STUDY ON THE MODERNIZATION OF THE AGRICULTURAL ROAD SYSTEM, CORCOVA COMMUNE, MEHEDINTI COUNTY

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Abstract. *The project which was proposed for implementation has, as responsable entity, the Corcova Commune, Mehedinti county, as public local authority wich owns and administrate the local roads which are proposed to be modernized. Corcova Commune is situated in the middle part of Husnita Highland, a relief unity of Getic Piedmont, which is sided by the Getic Sub-Carpathians and to the south by the Romanian plain. It detains a wide opening to the urban civilization reprezented by cities of Drobeta Turnu Severin at a 40 kilometer distance and Motru from Gorj County, at a distance of 15 kilometers, and even Craiova, but not before passing over Filiasi city, the first urban gate of Dolj County on the European roadway no. 70. The accomplishment of this project needed an applied documentation on the local realities regarding the topography, geology, geotechnics and also the traffic on the studied agricultural roads. Solving these goals requaired detailed topographical studies, applied geothenical studies and consulting GIS maps in serch of the owners neighbouring the modernized roads. After visiting the area, analyzing the geotehnical studies, measurements of the geotechnical elements, the longitudinal and transversal profiles and also observing visually the state of the expertized roads,we drew thw conclusion that the upgrading capacity of the existent road system is partially outmoded, a facts which leeds to the aparition of the faults in the form of cavities resulted from the freeze-thaw process. From the geotehnical point of view, the drillings made have intercepted some dacian formation. Dacian is the oldest geological formation which appears at surface being visible in Strehaia sector. Thus according to the plan, the actual line of the communal roads was respected, in order to avoid expropiations.The design of the curves was made in conformity with STAS 863 regulation. The red line was designed by taking into account the tickness of the proposed road system and also STAS 863 regulation and other technical normatives, providing the connection between existent declivities and respecting exceptional declivities in the curves. As a conclusion, we can state that the designed road structure will be, when the construction work is finalized, a factor in the development of the area regarding agricultural exploatation but also the wine exploatations, in the conditions in which the wine growing encountered a strong development in the last few years in this administrative zone.*

Key words: *roads, agricultural, GIS, geotechnics, surveyng.*

INTRODUCTION

The geographical region of the confluence of Cosustea with river Motru, situated in Getic Piedmont, is a sub-unit of the great geomorphological characteristics of Getic Piedmont. The Motru Valley crosses Motru Piedmont in the direction of the North-West, South-East and divides it into two distinct parts: The Cosustea Hills (Gruiurile Cosustei or Piemontul Strehaia) to the west of Motru with lower heights (200-300 m) and the hills of his chair, to the east, the highest (over 300m), with the appearance of the moors extend, fragmented by a network of woe nearly parallel, facing in accordance with the overall of piedmont tilt. The most important river basin element in the area is the Motru River. Motru is the largest tributary of the Jiu River , which prints the main course peculiarities of the Getic Plateau geological structure. It collects its springs from the top of the Oslea (1946 m) of the Valcan mountains, at an altitude of 1230 m near the Bistrita Springs. Together with its other tributaries crosses forms of relief

with different geological Constitution: crystalline shales, granites, limestones (in the mountain area) and loose deposits (sand, gravel, clay, marne) in the Piemont area and the plain. Another important river in the studied area is: Cosustea. Raul Cosustea springs from the eastern slope of the massive Piatra Alba and receives as a tributary in the mountains Valea Verde river.

Compared to other parts of the Getic Piedmont, the Corcova area has been slightly geologically researched.

From the undertaken investigations in connection with the paleogeografic evolution of the studied area, it turned out that the foundation on which the sedimentary base of the Piedmont was formed before Franchian in the Strehaia region, Corcova is found at depths exceeding 2600 m. This foundation is made up of crystalline shales and paleozoic limestone, clay and jurassic limestone and appears in the form of a anticlinal vault, put into evidence by high-depth geological drillings. This structure supports the more recent formations of the Superior Cretaceous.

