Structural Support
1212 Main Street
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August 17, 2010

Homeowners
Sun City Hilton Head
Bluffton SC 29910

Attached report describes engineering evaluation of the design of connections between so-called "valley" roof trusses and the underlying main roof trusses for houses in the Sun City Hilton Head development.

I am a professional engineer, licensed in South Carolina, with extensive experience in structural design and analysis for residential buildings.

This evaluation has been performed independently, without any request from any party.

Initial distribution of the report (hardcopy) is being made to several persons directly involved. The report will most likely be available from the Structural Support web site in the near future (www.structural101.com).

Evaluation is focused on design capacity of valley truss connections specified on available building design plans prepared by engineer for the builder.

For roof framing design at Sun City, it is reasonable to conclude that design capacity of valley truss connections made with two 12-penny (12d) nails is much less than required capacity for wind pressures specified by the governing building code.

Design capacity (also known as "allowable" capacity) is less than "failure" capacity. This key issue is addressed in the report.

Determination (via calculation) of connection design capacity and required uplift capacity (wind force) is subject to some "engineering judgment" due to actual conditions that do not conform with standard conditions forming the basis for standard code provisions. Conservative design is warranted considering uncertainties with non-standard conditions as well as risk of severe damage during a hurricane if valley truss connections fail. However, basic conclusions remain intact even when more liberal assumptions are used.

Problems with as-built construction are discussed briefly, and only in general. Details of as-installed truss connections have been provided by Tony Kunich of Professional Home Inspections (PHI). Of course design deficiencies plus construction defects equal high risk for severe structural damage in the future.

Connections made with one 10 gage x 3-1/2 inch wood screw may have adequate design capacity, but only if wood members are not already damaged by nails.

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