

Process in Urban Project, Case Bejaia Port Implementation (Algeria)

Lamia Benouaret, Dr. Dekoumi Djamel and Prof. Dr. Pedro Fernández Carrasco

Abstract—Bejaia, throughout its millennium history, radiated on both the Mediterranean and the whole of the Maghreb. The port aims to increase its attractiveness and ensure a most dynamic offshore platform of the country. The work presents an assessment of the evolution of the traffic, the capacity of storage, and the duration of stay at the quay, as well as a synthesis of the needs and the constraints of this port. Hence the necessity of developing the port through a process consisting three main phases, several operations of extension, construction of new projects, and finally moving the oil port - A flagship operation of the port development project.

Keywords—Bejaia port, urban project management, development of the port, master plan, oil port implementation.

I. INTRODUCTION

The port of Bejaia is an Algerian port, which serves a hinterland composed of seven cities of the South East of the country.

The port of Bejaia has succeeded, in a few years, to assert itself as one of the most dynamic port platforms of the country. With a national maritime traffic of 31%, it was able to obtain the title of "motorway of the sea"¹.



Fig 1. Port of Bejaia 1834



Fig 2. Port of Bejaia 1911

Bejaia's port construction began in 1870 and was completed in 1911. Some or several improvements were made later in 1930. Finally, in 1987, the wharf was expanded and the modern was built.

Port infrastructures

The Port of Bejaia is located approximately 1.5 km in the south of Cap Carbon, on the west side of the Gulf of Bejaia. The current harbor is protected by the jetties East (650ml), the South (450ml), of the wide (1.500ml) and of closure (800 ml). These works of protection frame three ponds, the Outer harbor (75 ha) the old harbor (25 ha) and the inner harbour (55ha), which together cover a surface of water strength of 156ha.

Works of protection (piers), whose depth reaches 16 meters, have a total length 3,4Km. Central reservations bounded by the city cover a surface about 50ha, of which only 21.5 ha are used.



Fig 3. Basin's composition of Bejaia port

PhD candidate Lamia Benouaret, sustainable urban project management, laboratory AVMF from the University Of Constantine 03 Algeria, faculty of architecture and urban planning, department of urban project management (benouaretlamia@yahoo.fr).

Coauthor (1) Dr. Dekoumi Djamel from the university of Constantine 03 Algeria (dj.dekoumi@gmail.com)

Coauthor (2) Prof. Dr. Pedro Fernández Carrasco from the Polytechnic University of Madrid, Spain (pedro.fernandez@upm.es)

II. CONSTRAINTS AND RISKS

The port of Bejaia, by its activity and situation, presents several risks:

- the danger posed by the three (3) 32-inch pipes that run along the port, going through part of the city from the oil

port, the sea breeze along the EPB² fence to the facilities From SONATRACH³ to the rear port

- proven risks to the populations and the environment, namely: loss of containment, water pollution, fire and explosions considering the regulatory requirement for a 75-meter safety perimeter on both sides of the route (compliance).
- The circulation of flammable trucks in the city, which is a source of risks regarding loss of confinement, pollution of the water, fire and explosions and congestion which reduces the capacity of means of intervention especially during their mobilization.
- The GPL⁴ business which currently represents a pervasive risk on the activities of the merchant port.
- The saturation of storage spaces and inadequate capacity of vessels
- The town limits cover an area of approximately 50 hectares, only 21.5 ha are used as storage areas, the area of which is divided as follows:

• Bare ground storage area:	25373	m ²
• Covered Storage Area (Hangars):	11476	m ²
• Ro-Ro park:	12684	m ²
• Shelter:	1286	m ²
• Dangerous Goods Transit Center (DTMC):	6736	m ²
• Wood Terminal:	68000	m ²
• BMT:	90,000	m ²

