

P35

The influence of print orientation and print location on the mechanical characteristics of specimens obtained by SLS technology

Ivana Jevtić¹, Goran Mladenović², Miloš Milošević¹, Aleksa Milovanović¹, Isaak Trajković¹

¹Innovation Centre of The Faculty of Mechanical Engineering, University of Belgrade, Kraljice Marije 16 street, Belgrade 11120, Serbia

²Faculty of Mechanical Engineering, University of Belgrade, Kraljice Marije 16 street, Belgrade 11120, Serbia

SLS technology has become popular in various industries due to its ability to produce complex components with less effort than traditional methods. The study used PA 12, a commonly used material in SLS printing, to create three types of specimens that were tested for their mechanical characteristics. The specimens were designed based on ISO standards (i.e. ISO 178, ISO 527-2, ISO 604) and printed on the Fuse 1 (FormLabs, Summerville, MA) 3D printer in four batches. These batches differed according to the printing orientation (i.e. horizontal and vertical) and the printing location (i.e. in the middle and on the edge of the powder bed). The printed specimens were then tested on subjected to a standard tensile testing machine (SHIMADZU AGS-X 100kN).

The study found that the specimens printed according to ISO 178 standard vertically in the middle of the powder bed had the smallest deviations in mechanical characteristics. On the other hand, the specimens printed based on ISO 604 standard had the biggest deviations. These findings suggest that the printing orientation and location on the powder bed can affect the mechanical properties of SLS-printed components.

Acknowledgement: The authors acknowledge the support from the Ministry of Education, Science and Technological Development of the Republic of Serbia (contracts: 451-03-47/2023-01/200213)

P36

X-ray fluorescence spectroscopy of eggshells as a potential raw material in the construction industry

Nevenka Mijatović¹, Anja Terzić¹, Ljiljana Miličić¹

¹Institute for Materials Testing, Bulevar vojvode Mišića 43, 11000 Belgrade, Serbia

Due to its chemical composition based on CaCO₃ and low price, eggshells, as waste from one of the most widely consumed foods worldwide, are receiving increased attention in building and construction industry studies. The goal of this study was to see if the chemical composition of eggshells could be utilized to distinguish eggs from different production systems. In Serbia, eggs were taken at random from ten commercial cages and ten commercial free-range flocks. Using energy dispersive X-ray fluorescence spectroscopy (EDXRF) and a chemometrics approach, twenty eggshell samples from each flock were tested for element composition (Ca, P, Mg, Na, Al, Cu, Mn, Fe, K, S, and Zn). Analysis showed that free-range eggshells had higher levels of macrominerals (P, Mg, and Na) but lower levels of microminerals (Cu, Fe, K, S, and Mn) than caged eggshells (P<0.05). A large