

BLAST PERFORMANCE OF HIGH-STRENGTH CONCRETE REINFORCED FOAM CORE PANELS

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There is an emphasis to develop lighter cladding building systems that can be implemented for building blast hardened construction. An innovative cost-effective reinforced concrete foam core panel has been developed to take advantage of increased section depth with minimal impact on panel weight. The panel is unique in its use of high-strength concrete specifically designed for in-situ application either before or after installation of the foam panel units, and for its electro-welded stainless steel welded wire mesh for shear reinforcement that passes through the foam core. This system improves constructability for applications where access is difficult, as well as enhanced thermal characteristics. Eight shock tube tests were conducted on six foam core panels, which were compared to four tests on two solid cast panels. Light, moderate, severe, and collapse damage levels were achieved in this test validation program. Structural dynamic responses were estimated and compared with test results. The panels were found to perform well under significant applied blast loads, thereby representing a viable light-weight blast hardened alternative to more traditional solid panel construction.