Task 3 Interim Report
Fiscal Year 2011/2012 Scope of Work

1. Scope of Work and Progress Updates

Investigate the susceptibility of tile roof systems to failure in hurricane winds and their windborne debris characteristics and potential impacts on surrounding housing. Phase II studies will focus on quantifying the dynamic wind loads on tile systems, and identifying tile failure thresholds for wind uplift. Both with utilize full-scale experimental methods. The Contractor is authorized to spend up to $150,000 on Task 3(a), 3(b), 3(c) and 3(d). The Contractor shall provide an interim progress report and an ending report on this task and all sub-tasks.

(a) The contractor shall experimentally characterize the uplift forces that act on common tile shapes and installations using the contractors' existing dynamic wind load simulator apparatus. Variables are to include mortar set, mechanically fastened, and spray foam adhesive tile roof systems

See next response.

(b) the contractor shall compare results from subtask (a) to design loads determined from Section 1609.5.3. of the Florida Building Code, Building and evaluate the methodology to determine these design load requirements

Task 3(a) and 3(b) are interrelated. Three experimental research plans are being carried out. The first two plans are attached:

Task 3 Interim Report Appendix - Experimental Plan #1.pdf
Task 3 Interim Report Appendix - Experimental Plan #2.pdf

The plans address the characterization of pressure loading and reaction forces of roofing tiles, respectively. We are currently finalizing the third plan, which addresses the mechanical uplift resistance of tile installations.

The investigators have formed an oversight committee comprised of industrial stakeholders to address these issues.

(c) The contractor shall evaluate the resistance of these systems using dynamic load actuation to identify damage modes and load thresholds and characterize typical windborne debris generated by tile failure under simulated dynamic wind loads

Development of the control algorithm has proved to be challenging due to the response characteristics of the existing loading actuator, which are insufficient to replicate the time-varying load conditions. We are currently working with the Nonlinear Controls and Robotics Group at the University of Florida to resolve the issue.

(d) The contractor shall finalize remaining issues with the fiscal year 2010-20111 study of tile roof frangibility, debris trajectory and fenestration impact

Completed. Refer to *Task 3 Interim Report Appendix - Roof Tile Frangibility Paper.pdf* (attached) for detailed information. A companion PowerPoint entitled, *Task 3 Interim Report Appendix - Tile frangeability research ppt given 12-04-11.pdf*, was given at the December 4, 2011 Hurricane Research Advisory Committee Meeting.

(e) The contractor shall collate the results from subtasks (a) – (d) with the fiscal year 2010-2011 study outcomes on frangibility, debris trajectory and fenestration impact to evaluate the susceptibility of tile roof systems to failure from wind loading and tile impacts and the vulnerability of surrounding residential infrastructure.

In progress; this subtask can only be completed at the end of the project.