

Structural modelling of expansive clay subgrades treated with lime

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Given the wide spread existence of expansive soils across Australia, lime stabilisation of expansive subgrades to improve the California Bearing Ratio (CBR) has been widely used and accepted for well over 50 years. The process of spreading and mixing lime into expansive clays is simple and cost effective where permanent CBR improvements can be increased by a factor of well over 10. The use of structural and mix design conventions are readily available for use by designers to quantify these improvements.

The 2017 edition of Austroads' Guide to Pavement Technology Part 2: *Pavement Structural Design* introduced a simple method for the modelling of lime stabilised subgrade materials where a treatment thickness and corresponding design CBR can be optimised. The resultant design CBR can be used as an input variable in empirical design methods or in layered elastic analysis software programs.

Mix design procedures for the determination of binder type and quantity (typically lime in the case of expansive clays) are reasonably well documented throughout Australia, however many practitioners fall short of applying a thorough mix design regime prior to specifying lime application rates.

This paper discusses the approach to designing an improved expansive subgrade material through the use of lime stabilisation. Methods outlining accepted structural design practices and minimum process requirements for undertaking mix designs are presented. Outcomes will be explored showing how expansive clays with low CBR values can be treated with lime to a calculated thickness such that significant improvements to the CBR can be achieved for use in pavement design modelling.

References:

1. Austroads. (2017). Part 2: Pavement Structural Design. *Guide to Pavement Technology*. Sydney.
2. Austroads. (2006). Part 4D: Stabilised Materials. *Guide to Pavement Technology*. Sydney.