

## Port of Vado Ligure (Savona - Italy)

# Identification / development of structural arrangements on the oil terminal. Design of the Esso and Petrolig pipelines between the limit of the reclaimed land and the superstructure of the multi-functional platform

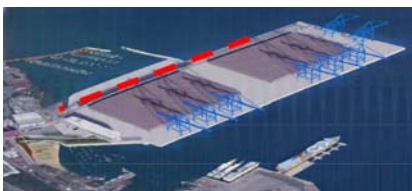
### General data

- ✓ Years: 2012-2016
- ✓ Client: Port Authority of Savona
- ✓ Works value: € 1,356,000

*Identification / development of the structural arrangements to be expected on the superstructure of the Multi-functional platform dedicated to the new oil terminal.; design of Esso and Petrolig pipelines between the limit of the reclaimed land and the superstructure of the multi-functional platform - Port of Vado Ligure (Savona - Italy) - APS Project n. 636636*



Area of intervention in the Port of Vado Ligure at the multi-functional platform and future oil terminal



### Characteristics of the works

Inside the port of Vado Ligure is in the process of building a multi-functional platform; along one of its sides is foreseen the construction of an oil terminal, that will operate in place of the existing jetties currently licensed to Petrolig and Esso. For the various components that make up the system, the necessary structural predispositions have been studied. In detail, starting from the equipment and facilities provided by the designer of the multi-functional platform (Technital), as a function of the acting loads, inserts and anchoring devices of related structures have been defined, in order to identify possible interference with the structural elements of the quay and provide typical details reference for subsequent executive design phases.

Analyzed Elements are:

- Bigo port gangplank
- Loading arms
- Towers monitors
- Sleeper way
- Overpass of sleeper way
- Foam pourers
- Sentry box operators + HVAC
- Esso and Petrolig traps
- Oil hose Attack
- Electro-hydraulic power units
- Control Pulpits
- Panels valves
- Vapor recovery system
- Storage and mixing liquid foaming

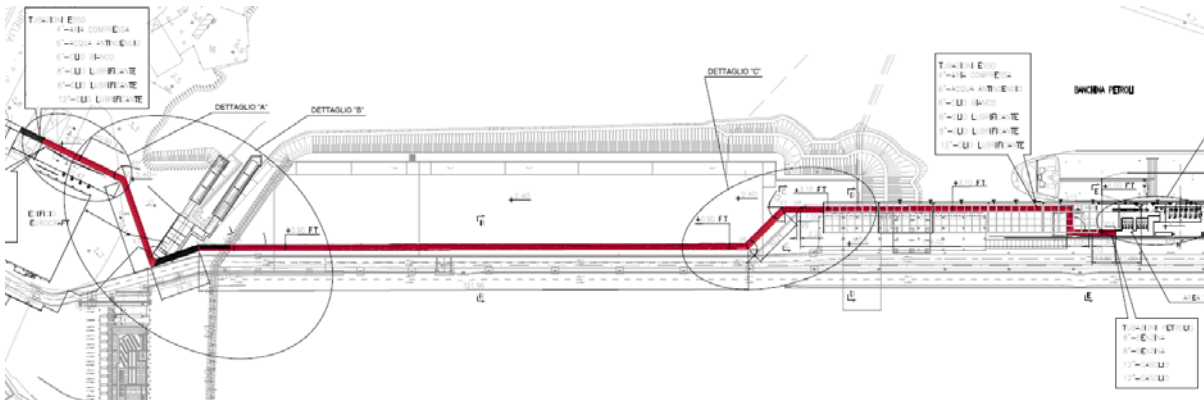
Furthermore, in case oil jetties will be put out of work, it is necessary to interconnect the pipelines from the root of the jetties to the new oil terminal on the platform. The APS Project No. 636 concerns this interconnection between the limit of

the reclaimed land and the superstructure of the multi-function platform next to the oil terminal. The route of Esso and Petrolig pipelines starts from just beyond the boundary of APS property up to the future oil dock provided on multi-functional platform. The steel pipes, 10 in number with diameters ranging between 6" and 12", first run next to Eurocraft shelter, then traverse the square in front of it, bordering on the seaside of the reclaimed area and then rise up to +4.50 m.

