EXPERIMENTAL AND NUMERICAL EVALUATION OF A NEAR-CONTACT BLAST MITIGATION STRATEGY FOR UNREINFORCED MASONRY

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ABSTRACT

This technical paper will summarize research currently being conducted for the Department of Homeland Security (DHS) by the U.S. Army Engineer Research and Development Center (ERDC), Vicksburg, MS, and Lawrence Livermore National Laboratory (LLNL), Livermore, CA. The objective of this research is to develop and validate mitigation techniques that are capable of diminishing the effects of near-contact detonations on unreinforced masonry targets. This validation process is accomplished through field experimentation and computational modeling. The success of the mitigation scheme was measured by its ability to reduce deformation and prevent breach in the test specimen. Computational models are being developed to predict the responses of the masonry targets to explosive loads, and the experimental data provide information to validate those models. The resulting mitigation concepts will harden the structures against potential attacks.

Thorough comparisons were made between the breached zones of the masonry targets to determine the effectiveness of each mitigation strategy in diminishing the effects of near-contact detonations. The results of these comparisons will be presented. Comparisons between experimental and numerical results will also be presented. The result of these experiments will be used to determine the optimal retrofit concept and the possible recommendation of improvements that could be made in future tests.