

## **Investigation on the flexural behaviour of high-performance reinforced concrete beams using sandstone aggregates**

### **Abstract**

In recent years, an emerging technology termed high-performance concrete (HPC) has become popular in construction industry. The constituent materials of HPC depend on the desired characteristics and the availability of suitable local economic alternatives. Tests are reported in this study on the flexural behaviour of high-performance reinforced concrete (HPRC) beams made with crushed sandstone coarse and fine aggregate together with silica fume. The beams were made from concrete having compressive strength of 74 and 78 N/mm<sup>2</sup> and tensile reinforcement ratio in the range of 1.34-3.14%. The ultimate moment for the tested beams was found to be about 14-30% and 3-9% higher than that of the predicted ultimate moment based on BS 8110 and ACI 318, respectively. Due to lower stiffness of sandstone aggregates, the beams resulted in excessive deflection under service loads. The observed crack width under service loads were within acceptable limits. The mineral fillers in crushed sandstone sand and silica fume increased the flexural stiffness of HPRC beams and resulted in adequate safety factors against flexural failure. The test results showed that it is possible to produce HPC using sandstone aggregates with silica fume and superplasticisers. © 2006 Elsevier Ltd. All rights reserved.