved area of 6 ha and a reinforced quay wall.

(3) Storage Facilities

The Port has an area of 21,000 m² of transit sheds, 131,000 m² of open storage yards and two cereal silos with a total capacity of 40,000 tons (silos 30,000 and 10,000 tons) as handling and storage facilities.

The transit sheds and open storage yards are as indicated Table 6.1.1.(3).1.

Table 6.1.1.(3).1 Transit Sheds and Open Storage Yards

As of November 1991

Name	Position	Area (m2)	
Transit shed			
Dock 3	Quay No.8	1,180	
Dock 4	Quay No.8	798	
Dock 5	Quay No.8	858	
Dock 6	Quay No.8	1,011	
Dock 7	Quay No.11	2,425	
Dock 8	Quay No.11	2,308	
Dock 9	Quay No.13	1,580	
Dock 10	Quay No.13	1,614	
Dock 12	Quay No.15	1,518	
Dock 13	Quay No.15	1,613	
Dock 14	Quay No.19	1,890	
Dock 15	Quay No.19	2,233	
Dock 16	Quay No.19	1,980	
	Total	21,008	
Open storage			
	Mole IBN SINA	35,184	
	Mole ROHD	14,588	
	Mole BADIS	31,081	
	Quay No.8	10,930	
	Quay No.12	10,128	
	Quay No.16,20	30,000	Container yard
	Total	131,911	

Source : EFO

6.1.2 Cargo-Handling Facilities

(1) General

Cargo handling facilities of the Oran port mainly consist 11 quay cranes, 3 grain unloaders, 8 mobile cranes and others.

Most of the quay cranes has been under use for 30 to 40 years without sufficient maintenance being done. All the quay cranes are superannuated similarly to those installed in other Algerian Ports. On the contrary, the grain unloading facilities are well maintained and used in good working conditions.

(2) Quay crane

1) Working condition

The port of Oran has 11 quay cranes for cargo handling and their capacity varies from 3 to 6 tons. The working conditions of each crane are as detailed in the table 6.1.2.1.

Table 6.1.2.1 Detail of Working Condition of Quay Cranes at E.P.O

No. Crane	Instal- led Year	Capac- ity (ton)	Maker	Number	Condition			Remarks
					Good	Norm	Bad	
01	1952	3	CAILLARD	SENEG		*		Lowered performance
02	1952	3	:	:		*		Lowered performance
03	1952	3	:	:		*		Lowered performance
04	1952	6	STOTHER &			*		Lowered performance
05	1952	3	-PITT :	:		*		Lowered performance
06	1952	3	:	:		*		Lowered performance
07	1960	3	:	:		*		Lowered performance
08	1960	6	:	:		*		Lowered performance
09	1960	6	:	:		*		Lowered performance
10	1952	6	:	:		*		Lowered performance
11	1952	6	:	:		*		Lowered performance

Note: Good : in good operating condition

Norm : requires some minor repairs.

Bad : almost unrepairable.

2) Working efficiency

The quay crane are superannuated and most of their parts including steel structures have serious corrosion. The loading test result shows that their loading capacity is lowered by 25% or more compared with their nominal capacity. Comparison of the unloading efficiency of cargo ship cranes and that of the quay cranes revealed that the performance of the quay cranes are ten times less than that of ship cranes as shown in the table 6.1.2.2.

Table 6.1.2.2 Comparison for utilization of Quay Cranes and Ship Cranes at E.P.O (from January to June 1991)

Month	Cargo Ship Crane (A)		Quay Crane (B)	
	No. of Unloading Operation(a)	No. shift(b)	No. of Unloading Operation(a)	No. shift(b)
Jan. 1991	3,235	535	217	180
Feb. 1991	2,065	440	225	168
Mar. 1991	1,882	458	205	176
Apr. 1991	2,057	489	193	183
May. 1991	2,657	607	307	212
Jun. 1991	1,451	298	137	104
Total	13,307	2,627	1,204	1,023
(A)/(B)	11.05	2.57	1.00	1.00
(a)/(b)	5.18		1.18	

Note : The normal working time is 6 hours x 2 shifts per day or:

1st shift : from 07h00 to 13h00

2nd shift : from 13h00 to 19h00

(3) Mobile Crane

The E.P.O has purchased 8 mobile cranes for cargo handling but half of them are out of order because of damages caused by accidents and shortage of spare parts necessary for repair. In the case of 140 tons mobile crane, it fell down to the basin by a miss operation. It is estimated that its repair cost would be higher than purchasing a new equipment, therefore it is better to

abandon it than repair. The operating conditions of the equipments are as indicated in the table 6.1.2.3.

