

BLAST INDUCED HEAD ACCELERATION MEASUREMENTS & THE POTENTIAL FOR INJURY

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Head acceleration measurements obtained during full scale testing involving instrumented mannequins are presented. The mannequins were equipped with tri-axial head accelerometers and exposed in a standing free-field configuration to peak side-on blast overpressures of 1 to 12 atm (15 to 180 psi). The explosive blasts were generated by cylindrical charges of bare explosive. Test conditions included bare, unprotected mannequins, as well as, mannequins fitted with a helmet and protective suit. The protective equipment is typical of that used by military or law enforcement personnel, involved in disposal operations of explosives ordnance and improvised explosive devices (EOD, IED). Significant differences in head acceleration measurements were observed between the two configurations. Peak resultant head accelerations are compared with published head injury criteria to describe the potential for injury. This study clearly demonstrates the importance of considering head accelerations in the monitoring or assessing of blast induced injuries. The level of Protection available to personnel wearing protective ensembles is also highlighted. Recommendations for future study are provided.