STATE UNIVERSITY OF TETOVA
FACULTY OF APPLIED SCIENCES

BOOK OF ABSTRACTS

FIRST
INTERNATIONAL CONFERENCE OF APPLIED SCIENCES
(ICAS2015)

KONFERENCË NDËRKOMBËTARE E SHKENCAVE TË ZBATUARA
МЕЃУНАРОДНА КОНФЕРЕНЦИЈА НА ПРИМЕНЕТИ НАУКИ

ARCHITECTURE
CIVIL ENGINEERING
MECHATRONICS

8-9 May 2015
Tetova, Macedonia

CIP - Каталогизација во публикација
Национална и универзитетска библиотека „Св. Климент Охридски", Скопје

6 (062) (048.3)

INTERNATIONAL conference of applied science - ICAS 2015 (2015) (1 ; Tetovo)
Book of abstracts : ICAS 2015 : Architecture, Civil Engineering, Mechatronics / First International Conference of Applied Science - ICAS 2015 = Konferenca e parë ndërkombëtare e shkencave të zbatuara = Прва меѓународна конференција на применети науки, organized by State University of Tetova 8-9 May 2015, Tetova, Macedonia. - Tetovo State University of Tetovo, 2015. - 92 стр. ; 21 см

ISBN 978-608-217-026-8

I. = Konferenca e parë ndërkombëtare e shkencave të zbatuara 2015, Tetovë види International conference of applied science - ICAS 2015, Tetova
II. Меѓународна конференција на применети науки 2015; Тетово види International conference of applied science - ICAS 2015, Tetovo

а) Применети науки - Собири - Апстракти

COBISS.MK-ID 98645002

FIRST INTERNATIONAL CONFERENCE OF APPLIED SCIENCES - ICAS 2015

BOOK OF ABSTRACTS
ICAS 2015

KONFERENCA E PARË NDËRKOMBËTARE E SHKENCAVE TË ZBATUARA

ПРВА МЕЃУНАРОДНА КОНФЕРЕНЦИЈА НА ПРИМЕНЕТИ НАУКИ

Organized by:
State University of Tetova
8-9 May 2015
Tetova, Macedonia

ORGANIZING COMMITTEE / KËSHILLI ORGANIZUES / ОРГАНИЗАЦИСКИ ОДБОР

Doc. Dr. Enis JAKUPI
Prof. Dr. Kujtim Elezi
Dr. Shazim Memeti
Dr. Ragip Hadri
Mr. Shinazi Zejneli
Mr. Idaver Useini
Dr. Asan Idrizi
Mr. Semijal Hasani-Ziberi
Mr. Armir Ferati
Mr.art. Burim Ukuçi
Ma. Lindihana Goxha
Ma. Merita Maksuti
Mugni Arifi
Sabedin Emini
Besian Memeti
Ma. Egzona Zendeli
Ma. Kaltrina Elezi
Ma. Gremina Elmazi
Ma. Ajla Limani
Ma. Aurora Saidi
Nexhibe Musa

CONFERENCE SECRETARIES / SEKRETARET E KONFERENCËS / СЕКРЕТАРИ НА КОНФЕРЕНЦИЈАТА

Mr. Nuran Saliu
Ulvie Memeti

TABLE OF CONTENTS

ARCHITECTURE

CIVIL ENGINEERING

MECHATRONICS

ГЕОМЕХАНИЧКИ КАРАКТЕРИСТИКИ НА ХИДРОЈАЛОВИШТЕ "ТОПОЛНИЦА"

Aleksandra Angelova[1], Doc-d-r Risto Popovski[2], Prof. d-r Zoran Panov, m-r ass. Radmila Karanakova Stefanovska, Doc.d-r Marijan Delipetrev[3]

University „Goce Delcev"-Stip, Faculty of natural and technical science, Institute of mining

aleksandra.gf@hotmail.com, , risto.popovski@ugd.edu.mk, marjan.delipetrev@ugd.edu.mk, zoran.panov@ugd.edu.mk , radmila.karanakova@ugd.edu.mk

Резиме

За преградниот профил на браната "Тополница" изработени се лабораториски испитувања на триаксијален апарат за материјал земен од низводната и возводната косина на браната, за определување на јакосните параметри на истиот. Притоа, направено е испитување на гранулометрискиот состав на материјалот на Ласерски гранулометар и на крајот е дадена интерпретација на добиените резултати и опис на геомеханичките параметри.

