

The case for lower strength, lower strength gain and early age acceptance of concrete for road pavements

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ABSTRACT

This paper summarises the current methodology for minimising shrinkage and hence the reduced likelihood for cracking. It illustrates the conflicting requirements for design, construction and economic considerations. As background, it lists the types of shrinkage induced cracking that may be encountered and provides suitable commentaries about these. Examples are given of the variations in shrinkage against the indirect tensile strength of concrete due to variations in the types of aggregate and the gradings of these. As most “drying cracking” occurs or commences in less than 72 hours (depending on the thickness of the base), there is no suitable laboratory test available to enable early shrinkage to be recorded and hence, to be compared to the gain of indirect tensile strength of the concrete. In the last 15 years, a lot of research has concentrated on “early-age shrinkage”. However, nobody seems to have differentiated or taken into account the difference between drying and cooling of the concrete. The paper demonstrates the need to reduce the cement content in design mixes to reduce the significant expansion through heat of hydration and the subsequent early-age shrinkage after cooling. Suitable recommendations are made.