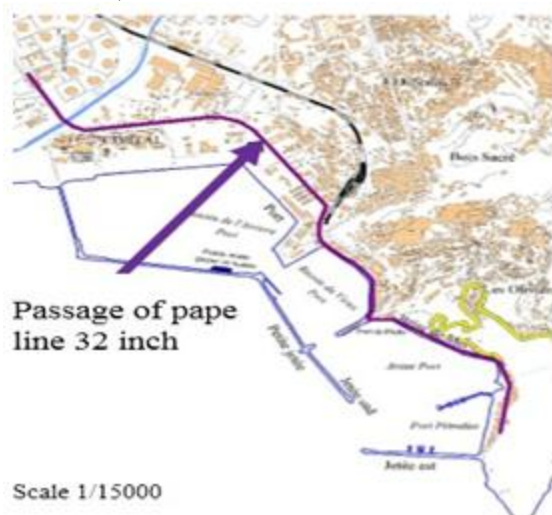


Fig 4. Passage of pipe line

That is 43% of the total area of the harbors of the Port

III. NEEDS

- The tonnage of vessels is increasing and the difficulty of navigating within the harbor is also increasing, also the space for docking is kept to a minimum, and storage and storage more restricted.

² EPB: port company of Bejaia

³ SONATRACH created in 1963 Spa operates as an oil and gas company in Algeria, Africa, and internationally. The company engages in the exploration, production, pipeline transportation, and marketing of hydrocarbons and by products.

⁴ GPL: Liquefied petroleum gas.

- According to the basic technical and statistical data, the current state and the capacities of the port cannot meet the needs of the movement. Traffic forecasts are very important and it is more than necessary to increase dock liners as well as handling and warehousing areas dedicated to goods and other farm equipment.

- The management of the spaces that is organized around the terminals requires infrastructures and superstructures with sufficient bearing capacity and sufficient permissible ground stress.

Thus, the port of Bejaia will find itself faced with a situation that cannot catch traffic nor modernize the spaces devolved to the different modes of organization of the solid lands recognized by the world (harbor of 4th generation).

To do this, the port of Bejaia is obliged to move towards a project of development and extension of the port and to proceed to the realization of the infrastructures namely docking works and warehouses.

IV. DEVELOPMENT OF HYDROCARBON / NON-HYDROCARBON TRAFFIC (2001-2011)

Below is a table showing the retrospective of the traffic transited at the port of Bejaia since 2001, with a distinction between hydrocarbon and non-hydrocarbon (general cargo) traffic. Unit 1000tonnes.

We see a net change in overall traffic driven primarily by the tremendous increases in general freight traffic. For overall traffic, the increase between 2001 and 2011 is almost 24%, with an average annual growth rate of 2.16%.

- For hydrocarbon traffic, the port of Bejaia, following positive developments from 2001 to 2009, saw a substantial decrease, due mainly to the redeployment policy adopted by SONATRACH, focusing on the port of Skikda. Nevertheless, there was a significant upturn in hydrocarbon traffic in 2012, with an increase of 417% (in exports) in the first half of the year compared with the same period of the previous year.

- For non-hydrocarbon traffic, the trend is constant. Thus, traffic increased by 229% from 2001 to 2011, with an average annual growth rate of 12.65%.

A. Saturation of storage spaces and insufficient vessel reception capacity

The causes

- Rapid and sustained increase in traffic.
- Extended occupations of spaces by certain goods.
- Heterogeneity of goods.
- Absence of extra-port warehouses under customs control.
- Non-evolution of the harbor's storage areas since 1987.
- Trend towards increased vessel volumes (three operational positions only for large vessels).

Suggested solutions

- Creation of terminals: containers, wood and ro-ro
- The use of coercive solutions (surcharges, demands, etc.).
- Prospecting of land for the development of dry ports and extra-harbor areas.

TABLE I
DEVELOPMENT OF HYDROCARBON / NON-HYDROCARBON TRAFFIC (2001-2011)

years	Hydrocarbon traffic(1)	No-Hydrocarbon traffic (2)	Total (3)	Evolution Rate (1) (%)	Evolution rate (2) (%)	Total rate Evolution (3) (%)
2001	8 131	2 855	10 986			
2002	8 250	3 393	11 643	1,46	18,8	5,98
2003	8 436	3 356	11 792	2,25	-1,1	1,28
2004	8 924	3 909	12 833	5,78	16,5	8,83
2005	9 308	4 694	14 002	4,30	20,1	9,11
2006	8 745	5 357	14 102	-6,05	14,1	0,71
2007	9 152	5 663	14 815	4,65	5,7	5,06
2008	9 522	6 163	15 685	4,04	8,8	5,87
2009	8 888	6 960	15 848	-6,66	12,9	1,04
2010	3 832	8 889	12 721	-56,89	27,7	-19,73
2011	4 211	9 394	13 605	9,89	5,7	6,95
Average Annual Growth Rate				-6,37%	12,65%	2,16%