Клучни зборови

Хидројаловиште, јакосни параметри-кохезија (c) и агол на внатрешно триење (φ˚), гранулометриски состав.

GEOMECHANICAL CHARACTERISTICS OF THE TAILING DAM "TOPOLNICA"

Apstract

For the profile of the tailing dam "Topolnica" are prepared laboratory tests of the triaxial apparatus for material taken from the downstream slope of the dam, and determining the potency parameters of the same.

It was examined and granulometric composition of material with Laser granulometar and for the end is interpretated the results and description of geo-mechanical parameters.

Key words: tailing dam, potency parameters- cohesion (c) and of internal friction (φ˚), and granulometric composition.

1. elevation of plosive profile of the tailing dam „topolnica"

The tailing dam "Topolnica" is a storage type because it has a dual purpose, that is used for the disposal of tailings flotation in the space of a river bed and it accumulate fluid flow water from the river Topolnica which serving open pit mine with drinking water. First projected elevation was 610 m above sea level, it has long been exceeded and reached final height of 90 meters. In the last couple of years, when the elevation of the tailing dam arid approached to the final projected elevation, the open pit mine approached to develop technical documentation for the same elevation. It was made a additional project for elevation to the upstream slope for 20 meters, elevation 630 m. In 2006 it was made second additional projet for elevation of the upstream slope for another 24 meters, elevation 654 m and a total height of the crown of 136 meters. With the implementation of a additional project for tailing dam it is numbered as a highest dams in Europe.

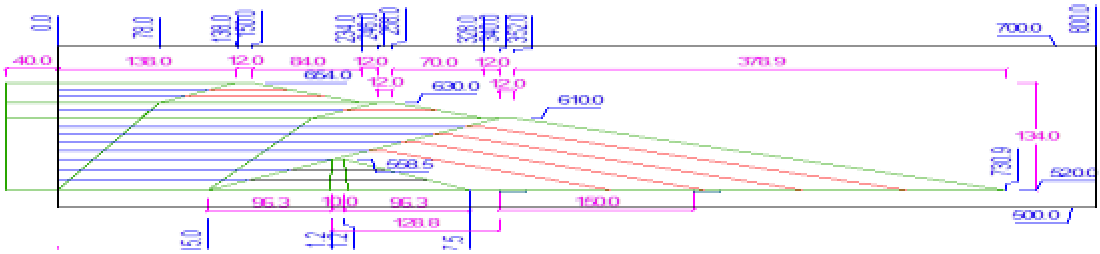

Fig 1. Schematic showing of the max. elevation of tailing dam Topolnica

2. TESTING OF POTENCY PARAMETERS OF THE MATERIAL WITH THE TRIAXIAL APPARATUS

Triaxial apparatus are widely used in geo-mechanical laboratory, and during the experiment under different conditions, register stresses, deformations of the sample, the change of volume mass and based on those sizes are determines the parameters of the stress strength for examined soil sample. System of the triaxial apparatus allow servicing of pressure to act on all sides. In triaxial apparatus are tested cylindrical soil samples which are bored with cell pressure and axial strain to fracture, while in the standard triaxial experience the radial pressure is constant. Preparation of at least three samples with a cylindrical shape with a diameter 50 mm and height 100 mm, respectively. Samples of coherent and incoherent soils are prepared and incorporated in different ways. Preparation and installation of sample of a coherent soil is taken by a cylinder with thin wall. After displacement of the cylinder, the sample finely processed, and then the sample is placed on the bottom of the main cover of the cell, which had previously placed perforated or non-perforated plate, depending on whether the sample is tested with or without drainage. Then from the top of the sample is placed a perforated or non-perforated plate, and through it a metal plate through which by means of the piston will stretch the sample. Next, the cover is put in a rubber membrane which rubber rings are secured to the upper metal plate, and as the base to which the sample is placed. The rubber membrane isolate the sample from the liquid in the cell, because between the cells from the cylinder and the lower and the upper cover are set rubber rings, and that cell is hermetically sealed. (The vertical forces are measured by dynamometer and vertical deformations with comparator.)

