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EXTENSION OF A HOTEL IN POIANA BRASOV ON AN INCLINED SLOPE

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Abstract: *Extension of a building with 4 floors with 3 corps on inclined slope, in a mountain resort on compressible ground, required further study and monitoring of its behavior in time. The problems becomes from different type of foundations,the slopes of delluvial deposits which consist of detritus with interspaces filled with cohesive material. Partly, natural soil has been replaced with fillings from urban facilities. This article aims to review the phases of research, execution and monitoring the behavior of the construction*

Key words:*. soil investigation, slope foundation type*

1. Introduction

On the site of the study Ciucaş hotel is built on a project implemented in 1972. In this project was studied several extensions as follows (Fig.1):

- indoor pool, in the southern part of the hotel with at "C" corp by basement (B), ground floor and one floor (partial), continued on south with a ground floor (GF) with terrace,
- in plane extension of "A" corp throughout the southeast side only by GF;
- extending the "C" corp northward in front of the reception area, with a B + GF + 2F structure and a chiller stations in the eastern part on 4 levels

The studied data available for this work and hotel is founded on piles on top carriers embedded in bedrock - conglomerate.

The swimming pool will be enforced concrete diaphragms on a foundation type mat and will be embedded in a structure separate from the structural point of view.

The extension of "A" and "C" corp to the north will be by the addition of a span on the entire length Station chiller will also have a frame structure on 4 levels.

2. Geomorphological and Geological Data of the Area

Poiana Brasov resort is located in a depression of the mountain Postăvarul, comprising by geomorphological point of view eluvial deposits formed from by the weathering of base layers, respectively Cretaceous formations.

In terms of lithological strata it can be found over Bucegi conglomerates, which form the bedrock, sandy yellowish silt. These are an alteration blanket of Quaternary age and contains fragments of bedrock in variable percentage, according to paleorelief.

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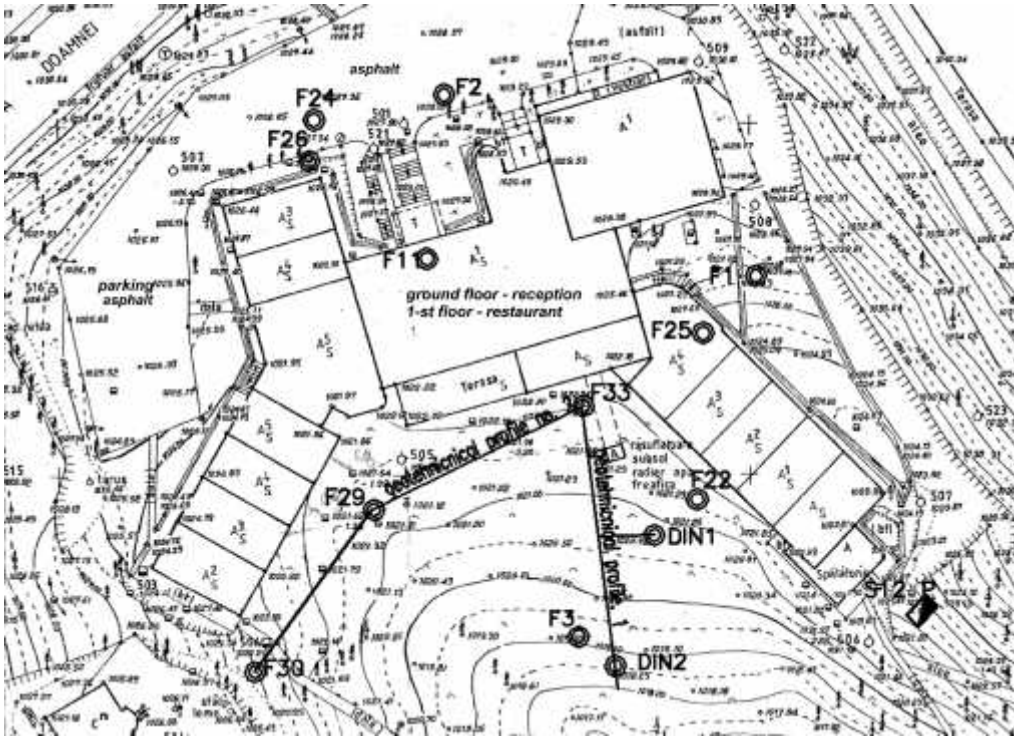

Fig. 1. *Site plan*

In terms of lithology the natural formations encountered here are made in the depression area of eluvial nature silty clay, and on the slopes of by delluvial deposits which consist of detritus with interspaces filled with cohesive material. Partly, natural soil has been replaced with fillings from urban facilities. It should be noted that the topographic survey of the initial project, in the southwest of the site has been identified with the existence of a north-south trenches which seems to have had as a source, perhaps intermittently; This assumption is in addition to observations made during the execution forges for this study who has identified a horizon with extreme moisture at a depth of 5-7 meters[1].

