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Mechanical Properties Of Geopolymer Concrete: Statistical Analysis And Prediction Models

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Abstract - With the rise for the need of construction materials, and the considerable amount of impact the cement industry has on global warming, the use and study of alternative materials for construction has emerged on the scene. The use of alkali-activated binder, which has less of an impact on the environment due to the use of by-products of other industries such as power generation and burning coal, is on the increase with time. Despite the fact that (Alkali Activated Binder) AAB is currently in area of active research, many models for the prediction of mechanical properties are available, however they follow the OPCC methods or (template) of determining the mechanical properties of AAB. The models available currently use only compressive strength to predict other mechanical properties, without directly addressing the chemical composition of the AAB. The main aim of this study is to provide prediction models for the mechanical properties of AAB and identify the parameters that affect these properties, and to determine the significance of these effects. This research will attempt to collect the data from multiple researches, study the characteristics of each work, and propose models that can describe all the data collected by regression and dimensional analysis. By analysing the collected data from over 50 published papers, with over 500 tested samples, models are generated for determining the Modulus of Elasticity, splitting strength and modulus of rupture of AAB. These models take into account the compressive strength as the most significant characteristic, while also considering the effect of test conditions and the chemical composition of the samples.

***Keywords*:** Geopolymer Concrete, Modulus of Elasticity, splitting strength and modulus of rupture, compressive strength