

RESEARCHES REGARDING SOIL EROSION AND MEASURES TO FIGHT IT ON THE DECLIVITOUS TERRAINS LOCATED IN THE CORNEA AREA (CARAŞ-SEVERIN COUNTY): THEIR IMPACT ON THE LOCALITY

CERCETĂRI PRIVIND EROZIUNEA SOLULUI ŞI MĂSURILE DE COMBATERE A ACESTEIA PE TERENURILE ÎN PANTĂ SITUATE ÎN PERIMETRUL LOCALITĂȚII CORNEA (JUDETUL CARAŞ-SEVERIN): IMPACTUL ACESTORA ASUPRA LOCALITĂȚII

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Abstract: *In this paper are presented the erosion forms that led to the land slip from the Cornea locality, Caraş-Severin County, their impact over the locality and the solution for the area improving.*

Rezumat: *În această lucrare sunt prezentate formele de eroziune produse în zona localității Cornea, județul Caraş-Severin și impactul acestora asupra localității. Au fost propuse soluțiile de amenajare pentru combaterea eroziunii solului și ale alunecărilor de teren.*

Key words: *erosion, land slip, pedological profile, natural hazards, torrent dropping, bank falling.*

Cuvinte cheie: *eroziune, alunecare de teren, profil pedologic, risc natural, scurgere pe torenți, rupere de mal*

INTRODUCTION

Cornea locality is placed on south part of the Caras-Severin County, in the median part of the Caransebeş depression, from the well known tectonically Timiş - Cerna – Bistra lane, being traversed by the 45 ° parallel northern latitude.

- The climatic regime of the area is continentally – moderated, with Mediterranean influences and gentle, with moderated air currents that assures good natural ventilation on the Timis-Cerna lane direction.

- The geotechnical characteristics.

The administrative territory of the Cornea Commune is located in the area of the Orientals Carpathians. As a result of a few tectonically crashing they were separated by large lanes, attaining an island aspect – The Banat, Poiana Ruscă and Apuseni Mountains.

They have a large petrographical diversity, fact reflected in the big landscape variety. The crests are not very tall and mostly flat have allowed habitation establishing in these parts from ancient times.

- Natural hazards

In the present research study by hazards we understand : land slips, moving sands, swamping terrains, torrents droppings, erosions, snow avalanches, rocks bulling, floodable area and others, delimited on every county by a decision of the County Council, with the approval of the public administration specialized departments, the natural hazards considerate above are hydrological, hydro geological, geological and geophysical type, natural hazards are those elements of the environment, harmful for the human and mainly caused by forces that are outside him.

Considering that the danger represents the cause, and the risk the possibility to generate the present danger, the disaster is defined as an event that causes big material and

human losses and injuries for the environment, the legal base is the Law 10/1995 regarding construction quality, The Environmental Protection Law nr. 137/1995, The Water Law 107/1996, The Land Reclamation Law nr.84/1996, The Romanian Govern Decree no. 47/1994, regarding the defence against disasters etc.

The essential condition to eliminate the construction and improvements vulnerability towards the risks factors is their identification, the identification of the dangerous areas for the human establishment and stipulate the adequate measures to limit this factors effect.

The Cornea village surface is not kept away by natural risks of high amplitude like:

- The hydrographic basin of the Chişăvăţ River is adequate for the development in torrential rains of dangerous droppings for the village located on the inferior course of the river;
- The land slip that currently affects the Cucuiului Hill may lead to major damages for the houses located at the base of the versant;
- The bank falling on the left side of the Chişăvăţ River, together with the bottom erosion and the thalweg declivity changing cause an instability for the entire area;
- The land slip from Cernilova affects the entire agrarian field, the house and communal road from the landfall basis;
- Activation of the ravine top erosion near the water supply basin endangers this last one stability and the stability of the exploitation road near by;
- The land slip near the veterinary dispensary affects the stability of the rail way at the base of the landfall.

MATERIALS AND METHODS

To elaborate the research, that is the base for the present paper, the following data were used. We used the plan at 1:25000 scales (figure 1).

