SUSTENABLE RURAL DEVELOPMENT OF MAŞLOC VILLAGE, TIMIŞ COUNTY

Laura CONSTANTINESCU, Adia GROZAV, Iacob NEMEŞ

"Politehnica" University of Timisoara, Faculty of Hydrotechnical Engineering
Corresponding author: lauraconstantinescu_m@yahoo.com

Abstract: *The concept of sustainable rural development refers to forms and methods of socio-economic development of which base it is to ensure a balance between socio-economic systems and environmental. One element of Maşloc village development, in addition to programs contained in the Development Strategy of Timiş County (DJ691 county road rehabilitation, water supply, founding a center for children with special educational needs, rehabilitation of school with grades 1-8), was the execution of one construction of MOBILROM in village. The paper presents data geotechnical study, which is the necessary base to design any building, being part of the technical documentation necessary to authorizing execution of construction works under the Law no. 50/29.07.1991, on the approval of execution of construction works. Geotechnical investigation purpose is to providing information necessary of a relevant and economic design of construction works, adding these elements: the sequence of geological layers that form the foundation soil and their physical and mechanical parameters in the content of the active area of foundations; alert to special conditions of the site or difficult foundation soil; the hydrogeology conditions, establishing parameters of seismicity and the depth of freezing of the area investigated, determining geotechnical category of work, recommendations on the design and execution of the building, conditioned by the characteristics of foundation soil. Steps taken in carrying out geotechnical study are: - documentation, recognition site and determining the need for prospecting work; - prospecting land by surveys/geotechnical drilling, sampling of disturbed and undisturbed soil, water sampling, dynamic penetration survey execution; - analysis of soil samples taken in the field within the analysis soil and geotechnical laboratories to - geotechnical development (documentation, field and laboratory data processing, conclusions) and verify the strength and stability of foundation soils and the occurrence of land. In the laboratory were made the following determinations: - granulometric composition; - density; - volumetric weight; - humidity; - limits of plasticity; edometric compressibility method; consolidation of land; - resistance to direct shear; - characteristics of compaction; - an attempt Proctor. Physical properties of soils are determined according to the methodology of soil studies development and mechanical properties according to norm NP 074/2007.*

Key words**:** *rural development, geotechnical development, physical analysis, mechanical analysis*

INTRODUCTION

The concept of sustainable development means all forms and methods of socio-economic increase, whose foundation is the first such systems to ensure a balance between socio-economic system and natural capital items. The best known definition of sustainable development is certainly given by the World Commission on Environment and Development (WCED), namely: "Sustainable development is development which aims to meet the needs of present without compromising the ability of future generations to meet their own needs"[1].

Sustainable development pursue and try to find a stable theoretical framework for decision making in any situation where a report found such man-environment, whether it's environmental, economic or social.

Although sustainable development was initially meant to be a solution to ecological crisis caused by intense industrial exploitation of resources and continued environmental

degradation and primarily looks preserve environmental quality, today the concept is expanded about quality of life in its complexity and the issue economically and socially. Scope of sustainable development is now the concern for justice and equity between states, not only between generations. The intention of sustainable development is to operate to improve further the quality of life both for the present and the future generation. But this thing not only is obtained within able communities to use the resources wisely and efficiently and to discover ecological potential of the economy, ensuring prosperity, environmental protection and social cohesion [2].

The Maşloc village development joint programs include the addition of Development Strategy of Timiş County - DJ691 road county rehabilitation, water supply, setting up a center for children with special educational needs, rehabilitation of the school with grades 1-8 and the execution a construction of MOBILROM in the village.

To implement this construction was necessary geotechnical study, which is the basic geotechnical documentation necessary for design of any building, being part of the technical performance of work necessary authorization to construct, according to Law no. 50/29.07.1991.

At the construction of any objective the geotechnical study is necessary to prevent any degradation in time of the constructions but also for neighboring construction and environmental protection. Geotechnical study achievement is required by law, this being the Normative governing NP 074/2007 concerning the geotechnical documentations for constructions.

MATERIAL AND METHODS

The purpose of geotechnical investigation is to provide the necessary information to relevant design and economic construction work, stating the following: the sequence of geological strata that form the foundation soil and their physical and mechanical parameters on the content of the active area of foundations; alert to special conditions of the site or difficult land foundation; the hydrogeological conditions; establish the seismicity parameters and the depth of freezing of the investigated area; determining geotechnical category of work; advice on building design and execution the building.

The geotechnical study was evolve based on field measurements (drilling), specialized information on the analyzed land and the results of laboratory tests make on samples taken during drilling.

For preparation of geotechnical studies are collected the soil samples in disturbed and undisturbed structure, at the depth of 1.20 m, 2.60 m and 3.00 m.

In the laboratory of soil science and geotechnical were performed following determinations at physical and mechanical properties of soils:

- granulometric composition;
- density;
- volumetric weight (apparent density);
- humidity;
- limits of plasticity;
- edometric compressibility method;
- the reinforce of land;
- resistance to direct shear;
- compaction characteristics;
- Proctor test.

