

Impact analysis of magnesium slag deposit in changing climate conditions

Jelena Djokic
IBCM Mitrovica

Abstract: The impact of the airborne pollution by the slag from magnesium production is analyzed in different climate conditions, and the system of its usage as a construction material is proposed. The characterization of the slag is made by using X-ray diffraction, Scanning Electron Microscopy, Differential Thermal Analysis and Atomic Absorption Analysis. The dominant phase is γ modification of dicalcium silicate (γ -2CaO SiO₂), formed by polymorph modification from β -2CaO SiO₂ during the cooling of non-hydrated slag, significant amount of MgO, gellenite – 2CaO Al₂O₃ SiO₂, akermanite -2CaO MgO 2SiO₂ and portlandite Ca(OH)₂. Granulometric composition of the slag is within the range of 100 0/0 – 0,090 x 10⁻³m. Ad hock measurements on site in June showed that at 100, 300 and 600 m distance from the slag deposit, dust concentrations were 1.96 mg/m³, 1.73 mg/m³ and 1.37 mg/m³, respectively for North-East direction. By involving the results of experimental investigation of the dust emission for the wind velocities of 5, 7, and 10 m/s, and within the range of relative humidity from 20-50 % into SCREENWIEV software, the obtained values on the diagram showed good agreement with measurements on site. The simulation, that considered the landscape and wind roses in 20 years period, showed that the dust concentration will be over the Maximum Allowed Concentration up to 1400 m from the deposit, for average wind speed of 3.4 m/s, and up to 4000 m at unstable weather conditions. Proposed usage of magnesium slag in mortars is proven by the mechanical investigation of the produced mortars.