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Effect of High Strength Concrete for Bridge Girders

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ABSTRACT

High strength concrete (HSC) has been widely applied worldwide in recent years due to its favorable strength and dense microstructure. HSC shows some characteristics and engineering properties different from those of normal-strength concrete even though utilize similar raw materials.

Use of high-strength concrete for pretension concrete bridge girders has become accepted practice by many countries highway authorities because of its technical and economic benefits. High-strength concrete permits longer girders and increased girder spacing, thus reducing total bridge cost.

At present normal strength concrete is used in prestressed concrete construction in Sri Lanka. The demand for high strength concrete is expected to increase in future with growing tendency for high-rise and bridge construction in Sri Lanka. In several major projects, grade 50 concrete has been already used. As an example in bridge construction that the maximum grade of concrete that has been practically used is grade 50 for fly over bridge across the railway line in Base line road at Colombo.

The design of high strength concrete is much more complex than the normal strength concrete and require carefull selection of mix proportion. It further contribution to the complexity by use of high quality materials, low water cement ratio and high cement content. Chemical admixtures such as plasticizers and super- plasticizers and mineral admixtures such as silica fume, fly ash, slag and others, are widely used in production of high strength concretes. The non-availability of these mineral admixtures which are by – products of other processed and the reluctance to use chemical admixtures has resulted in Sri Lankan construction industry still using low strength (Grade 20-30) for reinforced concrete and medium strengths (Grade 30-40) for pre-stressed concrete . The uncertainty of the properties of high strength concrete has also contributed to the lack of progress in the use of HSC. The latter aspect has been improved with the large volume of research carried out in recent years on structural properties of high strength concrete

This researched describes the use of high strength concrete in bridge girders production, strengths in the range of 50 to 80 N/mm^2 were selected as most appropriate for Sri Lanka, as targeted in the study.

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