2.1. Field Investigations

Boreholes was made by Borros rig (Fig. 2), in continuous coring system with a diameter of 110 mm and superheavy dynamic penetrations with « 73/75 - Deep Drill » penetrometer. Considering inhomogeneity venue will present stratification for each objective parte.În drilling conducted in future pool area was found the following stratification:

Fig. 2. *Field investigations*

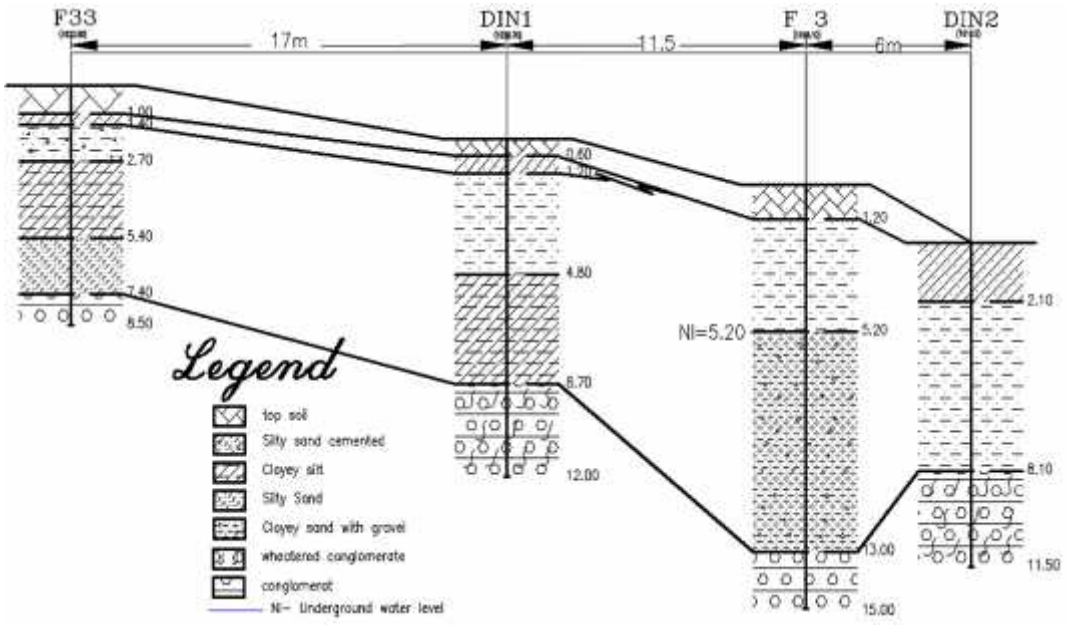

Fig. 3. *Geotechnical profile no.1*

Borehole F3 :

On the surface a layer of topsoil and / or filling of 0.90-1.20 m;

- 1.20 to 5.20 m clayey sand or sandy clay gray-green, plastic harsh, humid;

- From 5.20 to 13.00 m clayey yellow sand with rare gravel, with low plasticity, soft, saturated;

