The historical development of the Port of Livorno (Italy) and its new Port Plan 2010 in advanced stage of elaboration

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The Port of Livorno is the most important port in Tuscany and one of the most important in Italy as it has a strategic geographical location and good inland transportation infrastructures.
The Port in 2008 has passed the milestone of 34 million tons handled in total. In 2009 the port recorded a decline of 21.3% of traffic due to the global recession.
The Port lies in the southern end of an arched sandy beach long about 60 km (physiographic unit).
The most important rivers in the p.u. are:
- Magra;
- Serchio;
- and Arno River
Like most of the Italian ports, the port of Livorno has a long and complex history.
The origins of the port are inextricably linked to the history of Pisa and its port.
Pisa is a town of Etruscan origin.

Pisa in the past has always needed a port.

Pisa in the Middle Ages was one of the four Italian Maritime Republics (“Repubblica Marinara”).
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The most ancient Port of Pisa was "Portus Pisarum" = = Port of the town of Pisa

It was a river port located in a bend of the Arno River.
“Portus Pisarum” was unsafe due to the flooding of the Arno and of the Auser river which flowed into the Arno upstream of the town.
The Auser River (now called Serchio) was diverted by Bishop S. Frediano in 600 A.D.

The diversion of the Auser reduced the navigability of the Arno.
The second port of Pisa was located at Grado.

Grado was the main dock of Pisa until the 1st century.
Later Grado was abandoned in favor of “Portus Pisanus”, located in the lagoon named Sinus Pisanus.

In the era of greatest splendor of Pisa (1100-1300) was called Magnale Port

Portus Pisanus = = Port of the Pisa citizens
The goods were transported from Port of Magnale to Pisa by salinig along the coast and the Arno River. Such a method was rather difficult.
A navigable canal named Canale dei Navicelli was excavated (1160) in order to by-pass these difficulties.

The new waterway, characterized by a tortuous path, did not have the success expected.
The waterway connecting Pisa to Livorno was successfully completed in 1573.
“Portus Pisanus” was repeatedly attacked by Genoa during the second half of the XIII century when the power of Pisa vanished.

The port was moved close to the small village of Livorno.

In 1421 Livorno was sold to the Republic of Florence, who had absolute need of an access to the sea.
The merit of the development of the city of Livorno and of its port is acknowledged to the Medici family, who used Livorno as the access to the sea of Florence.
In 1587, Livorno was proclaimed "free port" and the “Laws of Livorno” were promulgated to provide privileges for Livorno citizens.

Livorno became a cosmopolitan, multiracial and multi-religious town.
This is the situation of Livorno in the middle of the XIX century when the Curvilinear Breakwater, designed by the French Victor Poirel, was completed.
The Unit of Italy was proclaimed in 1861 and the new State completed the Straight Breakwater in 1866.

Initially the Unification of Italy represented a negative factor for the Port of Livorno.
The Italian government was asked to expand the port in order to compensate for the loss of the ancient privileges.

The Port of Livorno in 1905.
A new breakwater named “Vegliaia Breakwater” was built between 1880 and 1900 with the aim of sheltering from southern coming waves the outer port, created by the Curvilinear Breakwater.
In 1908 the Livorno Port Plan, developed by Eng. L. Cozza, was approved. The Plan proposed the construction of two new breakwaters: the Meloria Breakwater and the Marzocco Breakwater.
In 1923 a new Port Plan was approved. It was clearly projected into the future and included the enlargement of the port inside the coastline (inland port). The plan didn’t jeopardized the development of the port in the sea to be achieved through the extension of the Meloria Breakwater.
The works which were completed before the Second World War, were the canal for the access to the industrial area and the Inghirami Dock. During the Second World War the harbor was subjected to very large damages.
Immediately after the war the harbor reconstruction began. A review of the Port Plan was necessary and was carried out by the Civil Engineers Office for Maritime Works of the State and was approved in 1953.
In about 60 years, between 1953 and today, five new Master Plans were developed but only one was approved in 1973 under the protest of the port operators. The plan included the realization of the Tuscany Dock.
1973 Port Plan

“Vincian Gates”

Mouth of the Arno Spillway obstructed by a sand bar
“Fill storage” for containing dredging material (waterproof)
Present state (2010)
North port entrance (shallow water)
Goals of the 2010 Port Plan

➢ To expand the container traffic. The goal is of receiving Post-Panamax up to 10,000–12,000 TEU capacity.

➢ To expand the traffic with ferries, ro-ro and ro-pax (the ferries maximum sizes in Mediterranean Sea have stabilized in the length of 220 m, in the width of 30 m and in the draught of 7.5 m). The most pressing request concerns the minimization of the transit time in the port.

➢ To move the tanker ships in a position placed the farthest possible from the town.

➢ To prevent the direct entry of the “Navicelli Canal” in the “Tuscany Dock”.

➢ To concentrate cruise ship traffic in the vicinity of the town.

➢ To rationalize functions and port activities.
Port entrance of the commercial Port (-17.0)

Port entrance of historical port
Breakwaters
Material to dig about 10x10^6 m^3
Two terminals

- Ro-ro and ro-pax: Wide 450 m
- Container: Wide 650 m

2010 Port Plan
Container terminal
About $2\times10^6$ TEU/year
$h = -16,0 \text{ m}$
ro-ro / ro-pax terminal
10 moorings

Ro-ro and ro-pax
Wide 450 m
Navigable canal connecting Livorno Port to Navicelli Canal
Road underpass the Arno Spillway Canal
Yachting and cruise ships
CONCLUSIONS

The Port of Livorno has the characteristics to be one of the most important in Italy, being favored by its geographical position and by good existing road and rail links. It may be noted that the Port is, respect to Genoa, closer to Brenner and thus to much of the central and southern Europe. Furthermore, the development of the port involves areas far from the town and close to a wide plain.
TANKS FOR YOUR ATTENTION