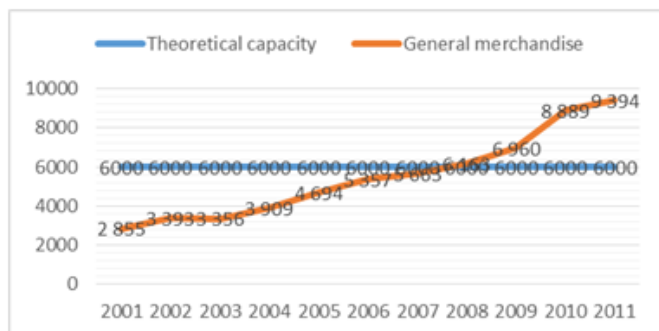


Fig 5. Storage capacity

The port of Bejaia estimates its processing capacity for a theoretical volume of traffic of 6,000,000 tons / per year of general cargo distributed over 14 operational stations. This level was already exceeded in 2008. This theoretical capacity is reduced because:

The existence of a petrol station at the merchant port.

Work on the realignment of posts 9, 10 and 11. The new wharf will be allocated exclusively for the berthing of car ferries (passenger traffic), in addition to the construction of the new maritime terminal.

B. The evolution of waiting times at the dock:

Which results from

- Heaviness of border control procedures (customs, FAD and phytosanitary)
- Insufficient infrastructure and equipment
- Absence of a phytosanitary analysis laboratory

Solutions

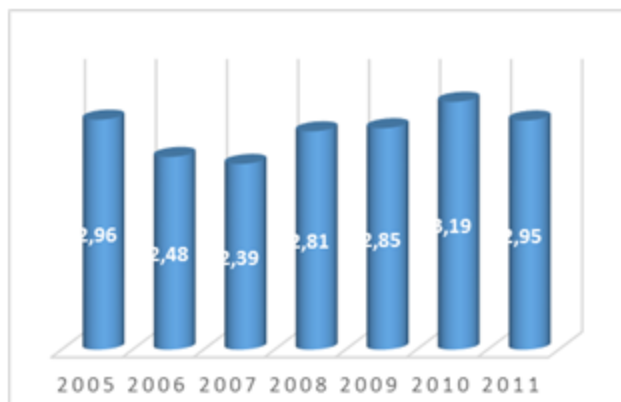


Fig 6. Average length of stay

- Use of unloading under hoist
- Reorganization of the handling teams
- Adoption of continuous work in consultation with the parties concerned (example: customs)

Synthesis

In terms of non-hydrocarbon traffic, the port of Bejaia is now processing a volume of around 10 million tones. This volume increased by 229% from 2001 to 2011, with an average annual growth rate of 12.65%. With the investments made, the use of continuous working arrangements (24h / 24, 7 days / 7) decided in 2009, this volume was able to be mastered despite the frequent situations of congestion both in the roads and on the platforms.

The current trend is likely to place the port of Bejaia in a tough competition for general cargo (especially for wood, steel products and containerized cargo). The cumbersome border control procedures (analyses, customs clearance, regulatory controls) mean that evacuations are too slow to meet space requirements. The increase of spaces becomes inescapable. The extension of the port is an absolute necessity.

C. The evolution of waiting times at the dock:

Which results from:

- Heaviness of border control procedures (customs, FAD and phytosanitary)
- Insufficient infrastructure and equipment
- Absence of a phytosanitary analysis laboratory

Solutions:

- Use of unloading under hoist
- Reorganization of the handling teams
- Adoption of continuous work in consultation with the parties concerned (example: customs)

PORT DEVELOPMENT MASTER PLAN

Constantly improving logistic performance, offering its clients the best benefits by trade capacity building and fluidity the abductions of goods, are among others, concerns that draw the strategy of development of the Bejaia port. Development master plan traced to this effect stems from a comprehensive vision that tends to put the port in the heart of an integrated region economic program. The future penetrating connecting the port to the East West.