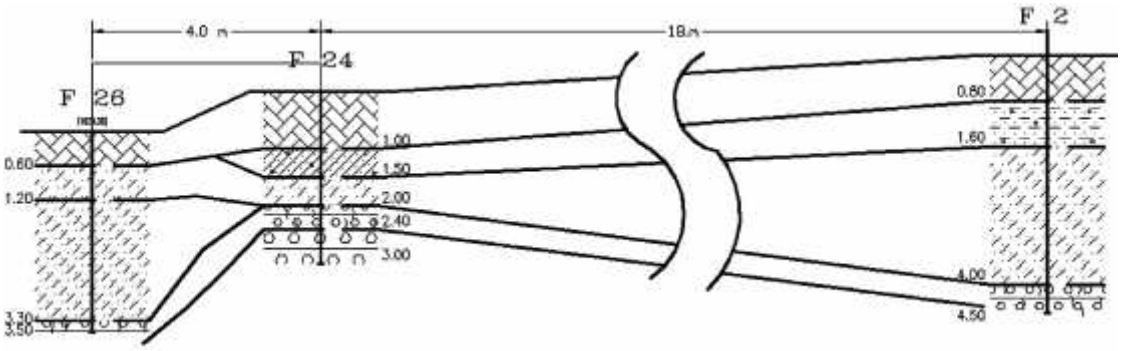

Fig. 4. *Geotechnical profile no.3*

-13.00 - 15 m rock (conglomerate) altered.

Drilling of the hotel expansion stratification revealed the following (see Fig. 3 and 4):

Borehole F2

- 0.00 - 0.80 m clayey silt brown ;
- 0.80 to 1.60 m clayey sand with rarely

The drilling conducted in the chiller station was found the following stratification: Borehole F1- 0.00 - 0.40 m filling,

- 0.40 to 1.60 m sandy clay, loose, humid;
- 1.60 to 2.20 m sandy clay with rare gravel, loose;
- 4.00 to 4.50 m rock (conglomerate) altered gravel;
- 1.60 to 4.00 m silty sand; - 2.20 to 2.50 m altered rock (conglomerate).

3. Stability and Settlement Analysis

By all corps it was done a settlement analyse with an analitical method (see Fig. 5 for stability and Fig. 6 for settlement). In all cases the calculated values was insignificant.

The same conditions it was put in a slope analyse especially in the pool area where the surface is most inclined.

The smallest value for the safety factor was 1.6 obtained with standard method witch we have considered it the most unfavorable [4].

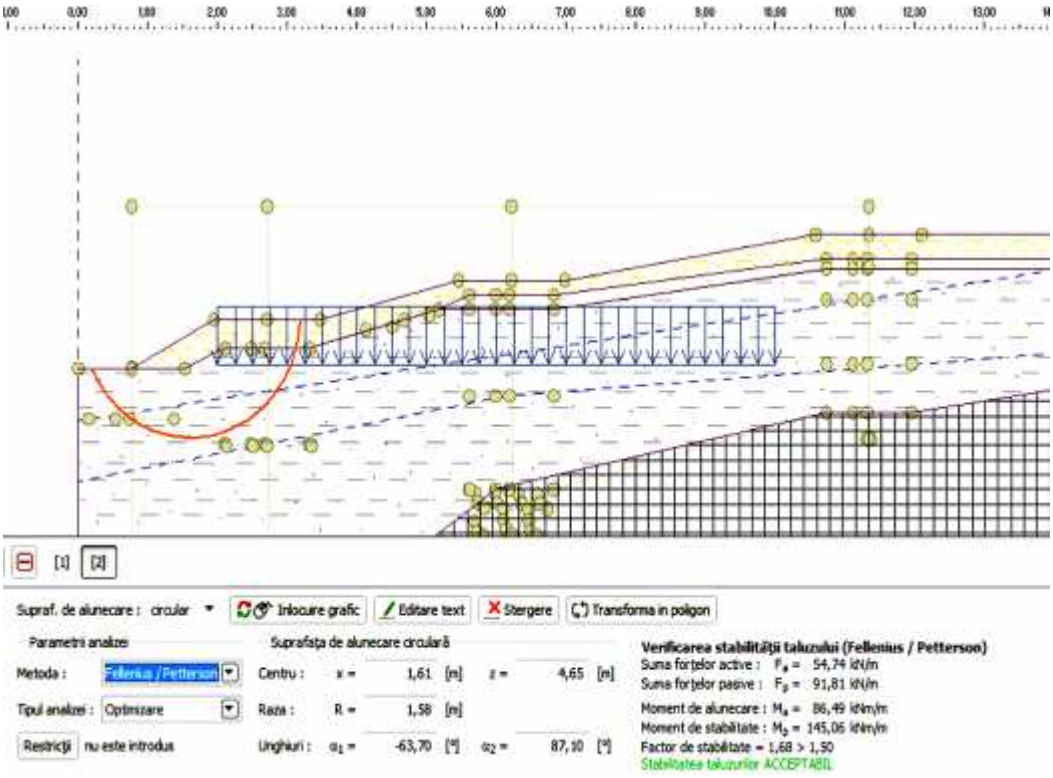

Fig. 5. *Slope stability analysis in the pool area*

4. Conclusions

Given the data submitted by the general designer, namely that task that the mat type of foundation of the pool and terrace is reduced, and will transmit to the ground approx. 30 kPa founding is recommended on the soft layer of cohesive material (sandy silt, clay or sandy clay). On the same geological conditions witth a bigger surcharge it would be necessar to use indirect foundations [6]; the small value it

