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Evaluation of steel stud beams for blast resistance

Steel stud walls are very common in commercial and military construction. These walls are normally designed to resist wind loads, and to some extent, seismic loads. The walls are currently designed to resist a uniform pressure in the order of 0.60 psi. Under blast loading, which can be higher than 40 psi, the walls provide minimal resistance and do not protect people from external explosions. Steel material has the desired properties of strength and ductility. To make these walls absorb the high energy associated with a blast, it is necessary to prevent all kinds of premature failures, such as those of the connections. This study evaluated the performance of 16 full-scale beams under static loading. The information was used in a dynamic model to predict the wall performance under blast. Engineering guides were developed to design steel stud walls under blast loading, which was implemented as a computer design code. The poster will present the results of the full-scale beam testing as well as the results of full-scale field testing of two walls under blast loading simulating a large vehicle bomb.