



Blast Impact Testing on URM Wall

Case Study – HJ3 CS200907

Introduction

HJ3 conducted testing to demonstrate the performance of the HJ3 BlastSeal™ System (formerly Blastek™) in a live-action setting. To conduct the test, two un-reinforced concrete masonry walls were constructed within a larger containment structure, with each wall being 8 feet wide by 11 feet tall. One wall was used as a control specimen and the other was retrofitted with the BlastSeal™ System. (Figures 1 & 2)



Figure 1. Containment Structure before installation of CMU walls
Walls installed



Figure 2. Containment Structure with Control and Retrofitted

Procedure

The BlastSeal™ System was applied to both the interior and exterior of the control wall. (Figures 3 & 4).



Figure 3. Interior view of retrofitted wall



Figure 4. Exterior view of retrofitted wall

The test consisted of detonating 220 pounds (100 kg) of a TNT-equivalent explosive. The loading produced by 220 pounds of TNT at 33 feet is consistent with many military design manuals as representing the size of a typical terrorist car bomb. The explosive itself was located 33 feet

away from the structure (aligned with the centerline between the two walls), and was elevated 3 feet in the air. Eleven different sensors were placed at various locations to measure the effects of the blast, including the exterior face of both walls, as well as the interior space behind the retrofitted wall. (Figures 5 & 6)



Figure 5. Exterior view of test structure and explosive

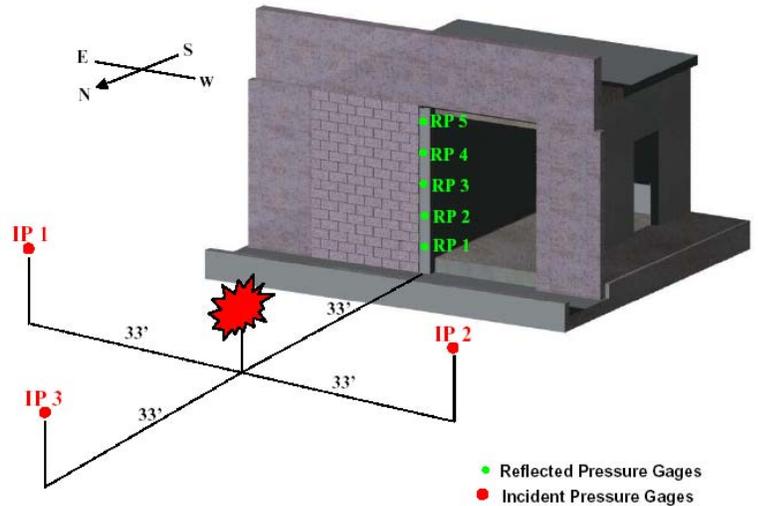


Figure 6. Illustration of test set up

Results

The detonation of the explosive created a crater that was approximately 108 inches in diameter with a maximum depth of 21 inches. The control wall was completely destroyed. (Figure 7) The retrofitted wall remained intact, and no debris of any kind was found in the interior space behind the retrofitted wall. (Figure 8) The maximum pressure exerted on the exterior face of each wall was 178 psi; the sensor located in the interior space behind the retrofitted wall recorded a peak pressure of 1.46 psi (overburden), demonstrating that nearly all of the force was dissipated by the BlastSeal™ System.



Figure 7. Post-Test view of control wall retrofitted wall



Figure 8. Post-Test view of retrofitted wall