Fig. 2 Triaxial apparatus (Laboratory at University “Goce Delcev”- Stip)

Fig. 3 Embedded material in triaxial cell

3. INTERPRETATION OF RESULTS FROM The researces

Table 1 Inbound and Outbound data for sample 1

Примерок -1, σ_3=100[kPa]								
Бр.	$\Delta l(mm)$	μm	F (kN)	A ([mm])	σ_1 (kPa	deviator(kPa)	p' (kPa)	q' (kPa)
0	0	0	0	0.00196349	100	0	100	0
1	1	95	0.4094	0.00198332	306.4	206.4	203.21061	103.21061
2	2	149	0.6422	0.00200356	420.5	320.5	260.264631	160.26463
3	3	185	0.7974	0.00202422	493.9	393.9	296.965098	196.9651
4	4	211	0.9094	0.0020453	544.6	444.6	322.314348	222.31435
5	5	229	0.987	0.00206683	577.5	477.5	338.77127	238.77127
6	6	242	1.0418	0.00208882	598.8	498.8	349.375347	249.37535
7	7	251	1.0794	0.00211128	611.3	511.3	355.62697	255.62697
8	8	259	1.1129	0.00213423	621.5	521.5	360.726563	260.72656
9	9	260	1.1171	0.00215768	617.7	517.7	358.865846	258.86585
10	10	261	1.1213	0.00218166	614.0	514.0	356.983738	256.98374
11	11	261	1.1213	0.00220617	608.3	508.3	354.128363	254.12836
12	12	260	1.1171	0.00223124	600.7	500.7	350.331807	250.33181
13	13	256	1.1004	0.00225689	587.6	487.6	343.787338	243.78734
14	14	249	1.0711	0.00228313	569.1	469.1	334.568549	234.56855
15	15	242	1.0418	0.00230999	551.0	451.0	325.498984	225.49898
16	16	231	0.9956	0.00233749	525.9	425.9	312.963651	212.96365
17	17	229	0.987	0.00236565	517.2	417.2	308.610688	208.61069
18	18	229	0.987	0.0023945	512.2	412.2	306.097306	206.09731
19	19	226	0.9741	0.00242406	501.8	401.8	300.923101	200.9231
20	20	224	0.9655	0.00245436	493.4	393.4	296.690587	196.69059

