

Investigation of Fastening of Wood Structural Panels for Opening Protection

Presented to the

Florida Building Commission
State of Florida Department of Business and Professional Regulation

by

Forrest J. Masters, Ph.D., P.E., masters@ce.ufl.edu, (352) 392-9537 x 1505
Kurtis R. Gurley, Ph.D., kgurl@ce.ufl.edu, (352) 392-9537 x 1508
David O. Prevatt, Ph.D., P.E. (MA), dprev@ce.ufl.edu, (352) 392-9537 x 1498

1. Issues

The letter from Joe Belcher on behalf of the International Hurricane Protection Association (IHPA) describes the project (see Appendix). FBC Staff requested that we provide third-party technical input, witness testing, and provide a final review of the report.

2. Relevant Sections of the Code

- Table 1609.1.2, Florida Building Code
- Table R301.2.1.2, Florida Building Code

3. Statement of UF Work

- Provide consultation to IHPA on the experimental design
- Witness testing at the certified product testing laboratory
- Interpret results, determine whether the problem requires action, and produce a report that explains the results and implications for the Code

4. Points of Contact for the Project

- TBD

5. Budget

Table 1. Budget

Budget	Amount
Salaries	\$11,151.80
Fringe Benefits	\$3,019.36
Equipment	\$0.00
Utilities	\$0.00
Travel	\$1,000.00
Misc. (M&S, Tuition)	\$10,000.00
Indirect costs	\$1,417.12
TOTAL	\$26,588.28

DRAFT

The miscellaneous budget category includes the \$10,000 payment to the cover cost of testing at a third party testing facilities.

Research personnel time will be reported and certified using a “loaded” rate computed from the following table. Note that the indirect cost shown in Table 1 is computed from the indirect cost in Table 2 + the indirect cost associated with the travel and miscellaneous categories.

Table 2. Breakdown of the hourly compensation rate

Person	Hours	Hourly Rate	Fringe	IDC	Total
F. Masters	80	\$70.07	\$18.43	\$8.85	\$7,787.86
K. Gurley	80	\$63.70	\$16.75	\$8.05	\$7,079.87
Admin Asst.	20	\$22.51	\$10.24	\$3.28	\$720.55

6. Deliverables

- A report providing technical information on the problem background, results and implications to the Code submitted to the Program Manager by June 15, 2014
- A breakdown of the number of hours or partial hours, in increments of fifteen (15) minutes, of work performed and a brief description of the work performed. The Contractor agrees to provide any additional documentation requested by the Department to satisfy audit requirements

7. Appendix: Letter from IHPA

JDB CODE SERVICES, INC.

September 16, 2013

Florida Building Commission
C/O Mo Madani, DBPR
1940 North Monroe Street
Tallahassee, FL 32399

SUBJECT: IHPA Request for Funding For Research Project Related to Fastening of Wood Structural Panels for Opening Protection

Florida Building Commission:

Please consider this a request for funding for an important research project related to the fastening of wood structural panels as specified by the Florida Building Code. During the August meetings at Fort Lauderdale the Florida Building Commission (Commission) adopted a definition for the term "research" as follows:

"An important and necessary endeavor that aimed at studying specific code related issue(s)/topics for the purpose of providing solutions to a specific problem or future code change(s) directed at improving the implementation and enforcement of the FBC. The issue to be researched must be fully understood (i.e. with clear purpose and goals); clearly defined with specific scope of work/approach; and within budget."

The International Hurricane Protection Association (IHPA) requests up to \$10,000.00 be expended for testing of the fastening specified at Tables 1609.1.2 and R301.2.1.2 of the Florida Building Code. This is an important and necessary endeavor because testing conducted and previously submitted to the Commission indicates the current code is inadequate for the intended task.

Testing conducted by Architectural Testing, Inc. for IHPA indicates there is a problem with the ability of the code specified fastening schedule to resist the structural loads specified by the code for opening protection products. The failures noted were under structural loading and would undoubtedly lead to failure of the panel if subjected to the cyclical loading specified by the code for opening protection products. Additionally, it was discovered during the testing that the fasteners specified by the code are not readily available in the marketplace.

The research proposal is to review the findings of the 2003 Loss Relativities for FBC Wood Panel Shutters¹ (LRWPS or the Study). The Study was used to develop the fastening tables for wood structural panels used in the FBC. The Study conducted testing on both the wet and dry condition. The technical approach of this project will involve:

1. Engineering Analysis. The performance of engineering analysis based on a review of the LRWPS and including catenary loading based on the findings of the testing previously sponsored by IHPA² to develop values for a table that incorporates edge distance on the buck, edge distance on the panel, tensile strength, deflection, end failure, and yielding or over-pulling of the anchors used for attachment of wood structural panels. A test strategy will be developed based on the final calculations considering

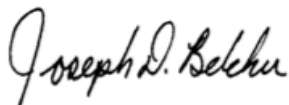
¹ Loss Relativities for FBC Wood Panel Shutters, Department of Community Affairs DCA Contract 03-RC-11-14-00-22-034, ARA IntraRisk June 30, 2003, Final Report,

² Architectural Testing, Inc. Test Report dated December 1, 2011.

DRAFT

- appropriate safety factors for wood structural panels installed using common anchors that are widely available in the marketplace.
2. The engineering analysis will be contributed to the project by an IHPA member. The estimated value of the analysis is \$5,000.00.
 3. Testing will be to ASTM E 330-02 for structural testing and ASTM E 1886-05 and ASTM E 1996-09 for impact and cyclic testing for large missile.
 4. Testing Program. The testing will involve a maximum of three tests to validate the data generated in the engineering analysis.
 - a. A dry test using an OSB wood structural panel in accordance with the methodology of the LRWPS.
 - b. A wet test using an OSB wood structural panel in accordance with the methodology of the LRWPS.
 - c. A dry test using a plywood structural panel in accordance with the methodology of the LRWPS.
 5. Testing to be performed by a Florida Building Commission approved testing laboratory.
 6. Responsibilities of the testing lab include:
 - a. All testing will be on a wood test buck as constructed by the testing laboratory.
 - b. Mounting test specimens.
 - c. Conducting tests.
 - d. Writing of sealed test report.
 7. IHPA will provide test specimens of commonly available materials and fasteners purchased from a retail outlet.
 8. IHPA will attend and witness testing.
 9. IHPA will provide installation drawings which will indicate fastener type and spacing, required shim space, and any other details pertinent to installation of wood structural panels.
 10. Installation drawings shall become a referenced document in the final test report.
 11. IHPA estimates the cost of Items 7, 8, and 9 at \$1,000.00
 12. Testing is estimated to cost \$8,775.00 and shall not exceed \$10,000.00. The total funding requested is to cover the testing costs only.
 13. The results of the engineering analysis and testing will be used to validate the existing values or, as indicate, to develop final recommendations for new table values to replace those of Tables 1609.1.2 and R301.2.1.2 of the Florida Building Code, Building and Residential, respectively.
 14. If indicated, new values will be submitted to the Florid Building Code as proposed code changes.

Respectfully submitted,



Joseph D. Belcher, Code Consultant

Cc. Frank Browning, IHPA President
Tom Johnston, Immediate Past President