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DEVELOPMENT OF PORT OPERATIONAL AREAS. PORT DESIGN ELEMENTS

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Abstract: *In this paper considers the harbor as an organization that develops economically permanent. In step with port development must develop or maintain and port operations area. In the operative surface is studied design of a wharf.*
Keywords: *wharf area operative port development*

1. INTRODUCTION

Constanta is located on the west coast of the Black Sea as a maritime hub located on Pan-European transport corridors linking the markets of Central and Eastern Europe with those of Central Asia and the Far East.

Total area they occupy is 1,313 ha and 2,613 ha land on water and is bordered to the north and south by two dams which also serve as protection and creation of optimal safety in terms of port activity. North Dam would a 8.34 km long and the South 5.56 km.

An image of Constanta port is shown in Figure 1.

Figure 1. Port of Constanta (Source: Google Maps)

Port land area of the territory is composed of surface area operative and non-operative thereof.

Operational area is organized is organized to meet the aspirations of sectorization port's setting quotas platforms and ports.

In this respect, the Port of Constanta are 156 berths, of which 140 are operational, the total length of piers is 29.83 km and depths vary between 7 and 19 m.

In the same time, the port area with ancillary facilities include, generally, in order to serve basic services menus operative surface. The non-operative area contains administrative buildings, industrial and cultural social system composed of railway trucks and internal traffic routes and areas designated port and called "free zones".

Next, the article we will refer to operational areas, namely the port berths.

Annual operating capacity operative area is 120 million dwt, aiming to be the future, this capacity to grow. This is achievable because the port Desideri can access both ships 165,000 dwt capacity. and 220,000 dwt bulk carrier capacity.

The building of new quays and piers is specified and the administrator Romanian seaports, CN APMM Constanta, [5] which are necessary to improve operating conditions by reducing wave agitation throughout the port waters, increase safety by ensuring the protection of channels of movement of vessels and reducing the destructive effects of waves on the inside port facilities.

Thus, following the trend of development of the port and increase operating capacity it is intended to maintain existing berths by performing works of Maintenance and expansion of the construction of berths us.

2. Data required design

To achieve a good construction is necessary to know all the parameters that can influence the stability of construction: construction data loading, data snow loads, wind, seismic land, land geoogia actions due to technological process etc.

Most hydraulic structures, meaning: docks, basins, access şenaluri etc, were designed by engineers with rich experience in ports and specialized work, with reference to the construction of reservoirs, storage rooms etc. have been designed by other specialists, specializing in sub [5].

2.1. Seismicity land

In terms of the norm "Seismic Design Code - Part 1 P100-1 / 2013" [6], the intensity for design, seismic hazard is described by the peak ground acceleration, ag (ground acceleration Design) determined for reference mean recurrence interval (ARI) of 225 years.

As shown in Table A.1. design ground acceleration ag value is 0.20 g and control period (corner) recommended design is TC = 0.7 s. [6] According to SR 11100 / 1-93 [7], the constant region is located in the grade "71" macroseismic intensity, the probability of an earthquake of grade VII (MSK) is at least once every 50 years.

2.2. Geomorphology area

In terms of geomorphology, South Dobrogea region has a raised plateau, with altitudes not too large, but the valleys were deepened strong, resulting in pronounced slopes with gradients.

The current work is influenced by relief modeling in determining the frequency of heavy rainfall (3-4 mm / min.), Which hold approx. 75% of the total rainfall. Transformative potential of Precip water is much increased by the presence of natural land on top of loess rocks, rocks with low resistance.

In the Constanta current predominant geomorphological processes, through which the continuous shaping of relief are :

— pluviodenudarea and surface erosion,
— fluvial-torrential processes,
— compaction and suffusion,

plus the subordinate : landslides, slumps, wind processes accumulation and abrasion marine (coastal area).

2.3. Geology field

The site is located after fault tested Capidava - Ovidiu and part of South Dobrogea unit, a unit of Carpathian orogen old.

South Dobrogea is a tabular unit, structural plateau. Foundation deposits of the region are generally represented by limestone and sandstone of Cretaceous. Quaternary Period is represented best by loess that uniform development in this area.

The hydrographic network for South Dobrogea, presenting a specific aspect steppe areas - a network of low density and seasonal collector, depending on rainfall catchment.

Carasu pool area is included. [3]

On the site there are two distinct areas of port Geologically:

A) The land area

For Image as many silos, warehouses and other structural elements necessary for the best possible activities in ports was necessary gaining land from the sea surface.

In this area we have the following geological

- The surface there is a filling made of crushed stone of various sizes through which a mixture of different lands, with a variable thickness from 0.50 m to 2.50 m;

- To a depth of 8.00 m aproxiamtiv are very heterogeneous filler material comprised of a result of excavations Canal - Danube-Black Sea, lands whose composition varies in size from clay loess diferite.In this filler color find scrap building materials, bricks, rubble, rubber, textile remnants, stones of different sizes, mud, shells etc;

- Is a complex consisting of clay loam brown, greenish yellow clay, green clay to sandy facies that this complex întâlneste.In clay at different depths are large fragments of degraded limestone and calcareous Concretes.

- Then follows a middle layer of sand, yellow, very wet;

- bedrock consists of limestone degraded and cracked;

B) Marine area , that was - have done berths etc;

Here lithological sequence is as follows :

- To depths between 11 and 15 m depth there is water;

- Is then a layer of sand with an average thickness of 3.00 m, the sand is fine and medium, the surface shows fragments of shells;

- Is then a sandy clay layer yellowish green thicknesses between 0.70 m and 4.00 m

- Lithology is continued with a layer of clay, limestone Concretes which meets the minimum depth to 24.00 MN rate.