Table 2 Inbound and Outbound data for sample

Примерок -2, σ_3=200[kPa]								
Бр.	$\Delta l(mm)$	μm	F (kN)	A ([mm])	σ_1 (kPa	deviator(kPa)	p' (kPa)	q' (kPa)
0	0	0	0	0.00196349	200	0	200.0	0
1	1	60	0.2586	0.00198332	330.4	130.4	265.193609	65.193609
2	2	145	0.625	0.00200356	511.9	311.9	355.972274	155.97227
3	3	212	0.9137	0.00202422	651.4	451.4	425.692262	225.69226
4	4	261	1.1213	0.0020453	748.2	548.2	474.115987	274.11599
5	5	300	1.2845	0.00206683	821.5	621.5	510.741333	310.74133
6	6	335	1.4309	0.00208882	885.0	685.0	542.514095	342.51409
7	7	356	1.5188	0.00211128	919.4	719.4	559.687088	359.68709
8	8	375	1.5983	0.00213423	948.9	748.9	574.444484	374.44448
9	9	393	1.6736	0.00215768	975.6	775.6	587.823722	387.82372
10	10	404	1.7196	0.00218166	988.2	788.2	594.104375	394.10438
11	11	413	1.7573	0.00220617	996.5	796.5	598.269663	398.26966
12	12	419	1.7824	0.00223124	998.8	798.8	599.419401	399.4194
13	13	421	1.7907	0.00225689	993.4	793.4	596.719362	396.71936
14	14	418	1.7782	0.00228313	978.8	778.8	589.421897	389.4219
15	15	414	1.7615	0.00230999	962.6	762.6	581.278998	381.279
16	16	411	1.7489	0.00233749	948.2	748.2	574.098162	374.09816
17	17	411	1.7489	0.00236565	939.3	739.3	569.644612	369.64461
18	18	407	1.7322	0.0023945	923.4	723.4	561.703905	361.7039
19	19	405	1.7238	0.00242406	911.1	711.1	555.560252	355.56025
20	20	400	1.7029	0.00245436	893.8	693.8	546.912895	346.91289

Table 3 Inbound and Outbound data for sample 3

Примерок -3, σ_3=300[kPa]								
Бр.	$\Delta l(mm)$	μm	F (kN)	A ([mm])	σ_1 (kPa	deviator(kPa)	p' (kPa)	q' (kPa)
0	0	0	0	0.00196349	300	0	300	0
1	1	141	0.6077	0.00198332	606.4	306.4	453.202461	153.20246
2	2	270	1.1589	0.00200356	878.4	578.4	589.210029	289.21003
3	3	370	1.5774	0.00202422	1079.3	779.3	689.632236	389.63224
4	4	448	1.9037	0.0020453	1230.8	930.8	765.383577	465.38358
5	5	506	2.1464	0.00206683	1338.5	1038.5	819.248888	519.24889
6	6	550	2.3305	0.00208882	1415.7	1115.7	857.851071	557.85107
7	7	585	2.4769	0.00211128	1473.2	1173.2	886.587403	586.5874
8	8	609	2.5774	0.00213423	1507.6	1207.6	903.824822	603.82482
9	9	625	2.6443	0.00215768	1525.5	1225.5	912.764262	612.76426
10	10	634	2.682	0.00218166	1529.3	1229.3	914.670816	614.67082
11	11	624	2.6401	0.00220617	1496.7	1196.7	898.345039	598.34504
12	12	602	2.5481	0.00223124	1442.0	1142.0	871.005709	571.00571
13	13	591	2.502	0.00225689	1408.6	1108.6	854.303816	554.30382
14	14	550	2.3305	0.00228313	1320.7	1020.7	810.374384	510.37438
15	15	548	2.3221	0.00230999	1305.2	1005.2	802.621607	502.62161
16	16	551	2.3347	0.00233749	1298.8	998.8	799.403613	499.40361
17	17	548	2.3221	0.00236565	1281.6	981.6	790.795217	490.79522
18	18	549	2.3263	0.0023945	1271.5	971.5	785.759031	485.75903
19	19	550	2.3305	0.00242406	1261.4	961.4	780.701455	480.70146
20	20	549	2.3263	0.00245436	1247.8	947.8	773.91125	473.91125

