

PENETRATION PROTECTION CONCEPTS USING HIGH STRENGTH CONCRETE

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High Strength Concrete (HSC) has been shown to possess more superior resistance against penetration as compared to Normal Strength Concrete (NSC). In addition, compared to Ultra High Performance Concrete (UHPC), the option is economically more viable as such concrete mixes are mostly non-proprietary. A research programme was initiated to build a predictive numerical modelling framework to develop protective concepts using HSC. Deciding that the RHT concrete model is a suitable constitutive model to predict structures under impact and dynamic loading, a HSC mix has been characterised to generate the suitable material parameters for the model. The validity of the constitutive model was demonstrated through comparisons with small and large scale penetration tests which were conducted in this same research programme. The large scale penetration tests also showed that HSC has the capability to yield a more significant dwelling of deformable projectiles at impact as compared to NSC targets. Compared to the NSC thickness required to prevent perforation, the use of HSC can yield more than 30% reduction in thickness. In addition, the performance of HSC and NSC targets under oblique impact scenarios was also studied.