Table 6.1.2.3 Working Conditions of Mobil Crans at E.P.O

No. of Mobil Crane	Year	Capacity (ton)	Maker	Crane condition			Remarks
				Good	Norm	Bad	
01	1976	15	GOTTWALD	*			Under operation
02	1976	15	GOTTWALD	*			Under operation
03	1981	20	DEMAG	*			Under operation
04	1981	20	DEMAG			*	The truck is out of order
05	1972	28	PINGULY		*		The engine is out of order
06	1982	40	KATO	*			Under operation
07	1982	40	KATO			*	Deformed body
08	1985	140	LIEBHEER			*	Accident
Total			8	4	1	3	

Note: Good : in good operating condition

Norm : requires some minor repairs.

Bad : almost unrepairable.

(4) Grain Unloader

There are two grain silos, one with the capacity of 12,000 tons constructed in 1976, and the other with the capacity of 30,000 tons renewed in 1984. There are 3 type of grain unloaders as shown in the Table 6.1.2.4.

Table 6.1.2.4 Condition of Grain Unloaders at E.P.O

Type of Unloader	Capacity	Year	Operating Condition
Pneumatic Type	200 t/h	1988	Very good
Screw Conveyor Type	400 t/h	1984	Corrosion produced at the screw
Mobile Pneumatic Tyoe	200 t/h	1990	Very good

(5) Fork-lift

The E.P.O. has 97 fork-lifts whose capacity varies from 3 to 36 tons. The fork-lifts classified according to the year of purchase is shown in the table 6.1.2.5. The tables indicates that most of the fork-lifts (95%) were purchased in 1981. Since then the fork-lifts have been used under very severe working conditions (2 or 3 shifts). Sixty-six percent (66%) of the fork-lift are working in good conditions. Twenty-four percent (24%) of them are in abnormal conditions and five (5%) of them are broken.

Most of the equipments are used beyond their normal life, similar to other Algerian ports, requiring increased maintenance cost to keep them in good working conditions. The situation of broken equipments is very close to that of the E.P.AL.

Table 6.1.2.5 Classification of Fork-Lift by Purchase Year at E.P.O

Maker	Year	Con- dit- on	Looaing Capacity (ton)					Total	Remarks
			1-5	6-10	16-20	26-30	30-36		
HYSTER	1980	Good			1	1		2	
		Norm			1	1	2	4	
		Bad							
TOYOTA	1981	Good	42	17				59	
		Norm	25	5				30	
		Bad	4					4	
MANTITOU	1986	Good	3						
		Norm							
		Bad							
STEINBOCK	1987	Good	20						
		Norm	3						
		Bad							
HYSTER	1990	Good			1	1			
		Norm							
		Bad							
Sub-Total		Good	65	17	1	1		84	66%
		Norm	28	5	1	1	2	37	29%
		Bad	4		1	1		6	5%
Total			97	22	3	3	2	127	100%

Note: Good : in good operating condition : 66 %

Norm : requires some minor repairs : 29 %

Bad : almost unrepair : 5 %

6.1.3 Port Service and Utilities

The Port offers services to ships such as; pilotage, tugs, stevedores, water and oil supply, garbage disposal etc.

(1) Small Craft

The Port has four pilotboats and three tugboats.

The capacity and dimension of each tugboat is as follows;

	(i)	(ii)	(iii)
Horse power:	1,000	1,500	1,700
Length (m):	23.8	28.0	28.0
Width (m):	7.0	7.62	9.0
Draught (m):	3.5	2.82	-
Built :	1971	1971	1983

(2) Water and Oil Supply Facilities

Fresh water is supplied by barge and the fuel is supplied by pipeline at Quay No.21.

6.1.4 Superannuation of Port Facilities

The construction of the modern Oran port, which has 140 years of history, was started in 1848. The quays were constructed in the following 6 phases:

- 1st phase : from 1848 to 1880 (30 years)
- 2nd phase : from 1881 to 1900 (20 years)
- 3rd phase : from 1901 to 1930 (30 years)
- 4th phase : from 1931 to 1945 (15 years)
- 5th phase : from 1946 to 1960 (15 years).

The 6th phase corresponds to the period of 8 years (from 1982 to 1990) during which the quays constructed in the 4th phase were improved. about 50% of the total quay walls were improved during this period in such a way as to