

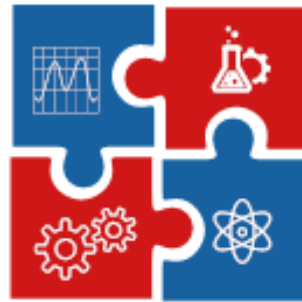
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**CNN TECH**

**„International Conference of Experimental and  
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# **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**

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

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### 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 ( $\text{SiO}_2$ ) and calcite ( $\text{CaCO}_3$ ), while the brick waste sample contained anorthite from the feldspar group ( $\text{CaAl}_2\text{Si}_2\text{O}_8$ ), wollastonite ( $\text{Ca}_{0.957}\text{Fe}_{0.043}\text{O}_3\text{Si}$ ) and mullite ( $\text{Al}_{2.4}\text{O}_{4.8}\text{SiO}_6$ ).*

*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.

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