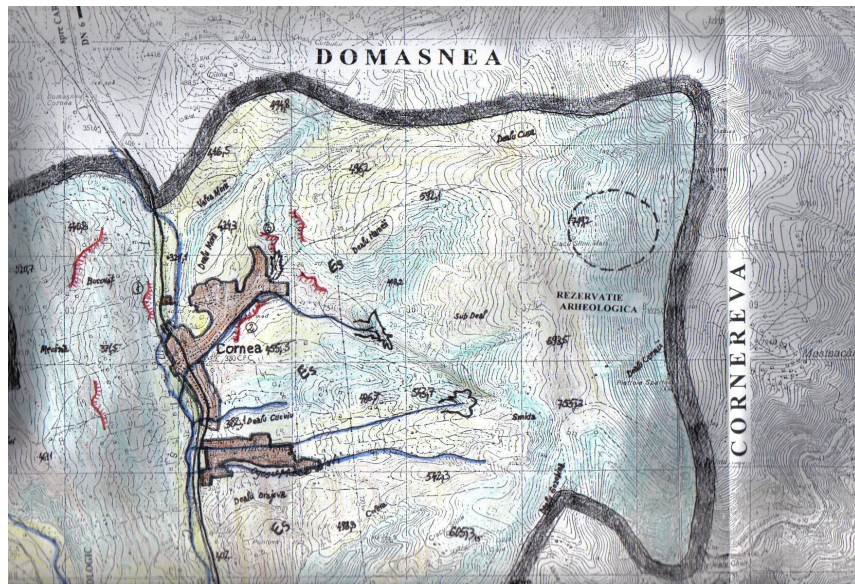


Figure 1. The map of Cornea locality

➤ Topographical data

To elaborate the paper a lay-out plan was use with the scale 1:5000 and 1:25 000.

To establish the declivity of the river improvement a longitudinal profile and 5 transversal profiles were draw in the characteristically points.

➤ Climatic dates

To characterise the area for the climatic point of view, we used dated from Caransebeş meteorological centre and resulted next values:

- Annual medium temperature: 10.6⁰C
- Annual medium precipitation: 690 mm, hence in the vegetative season: 380 mm
- Potential evapotranspiration: 860 mm
- Maximum precipitation in 72 hour with 5% insurance
- The dominant wind is from S-E direction, with 14.5% frequency, and the biggest speed has the wind by S direction.

Bases on the dates we draw up the water balance ensuring 80%, 60% and 5%.

Result from the water balance, that at 80% assurance, the humidity excess was maintained for 5 month, and for 5% assurance, the humidity excess period grow up at 9 month.

In 2004 total precipitation volume was 741,1 mm, with a maximum value of 141,2 mm in November month , and in 2005 the total volume of precipitation was 1199,2 mm, with a maximum value of 200,6 mm in April month.

➤ Pedological dates

In the studied area we make 3 main pedologically profile and other 10 secondary profile.

The dominant soil in the landslip area was LUVOSOIL tip that has next attribute:

- Is a tip of soils whose important characteristic are textural differences, a high clay cationic exchanged capacity, and a base saturation better than 50%, and lower aluminium saturation.
- The clay horizon geneses are a result of the clay eluviations from the saturated eluvial horizon, situated near the surface horizon, to the clay horizon from subsurface.

➤ Geotechnical and geomorphologic dates

To elaborate the technical solution for the territory improvement we used geomorphologic and geotechnical studies from IPROTIM Timișoara and the studies from Construction Engineering Faculty, Road and Foundation Department.

CONCLUSIONS

Proposed technical solutions are:

- For the landslip (small depth and surface landslip), near “Cernilova” base flank we propose the next solution (figure 2):
 - To level away the slip surface
 - Execute a horizontal drain to the base of the slip, that will collected the water from the sandy horizon that are situated under the gliding claying horizon, and will ejected to the emissary situated at the flank base.
 - To level away the area above the slip (an area with micro-dislevelment and furrows from farm equipment circulation)

- A declivous earth wall execution, which will collect the surface water and will eject in the natural outlet from around.



Figure 2. The Cernilova land slip

- For the landslide situated in Cucuiului Hill we propose the next solution (figure 3):
 - Glen tip formation improvement, situated near the landslide, with an outlet collection channel form, that will undertake the surface water and will eject in “Chișăvăț” River.
 - A declivous earth wall execution, upon the landslide, that which conduct the surface water to this outlet.
 - Left bank consolidation of “Chișăvăț” River in the landslide area, by forest works, executing a tail board with 2 m height, for slope of thalweg modifying.
- For the landslide from figure 4, a landslide that affect the railroad that are situated at the base of the landslide we propose:
 - To execute an abutment from prefabricated pieces.
- To stopped the erosion from the peek of the ravine that are situated near the water supply basin we propose:
 - To take the leakage from the overflow basin by a metallic drainage tube with a diameter of 100 mm and eject this water downstream the channel deep erosion (at the confluence with “Hamca” River).



Figure 3. The Cucuiului Hill land slip



Figure 4. The land slip near the rail road

- To execute a gabion wall stuffed with river stone at the upstream slope of the ravine.
- To plant seedling plant of *Rubinia sopophora* on the border and the peak of the ravine.
- To conduct the collected water by the exploitation road to a marginally channel at the ravine clew.

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