

Use of glass fibre reinforced polymer bars in concrete pavements

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ABSTRACT

The use of glass fibre reinforced polymer (GFRP) bars as an alternative to steel reinforcement has considerably increased over the past decade. There is now available design-related information that can be adapted into the Australian design and construction practice. The results of technological research and field implementation in concrete pavements carried out in the United States and Canada are promising and some experience has already been gained in light rail projects in Australia.

The corrosion resistance of GFRP bars, as well as the thermal and stiffness characteristics that are similar to concrete, make the use of GFRP bars an attractive reinforcement choice as it reduces the occurrence of cluster cracking and increases the overall average crack spacing in continuously reinforced concrete pavements. Another benefit is that because GFRP is a poor electromagnetic conductor, it allows the operational performance of vehicle detector loops that can be installed in the concrete pavement.

This paper reviews the material properties of GFRP bars for potential incorporation into the reinforcement design procedures of the Austroads Guide to Pavement Technology Part 2: Pavement Structural Design. The reinforcement design procedures consider creep, flexural and bond area to concrete volume for continuously reinforced concrete pavements as well as a separate procedure for jointed plain concrete pavements.