MATERIAL AND METHODS

According to the regulations on geotechnical construction documents – indicative NP 074-2007, the geotechnical risk classification and the geotechnical category are made according to the following tables:

Table. 1

Geotechnical framing

Factors	Type of land	Score
Field conditions	Medium land	3
Underground water	No epuisments	1
Classification of construction by category of importance	Lower	2
Adjoining	No risks	1
Terrain acceleration	ag=0,15	1
Geotechnical hazzard	Lower	8
Geotechnical category		1

Table. 2

Geotechnical hazzard

Nr crt	Geotechnical hazzard		Geotechnical category
	Tip	Score limits	
1	Lower	6…9	1
2	Normal	10…14	2
3	Major	15…21	3

Following the field visit, the analysis of the geotechnical study, the measurements of geometric elements in the plan, longitudinal and cross-sections profile, as well as visual observations on the current state of the roads of local interest (rural streets) the following were found:

1. The investment falls within the following technical indicators:

- technical class of the road: V
- category of importance: D
- corner period: T_C=0,7 s

- ag : 0,15

2. In the plan, the roads designed are conducted in alignments and curves with variable rays. Roads of local interest have as a dowry a layer of the shape of the ballast 0-63 mm in average thickness of 12.00 cm.
3. In longitudinal profile roads are mostly sectors in the landing, slopes in longitudinal profile being of max. 9.00%.
4. In cross-section profile:
   - road platform: 5,00+2x0,50 m
   - roadway width: 5,00 m
   - verge with: 2 x 0,50 m
5. Water draining devices: concrete and ground gutters and clogged.
6. The water draining is not insured either towards the side devices or along the road; The gutters, the existing channels being clogged partially or totally.
7. Traffic is mainly made up of cars and vehicles and heavy and/or oversized agricultural machinery.
8. Road signs are non-existent.
9. The road platform is not disturbed (strangled) by the pillars of the urban networks.

The geotechnical study shows that the land in the body of the roads allows the construction of the road structure designed without requiring special measures of stability.

The bearing capacity of the existing road system is partially obsolete, resulting in malfunctions as pits caused by the freeze-thaw action.

The proposed technical solution:

Road Structure Side Roadway 5.00 + 2x0 2.5 m

- Shape layer of natural ballast 0-63 mm, thickness 12.0 cm;
- Foundation layer of natural ballast 0-63 mm, thickness 18.0 cm;
- Base layer of broken stone for roads in thickness of 15.0 cm;
- Asphalt Concrete Link Layer BADPS 20 in thickness of 6.0 cm;
- Asphalt concrete Wear coating BA 16 thickness 4.0 cm.

Route in Plan

- The current route of the communal road was respected in order to avoid expropriation.
- The route of the projected objective shows a sequence of alignments and curves as presented in the situation plan.
- The arrangement of curves was carried out in accordance with the provisions of STAS 863.
- The red line is designed taking into account the thickness of the proposed road system, as well as the provisions of STAS 863, and other technical normatives, ensuring the connection of existing slopes respecting exceptional slopes in curves.

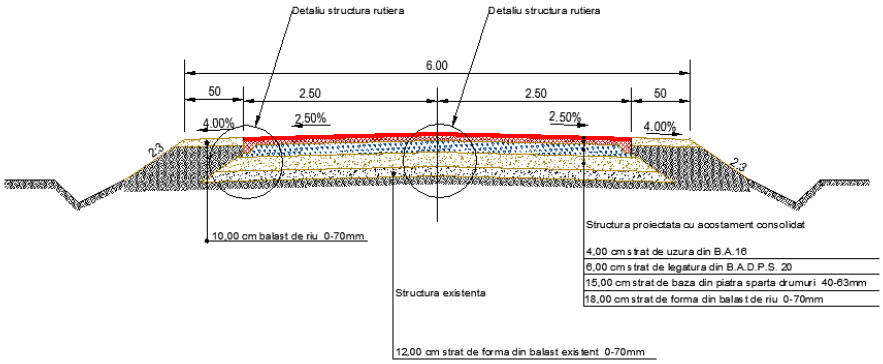
The values of the geometric elements of the roads depending on the base speed are according to the table below.

Table. 3

Geometric elements of the roads

Nr crt	Geometric elements	Basic speed, Km/h						
		100	**80**	**60**	**50**	**40**	**30**	**25**
2	The arcs of the circle max. 7,0	400..425	215..290	115..150	85..110	55..70	32..35	22..25
	6,5	426..500	291..315	151..170	111..125	71..75	36..40	26..30
	6,0	501..565	316..345	171..195	126..140	76..80	41..45	31..35
	5,5	566..625	346..375	196..226	141..155	81..90	46..50	36..40
	5,0	626..685	376..405	227..245	156..170	91..95	51..55	41..45
	4,5	686..745	406..445	246..270	171..185	96..105	56..60	46..50
	4,0	746..805	446..485	271..295	186..200	106..115	61..65	51..55
	3,5	806..865	486..525	296..320	201..220	116..125	66.70	56..60
	3,0	866..920	526..565	321..345	221..240	126..140	71..80	61..65
	2,5	921..985	566..600	346..370	241..260	141..160	81..85	66..68
	2,0	986..1000	601..620	371..380	261..270	161..170	86..90	69..70
3	Current radius, m	1000	620	380	270	170	90	70
4	Recommended radius, m	1600	1000	575	400	250	150	100

