

## **Creep of Geopolymer and Alkali Activated Binder Concrete: Comparison with OPC Concrete and Design Codes**

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Geopolymer has a potential to become a commercial alternative binder to Ordinary Portland Cement due to its capability of reducing the carbon dioxide emission that are associated with clinker production. However, concerns relating to the long-term properties of geopolymer concrete such as durability, creep, and shrinkage remain and factors that prevent it from being more intensely utilised as a structural material at scale. As opposed to fly ash dominated geopolymer concrete, which generally requires heat curing to obtain its structural properties, slag – fly ash blended geopolymer concrete, cured under ambient conditions, can save energy and be applied for cast in-situ projects.

In this paper experimental creep results for an ambient cured one-part slag and fly ash blended geopolymer concrete are presented and compared with those of traditional concrete of an equivalent strength grade. Furthermore, currently available prediction models are evaluated for the experimental creep data and conclusions are drawn.

The results show that creep of the ambient cured slag based geopolymer concrete tested is higher than that of an equivalent strength OPC concrete, and this is due to its

distinct microstructure and different creep mechanisms. It is concluded that models developed for OPC concrete and presented in design codes cannot be applied for the slag based geopolymer concrete mix prepared in this study. While the model presented in Australian Standard Technical Specification TS 199 provides a reasonable prediction for the tested design mix, further research is needed to determine the founding constitutive behaviours that define creep in Geopolymer concretes.