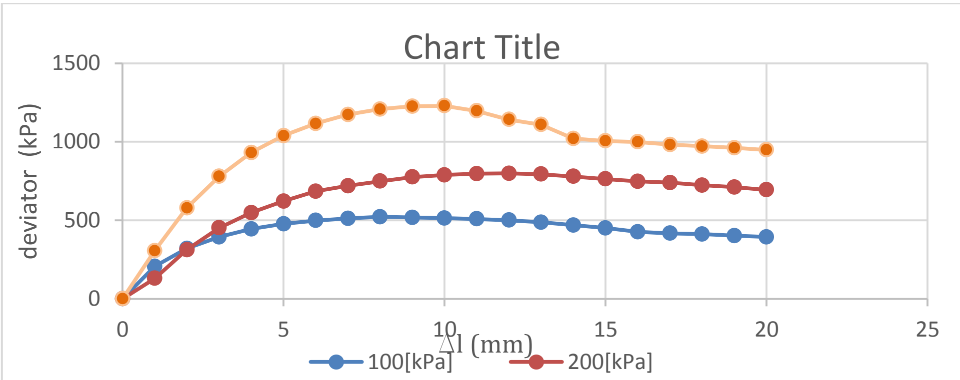

Diagram 1. Diagram for changes of the difference of deviator strain [kPa] and dilatation Δl [mm]

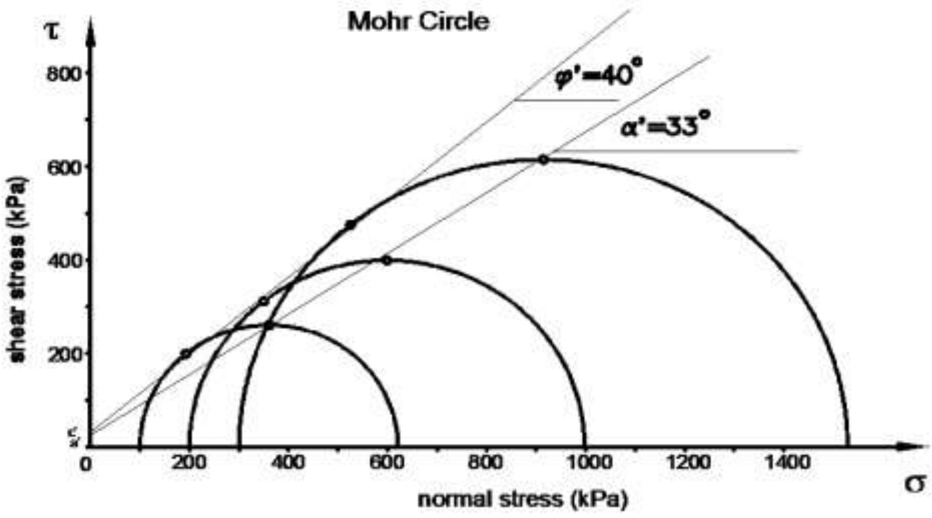

Diagram 2. Diagram of the Mohr circle: cohesion c =30kPa and angel of internal friction φ=40°

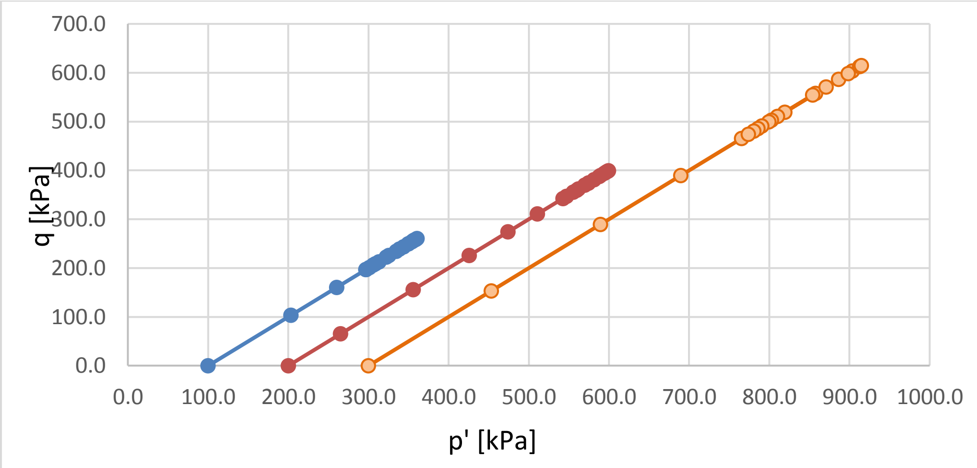

Diagram 3. Tracks on stress p’ and q’