Cross-section profile-Road part 5.00 + 2x0,50 m



Platform width : 6.5m
Roadway :5.0 m
Verge with: 2x0.50m
Transverse slope in current sections: 2.5%
Verge slope: 4.0 %

RESULTS AND DISCUSSION

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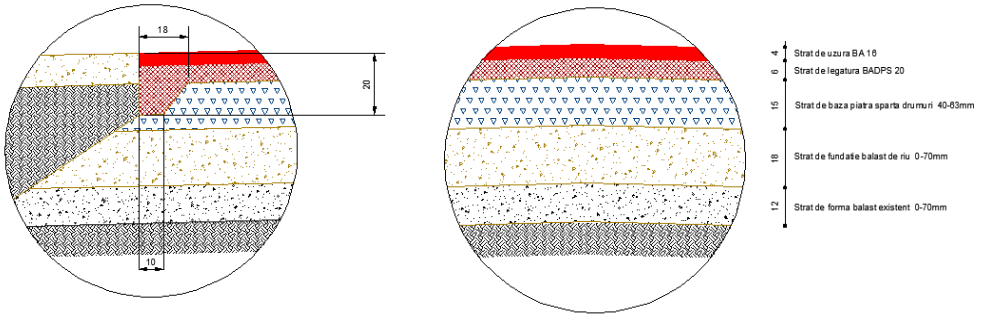

General elements:

- Technical class of the road: V
- Loading class I(A13-I60)
- Traffic class: T5
- Building importance class:D
- Roadway: 2,75 – 5,00 m

CONCLUSIONS

The sizing of this road structure envisaged the need to access agricultural machinery to cultivated land. It has also been taken into account that the weight of these machines has increased in recent years with the pooling of field surfaces and the emergence of large agricultural farms.

Other important factors in the calculation of the road structure are those that refer to geographic, geological, hidrogeological but also in terms of temperatures and precipitations.

BIBLIOGRAPHY

1. HERBEI, M.V., HERBEI, R., SMULEAC, L., SALAGEAN, T., Using Remote Sensing Techniques in Environmental Management. Bulletin of UASMV Cluj-Napoca, vol.73, Agriculture, no.2, 2016.
2. HERBEI, M., NEMES, I. (2012). USING GIS ANALYSIS IN TRANSPORTATION NETWORK. International Multidisciplinary Scientific GeoConference: SGEM: Surveying Geology & mining Ecology Management, *2*, 1193.
3. EDELHAUSER, E., Bazele proiectarii asistate de calculator,2007.
4. ONCIA, S., HERBEI, M., POPESCU, C. (2013). Sustainable development of the Petrosani city, the Hunedoara county, based on GIS analysis. Journal of Environmental Protection and Ecology, *14*(1), 232-239.
5. RĂCĂNEL, I.: „Introduction to transport engineering", ICB, 1992.
6. TODERAS, M. - Solutions for the consolidation of Mihoiesti dam. 10th International Multidisciplinary Scientific Geo-Conference & EXPO SGEM 2010 Modern Management of Mine Producing, Geology and Environmental Protection, Bulgaria. Vol. I, pg. 297 – 304. ISBN 10: 954-91818-1-2, ISBN 13: 978-954-91818-1-4.
7. TODERAŞ, M. - Rheological parameters of the differents type of sandstones from Jiu Valley basin. 12th International Multidisciplinary Scientific Geo-Conference & EXPO SGEM 2012 Modern Management of Mine Producing, Geology and Environmental Protection, 17 – 23 June, 2012, Bulgaria. Vol. 1, Section "Exploration and Mining", pg.777 – 784.
8. TODERAŞ, M. – Dilatancy and rheology of sedimentary rocks from Jiu Valley and their implications to ensure the main horizontal mine workings stability. 13th International Multidisciplinary Scientific Geo-Conference & EXPO SGEM 2013 Modern Management of Mine Producing, Geology and Environmental Protection, 17 – 23 June, 2013, Bulgaria. Vol. 1, Section "Exploration and Mining", pg.409 – 416.