action it would not affect the existing foundations.

Foundation quota of the pool will be between 1017.5 and 1019.0 m respectively depths between 1.50 and 3.0 m from ground level, the terrace between 1016.5 and 1017.50 m, respectively depths between 4.20 and 3.0 m from ground level arranged (see location plan). It will take into account a conventional pressure P_{conv} = 80 kPa.

The structure fhat includes the pool, will be founded on top carriers piles embedded in the base layer consists of altered conglomerate. Sheet piles will have a length of 14 meters downstream (southern part) of the site and 9 meters in the upstream, near the existing construction and chiller station area.

We have recommended according to [2], and [5] this type of foundations considering the following aspects;

- The land is sloping and the sole task geological foundations, regardless of the type Foundation will be different,

- Clayey layer yellow with rare gravel between 5- 12 m depths, is compressible and has very poor mechanical characteristics, being soft with high moisture.

- The existing construction is also founded on piles; adoption of another type of foundations, the foundations of direct surface could affect existing pilots by applying a lateral loads for which they have not been designed.

The „A"corp's plan expansion on the southeast side will be founded in the depth of 1.40 m from ground level arranged on the layer of soft layer of cohesive material (sand silt, clay or sandy clay) with conventional pressure p_{conv} = 80 kPa[3].

Both objects extend northward corp C station and the chiller will be founded directly at a depth of 2.70 m

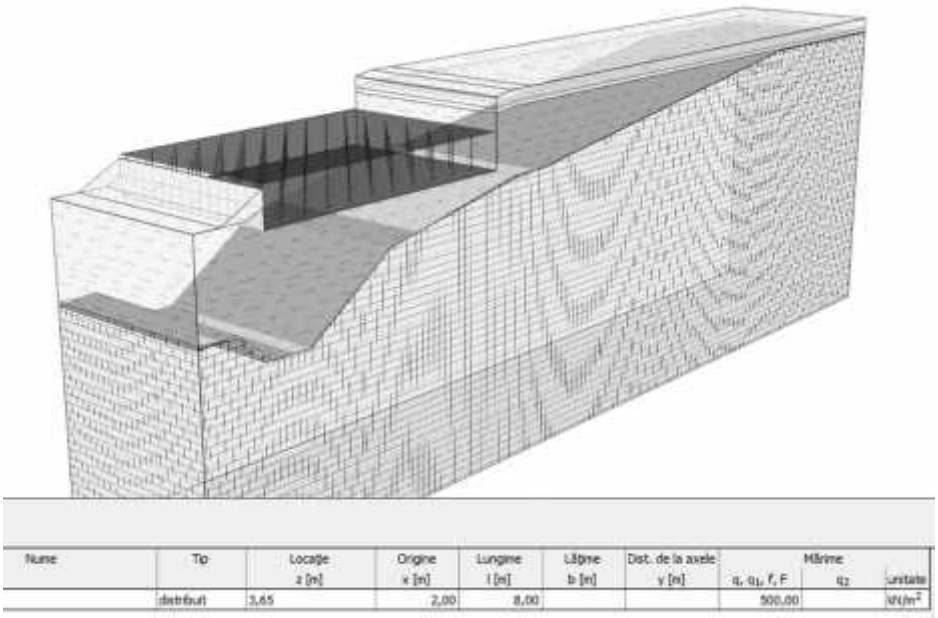

Fig. 6. *3D view of the settelment analysis*

As a result, to intervene judiciously in details during the execution of the project in terms of proposed foundations the order of the objects approach is to be following:

1. extending northward corp C station and the chiller;
2. A corp expansion plan on the southeast side
3. structure which includes the pool
4. The pool and designed with terrace of the C corp.

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