4. RESEARCES OF THE GRANULOMETRIC MATERIAL COMPOSITION WITH GRANULE LASER

Fig. 3 Granulometric laser (Laboratory at University “Goce Delcev”- Stip)

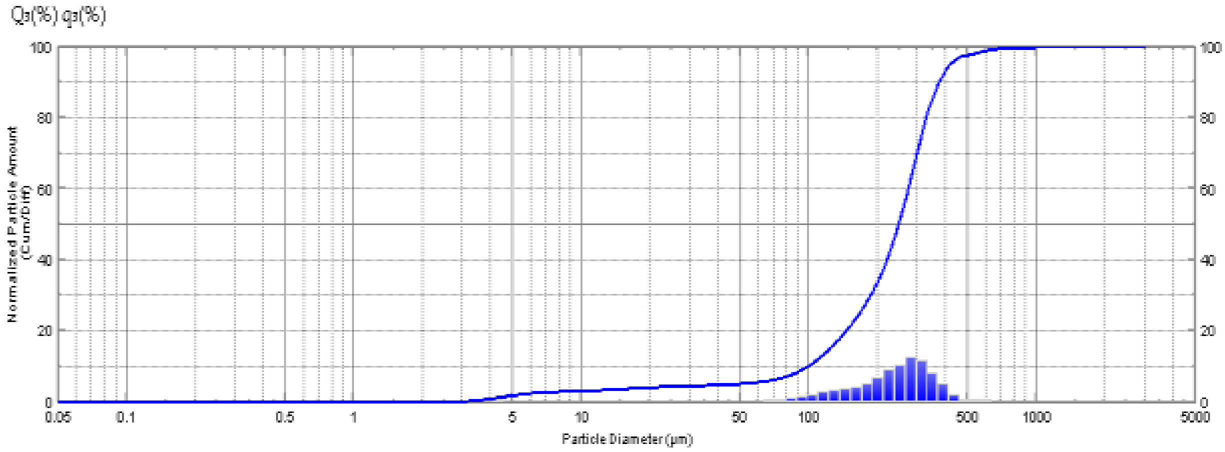

Diagram 4. Granulometric curve in testing material

Table 4. Representation of material fractions

	%	mm
Big sand	1,163	-2+0,6
Medium sand	60,765	-0,6+0,2
Fine sand	32,464	-0,2+0,06
Large dust	1,228	-0,06+0,02
Average dust	1,889	-0,02+0,006
Fine dust	2,471	-0,006+0,002
Clay	0,021	-0,002+0
Total	100,000	

CONCLUSION:

In this scientific paper was presented a research of the potency parameters and granule-metric composition of the material from tailing dam Topolnica. The researchers are done using a triaxial apparatus and granulometric laser in the laboratory of geomechanic at University "Goce Delchev"- Stip. In the laboratory were made experiments for triaxial shearing for dry material in various lateral pressures. The purpose of triaxial researces was to draw the diagram of dependence (deviator [kPa] - Δl [mm], Diagram1), tracks of the strain (p'-q [kPa] - Diagram3) and to determine the maximum effective equations between vertical and side strain for all three trials, thus formed a new diagram (Diagram 2), where were drawn half-circles whose diameter is the maximum equation for each of the three researches. On the three half-circles is withdrawn common tangent whose angle is busy with a horizontal axis and gave an angle of internal friction material φ = 40◦, and the stretch of the vertical axis presents cohesion c = 30 [kPa]. From Table 4 it can be concluded that the most present is the faction of average sand with 60.7% and the sand fraction of 32.4%. and all raw material is class -1mm + 0,0018mm.

REFERENCES

[1] Техничка документација за хидројаловиште “Тополница”-Бучим, интернет портал;

[2] Љ.Димитриевски, Механика на почви, Скопје, 2010година;

[3] М.Голомеова, Б.Голомеов, Методи на испитувања во минералната технологија, Штип, 2012година;

[4] Браја М. Дас, Принципи на геотехничко инженерство.