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Artificial neural networks (ANN), MARS, and adaptive network-based fuzzy inference system (ANFIS) to predict the stress at the failure of concrete with waste steel slag coarse aggregate replacement

Nzar Shakr Piro, Ahmed Mohammed ✉, Samir M. Hamad & Rawaz Kurda

Abstract

Concrete is a very flexible composite material that is extensively employed in the building industry. Steel slag is a waste material produced during steelmaking. It is formed during the separation of molten steel from impurities in steelmaking furnaces. Slag starts as a molten liquid melt and cools to a solid state. It is a solution of silicates and oxides that is rather complicated. Steel slag recovery is environmentally friendly since it conserves natural resources and frees up landfill space. Steel slag has been extensively utilized in concrete as a partial substitute for normal and crushed coarse aggregate to improve the mechanical qualities of normal-strength concrete, such as compressive strength. The researchers and suppliers investigated that using steel slag instead of normal coarse aggregate could save the environment and natural resources. Three hundred thirty-eight (338) data sets were gathered