The study of the master plan for development, drawn up by the Laboratory of Maritime Studies (LEM) in its 1997 version, updated in 2009, confirmed an immediate deficit in storage and berthing capacities.

A highway is one projects that would allows to port and for the region to better interact with the rest of the country...

The major phases of the blueprint of development include:

Phase 1: Immediate Program:

This is mainly for the establishment of a new mooring berth in the continuation of berth 24 (new Quay), on a length of 170 m and a depth of 12 m. This work will strengthen the capacity of the port in medians of 20,000 m² of storage areas.

Phase 2: Medium term Program (by 2015)

This program includes the extension of the port by the creation of additional surfaces and the construction of a new dock space, offering six new berths at docks for container ships and other vessels with a draught from 16 meters. The major works planned are:

1. The Construction of berths on a length of 870 m at 15 m depth. –
2. The Creation of 62 Ha of open area.
3. The Protection of medians on 11 773 m.
4. The Dredging of the rear port to a depth of 16 m.
5. The Enlargement of the Abdelkader and the Casbah channels to 150 m and their deepening to 16 m.
6. Transfer of the nautical sport.

Phase 3: Long-term program (by 2025)

Bejaia's Port projects the construction of berths a length of 214 m and a depth of 15 m. The realization of three docks is also expected for the receipt of large tankers and 26 acres of open storage for the installation of specialized equipment.

The vision of this project is an insured interest for both the port, the port community and the city of Bejaia and its hinterland. In addition to a new realization, that meets all of the standards and technical requirements, economic and operational, a new development at the level of the current oil port will be to consider the effect of achieving a tourist zone itself, which will benefit the people of the region and its visitors. The port will be made to the city and a marina will be created.

The culmination of this development blueprint will reinvent the port of Bejaia and increase its efficiency in the logistic transport chain; it will thus contribute to the competitiveness of its customers by providing effective services covering their needs in maritime transport, land transport and logistics services.

Note: Several of these projects have not yet been implemented.



Fig 7. Phase I of the port development

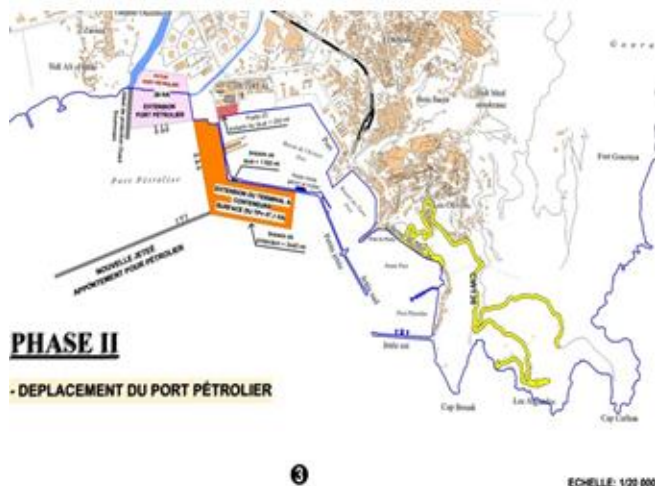


Fig 8. Phase II of the port development

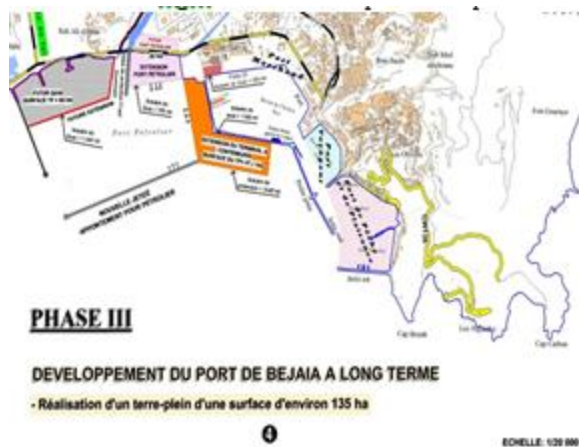


Fig 9. Phase III of the port development

THE PROJECT OF OIL PORT DISPLACEMENT:



Fig 10. Oil port displacement

The project involves the construction of a new hydrocarbon terminal by creating three landing stages for the reception of large oil tankers and the installation of 26 Ha of terminal platform adjacent to the terminal for the installation of specialized equipment dedicated to the activities of Concerned (SONATRACH, NAFTAL⁵, STH). The proposals take into account and integrate both the development plan of the Port (master plan of the Port of Bejaia) and the PDAU⁶.

