

COMPOSITE MATERIALS FOR STRUCTURAL RETROFIT

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A series of tests at Tyndall Air Force Base, Florida has been conducted to investigate the use of a polymeric coating to reinforce lightweight structural elements such as CMU walls and temporary buildings. Recent tests have indicated the elastomeric coatings applied to building walls may offer protection for occupants against an explosive charge at a relatively close distance. The material is a highly ductile elastomer spray-on coating. The polymer material was sprayed on the surface of the wall and cured within 10 minutes. The polymer bonds to the wall forming a system with a modest increase in static resistance over the CMU wall alone. During full-scale explosive tests, the retrofitted wall system experienced large deflections and the CMU block was severely fractured, but no wall fragments entered the room. Posttest observations indicate the ductile response of the polymer membrane effectively contain the shattered wall fragments and can prevent serious injury to persons inside a room. The curing time of 10 minutes after application allows for a quick retrofit method. Current testing of temporary buildings is underway, and results demonstrate that a trailer retrofitted with the elastomer will survive a blast-loading environment of 40 psi. The lightweight elastomer is an effective tool in providing military commanders in the field with an expedient method to protect deployed forces.