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Blast resistant wall retrofits

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Due to the rising number of explosion attacks, the need for blast resistant structures has increased greatly. Many materials have been tested for blast retrofit design but have shown to have limitation. The focus of this research is on the analysis of using steel sheets as a method for retrofit design. These sheets are thin and take up little space, have a large amount of energy absorption capability, and the installation process is quick and easy to perform in the field. For optimum blast retrofit design, the development of the sheathing's full capacity is controlled by its connection capacity. Structures, such as CMU walls, with low resistance to blast loading and that fail under external pressure of approximately 0.30 psi can benefit from these retrofit sheathings that increase the wall system's ductility and energy absorption. A CMU wall retrofitted with such method can resist blast loads as high as 40 psi. The tests results are used to develop design recommendation for improved performance. The axial tension that the samples will be subjected to is meant to simulate how steel sheets would react when resisting a blast load on a structure. The energy absorbed from the tests is found after plotting the pressure-displacement graphs of each sample, and then calculating the area under the curve. The parameters that are varied in these tests include two different clamping plate thicknesses, and alterations to the steel sheets. The clamping plate design is also varied to prevent premature failure at the sharp edges and corners. This project presents the experimental evaluation of steel sheet retrofit of CMU walls to resist blast loading.