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**LARGE WIND MISSILE IMPACT PERFORMANCE  
OF PUBLIC AND COMMERCIAL BUILDING  
ASSEMBLIES**

**Final Report**

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## **ABSTRACT**

In the absence of a standard guideline for Emergency Operations Centers (EOC), The Division of Emergency Management (DEM) at the Florida Department of Community Affairs (DCA) uses Enhanced Hurricane Protection Areas (EHPA) guidelines from the Florida Building Code (FBC). The EHPA guidelines state that wind and debris exposure can be provided through FBC criteria, provided an enhanced wind speed of 40 mph above the code specified basic design wind speed is used. The FBC specified 2x4 in. lumber weighing 9 lb impacting the building envelope at a speed of 34 mph may not be sufficient for EOCs, schools and/or light commercial buildings. A draft EOC Survivability Performance Category table from DCA lists Performance Category 3 (from 0 – 4 scale) as “Hurricane Enhanced Protection”, with missile impact resistance of a 2x4 in. 15 lb stud traveling at 50 mph. With the enhanced hurricane design wind speeds specified in the draft table, it may be sufficient to achieve the Performance Category 3 missile impact resistance for survivable EOCs.

The purpose of this study was to investigate the performance of commonly used Florida wall and roof assemblies under the basic FBC, enhanced-A and enhanced-B impacts. The enhanced-A and enhanced-B impacts consisted of a 2x4 in. 15 lb missile at a speed of 50 mph and 60 mph, respectively. Based on a thorough literature review, a list of wall and roof assemblies, which were not tested before, were selected. Wall assemblies included wood and metal framing systems, and concrete panels. Roof assemblies included metal framing systems and concrete panels. Based on the test results, a comprehensive list of wall and roof assemblies that passed various levels of large missile impact testing was developed. Also recommended were assemblies that should be avoided for the construction of EOCs, schools and/or light

commercial buildings. Recommendations on the impact performance improvement techniques for selected assemblies were also made.