Foundation will be based on the work position (Zone A or B) and construction data loads.

Thus we have area A foundation through stone pillows or piles drilled through and the area B, the foundation is recommended to make the clay layer.

2.4.Hydrostatic level

It is in close connection with the natural Terem quotas and the Black Sea.

The design and execution, was taken and will take into account that the foundations are in contact with water water chemistry influenced by the Black Sea, will comply with the STAS 3349/79 "Black Sea water aggressiveness" section 29, in which concrete and metal contact with the water.

3. The components of the structures

In Constanta harbor piers are the type most weight wharf, which is composed of the following building blocks:

a) quay wall consists of 7 cells by 7 precast concrete blocks, weighing up to 100 tf / piece, a width of 5.50 m;

Were placed six types of blocks based on the height and the two blocks are blocks having different shapes and sizes, in order to obtain stability of the structure at each point in the horizontal.

To reduce rear thrust blocks, distribution properly footing pressure on joints and blocks have bevels.

Concrete blocks are simple concrete composition and high strength concrete class.

b) crown molding monolithic quay which serves to tie each with 6 cell concrete blocks.

The characteristics of an average canopy are: width of 4 m, length of 33 m sections which are embedded in the middle bollard 1000 KN.

c) underlay the foundation that links between land good foundation, clay, and quays, its size being a function of the distance between them. It consists of crushed stone.

d) prism surge forward , with his role as a push quay wall as small, stone consists of unsorted. Figure 2 shows a cross section through the breakwater jetty.

It is observed in Figure 2(two), the constituents described above - wall quay, wharf canopy bed foundation prisms surge - and the arrangement of the seven concrete blocks, height. Also you can identify the constituent shares vertically.

At the same time the dimensions of the elements important are countersunk and slopes arrangement of different layers.

succession:

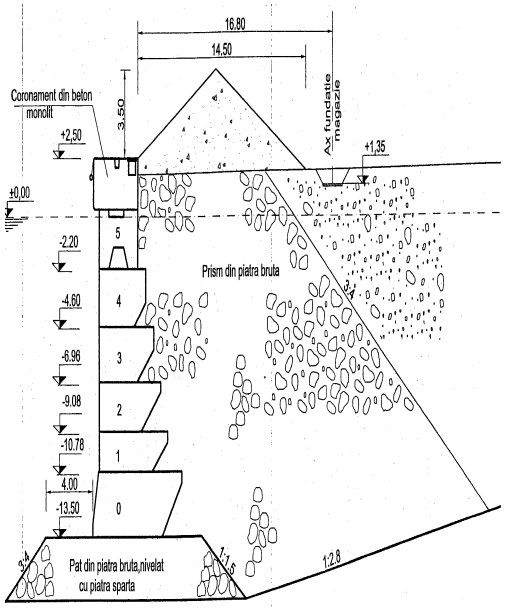


Figure 2. Cross-section of quay (source: [4])

Checks were carried quay slip stability, overturning clutching - mind the possibility of changing variable factors (rezenare on the bed surface, loading platform, angle of internal friction).

Figure 3 shows two examples of charts push for uniform and triangular loads.

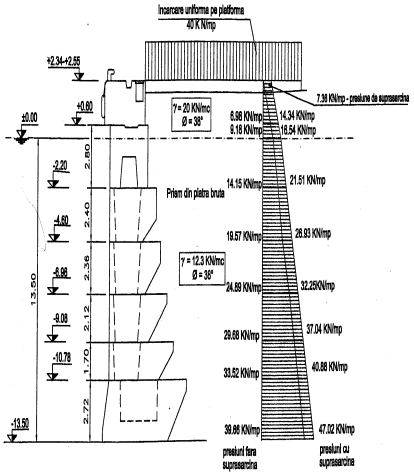
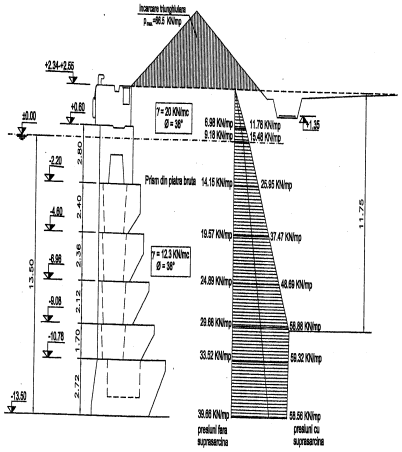


Fig.3. a) încărcări uniforme (sursa : [4])

Fig.3. b) incărcări triunghiulare (sursa : [4])



4. Conclusions

This paper was presented while monitoring the behavior of hydraulic works, dams and piers. In almost all cases the behavior was appropriate.

It was shown that potential problems are mainly due to:

- Local failure of the bed because it inappropriate material from which it was made (contains materiel cohesive);
- Current speed of the basin, natural or produced by the movement of ships, which in certain high intensities can lead to afuieri bed foundation;
- Adequate resettlement blocks during the construction of the quay;
- Inadequate post-use, namely that during use can plop a quantity of material to be dredged;
- Loading quay uneven sections or overload.

Analysis of processes and phenomena such as the port economic growth in freight traffic and erosion, degradation of coastal climates construction process performance monitoring in situ port construction - permit, while thinking, designing and developing port smooth and harmonious .

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