A. SPECIFIC OBJECTIVES OF PROJECT

The realization of a new oil harbor will allow, thanks to the projections of long-term arrangement (development), to take care of the reception conditions of the big going ships 340 m of length, a capacity from 250 000 tons to 350 000 tons, requiring 25m of draft. Also, the choice of this site will create an energy pole, excluding urban fabric, which will be composed by:

- Loading / unloading facilities for finished products (LPG, fuels, bitumen, etc.);
- Loading / unloading facilities for crude products (oil and condensate);
- Storing and transferring facilities for the various products;

⁵ NAFTAL: It is an Algerian company, 100% subsidiary of SONATRACH. It is responsible for the distribution of petroleum products on the Algerian and Tunisian markets through the center of the east.

⁶ PDAU: Master Plan for Town Planning and Development

- Systems for the control and supervision of the aforementioned installations;
- Safety (prevention and protection) systems in accordance with applicable regulatory and regulatory requirements.
- Environmental protection equipment in compliance with the normative and regulatory requirements in force.

SYNTHESIS

With these new installations and this new development, it will be possible to plan extensions in relation to the development of activities of energy operators (global vision), something that can not be done with the current situation of saturation of the oil port.

Also, the site recommended for this extension, will benefit SONATRACH and NAFTAL, given the proximity of the base to these operators.

It will also enable these two operators to review the layout of installations and equipment in order to optimize and increase their storage capacity over a larger area than the existing ones. Thus, moving the oil port will not only have the advantage of creating new installations that meet current safety standards, but also according to new environmental standards, replacing those that have existed for more than fifty years.

V. CONCLUSION

The port of Bejaia is faced with a situation that cannot capture traffic, nor modernize the spaces devolved to the different modes of organization of the solid lands recognized by the world (harbor of 4th generation).

For that purpose, the port of Bejaia is obliged to orientate itself towards a project of development and extension of the port and to proceed to the realization of infrastructures, namely docking and warehousing works. The project to move the oil port is essential and has a definite interest for the port, the port community, the city of Bejaia and its hinterland. In addition to a new project, which will meet all technical, economic, environmental and operational standards and requirements, new developments at the present oil port will be considered in order to realize a tourist zone proper, which will benefit the inhabitants of the region as well as its visitors. Inducing economic impacts will be favorable to the region.

Nevertheless, the partial development plan for the port is far from being achieved, despite the risks posed by many of its activities on the city and its population, a blatant delay in implementation, due in part to the lack of a clear, well-defined strategy for the different phases.

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- 2012, 4 months training at the public equipment direction Algiers Algeria
- 2010, 1 month training in urban planning subdivision Bejaia, Algeria
- 2009, 15 days training in an architectural office Bejaia, Algeria



First A. Author

Born on April 4, 1987 in Amizour, Bejaia.

2012- Access to PhD “sustainable urban project management” Constantine, Algeria

2012-master in architectural an urban planning specialty project management Constantine, Algeria

2010- License in architecture LMD operational management Constantine, Algeria

2007- Bachelor degree in natural science Bejaia, Algeria

PhD candidate Lamia Benouaret, sustainable urban project management (laboratory VMFS from the University Of Constantine 03 Algeria, faculty of architecture and urban planning, department of project management

2014-2017 temporary teacher at the architectural and urban institute-BLIDA -Algeria

2016 1 month training in laboratory PUERTOS polytechnic university of Madrid, Spain

2012-2014 temporary teacher at the architectural and urban institute-Constantine-Algeria

2012, 4 months architectural manager in CAZ architectural office Bejaia, Algeria