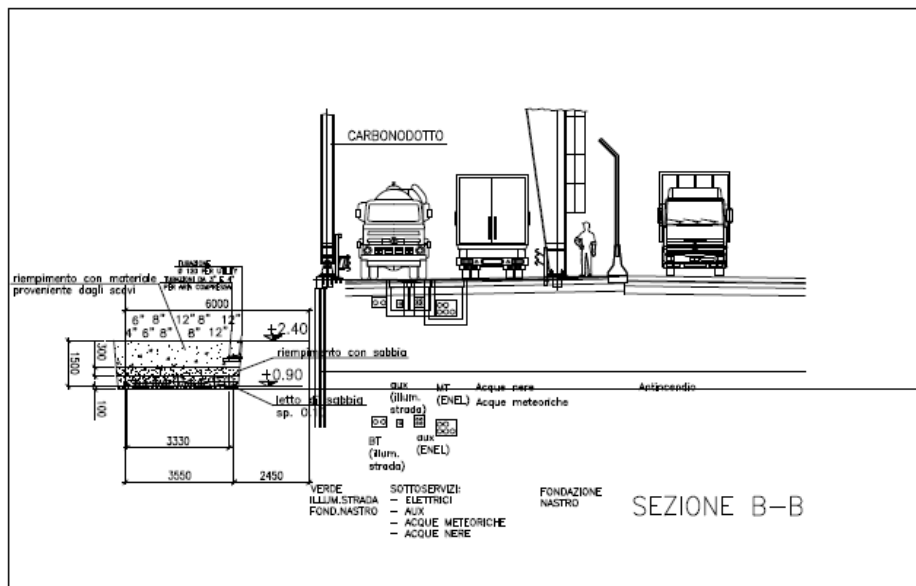
Then the pipelines run along a corridor foreseen inside the superstructure of the cellular caissons of the quay up to the limit of the "pig traps" already planned as part of the final project of the petroleum dock.

During the path, up to the end of the reclaimed area, the pipes run always buried to a depth of at least 1,50 m below the graded plan, always at least approximately 1 m above the mean sea level.

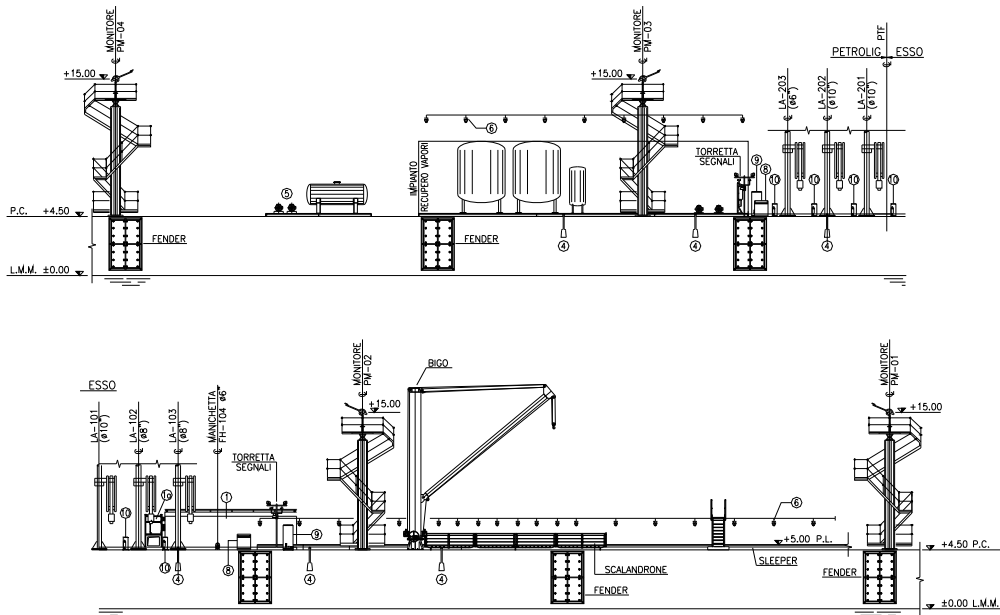
At the end of this path, in correspondence of oil quay, they run on sleeper way at an elevation of more than 4.5 m from the mean sea level. The pipes along their path interfere in four points with sheet piles countermining the reclaimed area; it is necessary to stiff locally the sheet piles by means of welded H-profiles and to open cuts for the passage for the pipelines. Along the pipeline in which hot oil flows at temperature of about 80 °, appropriate "U" structural devices have been provided, in order to allow displacements due to temperature gradient and to control stresses in the pipes.



Layout of Esso and Petrolig pipelines in the reclaimed land and quay superstructure



Section of the pipelines within the reclaimed area



View from the sea of the New oil terminal for identification of necessary structural arrangements