The physical properties of soil are determined according to the Methodology development of pedological studies (analysis by pipette method for determination

granulometric structure, the pycnometer method for determining the soil density, determination of the samples collected in the cylinders to determine bulk density, gravimetric method for determining the humidity) [3].

Resistance to cutting test was determined by tri and mono-axial test, the limits of plasticity are determined by Casagrande appliance and by cylinders, the compressibility and the compaction of soils are determined by edometric, respectively penetrometric [4].

To determine the lithological stratification was performed a drilling depth of 31 m. For water of drilling are determined pH, sulphates, total and temporary hardness, according to the methodology in force.

RESULTS AND DISCUSSIONS

The study location is still at the edge of built-in Maşloc village, on a pasture.

This is part of Vinga Plain, is the absolute altitude at 167 meters, has a low inclination of 2^0 and better natural stability.

Results of physical analysis performed are presented in table 1.

Table 1

The physical characteristics of soil

Quota compared to 0,00m	Texture					Bulk density t/mc	Total porosity %	Porosity coefficient %	Resistance of penetration kg/cm^2	Humidity %
	Coarse sand %	Fine sand %	Silt %	Clay %	Class					
1.20	0.4	30.4	29.3	39.9	Medium silty clay	1.39	45.7	0.84	26.6	23.2
2.60	0.3	29.9	26.5	43.3	Medium silty clay	1.38	47.5	0.91	28.5	18.4
3.00	0.2	33.4	30	36.4	Medium silty clay	1.41	46.8	0.88	39.2	17.3

Results of mechanical analysis are presented in table 2.

Table 2

The mechanical characteristics of soil

Quota compared to 0,00m	Plasticity			Optimum humidity for compaction Pr27 %	Consistence index %	Modulus of deformation daN/cm^2	Cohesion daN/cm^2	Internal angle of friction Φ^0	Admissible pressure t/m^2
	Wl %	Wp %	Ip %						
1.20	53.3	17.5	35.8	13.6	0.84	136	0.28	15.0	11.39
2.60	53.8	17.4	36.4	13.8	0.97	142	0.31	15.8	12.73
3.00	53.6	17.3	36.3	13.5	1.00	158	0.39	16.7	16.61

The data presented shows that:

-the foundation soil is a loamy clay medium, with adhesion and plasticity, the firmly plasticies consistence until hard;

-minimum depth of foundation is further D_{min} = 2.50 m;

-for the strength calculations shall take into account the following parameters:

-the foundation layer between 1.20-2.60m: DA = 1.38 t/m^3, c = 0.31 daN/cm^2, Φ = 15.8^0, M = 142 daN/m^2; admissible pressure = 12.73 t/m^2;

-the foundation layer between 2.60-3.00m: DA = 1.41 t/m^3, c = 0.39 daN/cm^2, Φ = 16.7^0, M = 158 daN/m^2; admissible pressure = 16, 61 t/m^2.

Following the drilling performed to a depth of 31 m resulted following lithologic stratification belonging Holocene and Pleistocene Ages:

-0.00-1.20 m Luvosoils;
-1.20-2.60 m loamy clay;
-2.60-3.00 m yellow loamy clay;
-3.00-9.00 m powder weakly clay with iron-manganese concretions;
-9.00-12.00 m bluish marly clay;
-12.00-22.00 m silty marly clay;
-22.00-26.00 m bluish marly clay with calcareous concretions;
-26.00-29.00 m sand with gravel rolled in clay binder;
-29.00-31.00 m bluish clay, compact, with gravel.

Groundwater occurs at 6.00 m, is neutral- weak alkaline active acidity (pH 7.6), total hardness 20.72^0G, 15.11^0G temporary hardness, sulphates are absent and the water is not aggressive.

CONCLUSIONS

On the characteristics land reveals direct earthwork construction. In terms of manual and mechanical excavation the land frames in heavy land groups. For excavations greater than 1.50 m need wall supporting. Frost depth is 0.8 m.

To avoid altering the land foundation before the concrete should be removed, manually, a layer of 0.10-0.15 m.

Groundwater is at 6.00 m depth and is not aggressive so do not affect the foundation. As to earthquakes, according to norm P100-92, the location is in the D area.

Through this work has achieved one of the aims of Sustainable Development Strategy namely continuous improvement of quality of life both for the present and the future. This is achieved only in communities able to use resources wisely and efficiently [5].

BIBLIOGRAPHY

1. Comisia Mondială pentru Mediu şi Dezvoltare – "Viitorul nostru comun" – 1986;
2. Strategia de Dezvoltare Durabilă, Barcelona, 2002;
3. Metodologia de executare a studiilor pedologice ICPA, Bucureşti, 2003;
4. Normativul NPO74/2007;
5. Strategia de dezvoltare a județului Timiş.