Innovation Center of Faculty of Mechanical Engineering

Faculty of Mechanical Engineering, University of Belgrade

Center for Business Trainings

CNN TECH

„International Conference of Experimental and Numerical Investigations and New Technologies“

Sponsored by:

MINISTRY OF EDUCATION OF THE REPUBLIC OF SERBIA

Programme

and

The Book of Abstracts

04 – 07 July 2023

Zlatibor, Serbia

„International Conference of Experimental and Numerical Investigations and New Technologies“

CNN TECH 2023

04 – 07 July 2023

Hotel Mona, Miladina Pecinara 26, Zlatibor, Serbia

http://cnntechno.com

Programme
and
The Book of Abstracts

Organised by:

Innovation Center of Faculty of Mechanical Engineering

Faculty of Mechanical Engineering, University of Belgrade

Center for Business Trainings

Sponsored by:

Ministry of Education of the Republic of Serbia

Title:	International Conference of Experimental and Numerical Investigations and New Technologies – **CNN TECH 2023** **PROGRAMME AND THE BOOK OF ABSTRACTS**
Publisher:	University of Belgrade - Faculty of Mechanical Engineering Kraljice Marije 16, 11120 Belgrade 35 tel: (+381 11) 3302-346, fax 3370364 e-mail: cnntechno@gmail.com web site: http://cnntechno.com, http://www.inovacionicentar.rs
Editors:	Dr Goran Mladenovic, Associate Professor Dr Martina Balac, Senior Scientific Researcher Dr Aleksandra Dragicevic, Scientific Researcher
Technical editor	Dr Goran Mladenovic, Associate Professor
Cover page:	Ivana Jevtic, Junior Researcher
Printed in:	Innovation Center of Faculty of Mechanical Engineering Kraljice Marije 16 11120 Belgrade 35 tel: (+381 11) 3302-346
Circulation:	150 copies. The end of printing: June 2023.

ISBN: 978-86-6060-155-3

“International Conference of Experimental and Numerical Investigations and New Technologies”

CNN TECH 2023

SCIENTIFIC COMMITTEE:

Nenad Mitrovic, Serbia (chairman)
Milos Milosevic, Serbia (co-chairman)
Aleksandar Sedmak, Serbia
Hloch Sergej, Slovakia
Drazan Kozak, Croatia
Nenad Gubeljak Slovenia
Monka Peter, Slovakia
Snezana Kirin, Serbia
Samardzic Ivan, Croatia
Martina Balac, Serbia
Mládková Ludmila, Czech Republic
Johanyák Zsolt Csaba, Hungary
Igor Svetel, Serbia
Aleksandra Mitrovic, Serbia
Valentin Birdeanu, Romania
Danilo Nikolic, Montenegro
Goran Mladenovic, Serbia
Bajic Darko, Montenegro
Tasko Maneski, Srbija
Luis Reis, Portugal
Zarko Miskovic, Serbia
Tozan Hakan, Turkey
Nikola Momcilovic, Serbia
Traussnigg Udo, Austria
Gordana Bakic, Serbia
Katarina Colic, Serbia
Peter Horňak, Slovakia
Róbert Huňady, Slovakia
Martin Hagara, Slovakia
Jovan Tanaskovic, Serbia
Marija Djurkovic, Serbia
Tsanka Dikova, Bulgaria
Ján Danko, Slovakia
Ognjen Pekovic, Serbia
Jelena Svorcan, Serbia
Suzana Filipovic, Serbia
Darko Kosanovic, Serbia
Nebojsa Manic, Serbia
Zorana Golubovic, Serbia
Vera Pavlovic, Serbia
Aleksandra Dragicevic, Serbia
Dragan Milkovic, Serbia
Bojan Cudic, Bosnia and Herzegovina
Vesna Miletic, Australia
Natasa Obradovic, Serbia
Branislav Sredanovic, Bosnia and Herzegovina

ORGANIZING COMMITTEE:

Milos Milosevic (chairman)
Nenad Mitrovic (co-chairman)
Aleksandar Sedmak
Martina Balac
Igor Svetel
Goran Mladenovic
Aleksandra Mitrovic
Aleksandra Lj. Dragicevic
Zarko Miskovic
Katarina Colic
Milan Travica
Aleksandra D. Dragicevic
Isaak Trajkovic
Toni Ivanov
Snezana Kirin
Igor Stankovic
Ivana Vasovic Maksimovic
Nina Obradovic
Ivana Jevtic
Jasmina Milenkovic
Mina Volic

enterprise europe network
Business Support on Your Doorstep

APPLICABILITY OF CONSTRUCTION AND DEMOLITION WASTE IN GEOPOLYMERS – A SCREENING TEST

Ivana V. Jelic[1*], Aleksandar R. Savic[2], Tatjana A. Miljojcic[1], Marija Z. Sljivic-Ivanovic[1], Slavko D. Dimovic[1], Marija M. Jankovic[1], Ivana M. Perovic[1], Dimitrije M. Zakic[2], Dragi Lj. Antonijevic[3]

[1]University of Belgrade, Vinca Institute of Nuclear Sciences, Radiation and Environmental Protection Department, 11000 Belgrade, Serbia

[2]University of Belgrade, Faculty of Civil Engineering, Laboratory of Materials, Institute of materials and structures, 11000 Belgrade, Serbia

[3]Innovation Center of Faculty of Mechanical Engineering, 11000 Belgrade, Serbia

Corresponding author e-mail: ivana.jelic@vin.bg.ac.rs

Abstract

In this study, the applicability of construction and demolition waste (C&DW) in geopolymerization technology was investigated. The C&DW components, concrete and solid bricks, were collected from demolition sites in Belgrade, Republic of Serbia. The concrete sample came from a demolished fifty-year-old construction road, while the remains of solid bricks originated from a 1930s building. Prior to mechanical testing, the C&DW components were characterized by XRD analysis for their mineralogical composition. The results showed that the concrete waste consisted mainly of quartz (SiO_2) and calcite ($CaCO_3$), while the brick waste sample contained anorthite from the feldspar group ($CaAl_2Si_2O_8$), wollastonite ($Ca_{0.957}Fe_{0.043}O_3Si$) and mullite ($Al_{2.4}O_{4.8}SiO_6$).

The mechanical properties were examined using the screening method on three geopolymer mixtures, one of each mixture of concrete and brick powders and a mixture of both C&DW components. According to the standard SRPS EN 12390-3:2010 for cubic samples, the geopolymer samples were prepared with alkaline activators for testing the compressive strength as the dominant parameter in the mortar and concrete evaluation. The compressive strength values increased in the range of 2.4 MPa for concrete, 10.2 MPa for brick, and 10.8 MPa for the mixed geopolymer sample. The low compressive strength result of the concrete sample was the consequence of the mineral composition, i.e., the absence of aluminosilicate. However, the brick and the sample with a combination of both types of waste showed moderately satisfactory compressive strength, which could be the starting point for further investigations.

Keywords

Brick, concrete, compressive strength, recycle.

Acknowledgement

The research presented in this paper was completed with the financial support of the Ministry of Science, Technological Development and Innovation of the Republic of Serbia, with the funding of scientific research work at the University of Belgrade, Vinča Institute of Nuclear Sciences (Contract No. 451-03-47/2023-01/200017), Innovation Fund, Republic of Serbia (Project Proof of Concept, ID 5755), the University of Belgrade, Faculty of Civil Engineering (Contract No. 200092) and the University of Belgrade, Innovation Centre of Faculty of Mechanical Engineering (Contract No. 451-03-47/2023-01/ 200213).

.

CIP - Каталогизација у публикацији Народна библиотека Србије, Београд

621(048)(0.034.2)
62:519.6(048)(0.034.2)

INTERNATIONAL conference of experimental and numerical investigations and new technologies (2023 ; Zlatibor)
Programme [Elektronski izvor] ; and The Book of Abstracts / International Conference of Experimental and Numerical Investigations and New Technologies - CNN TECH 2023, 04 – 07 July 2023, Zlatibor, Serbia ; organized by Innovation Center of Faculty of Mechanical Engineering [and] University of Belgrade, Faculty of Mechanical Engineering, Center for Business Trainings ; [editors Goran Mladenovic, Martina Balac, Aleksandra Dragicevic]. - Belgrade : University, Faculty of Mechanical Engineering, 2022 (Belgrade : Innovation Center of Faculty of Mechanical Engineering). - 1 USB fleš memorija ; 1 x 2 x 5 cm

Sistemski zahtevi: Nisu navedeni. - Nasl. sa naslovne strane dokumenta. - Tiraž 150.

ISBN 978-86-6060-155-3

a) Машинство -- Апстракти b) Техника -- Нумерички методи -- Апстракти

COBISS.SR-ID 119652617