



## Lay-On Gable Frame Connection: An Analysis of a Toe Nail Connection Visible after Sheathing is Installed

DD No. 1505-02

### Structural Building Components Association (SBCA)

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#### 1. General Notes:

- 1.1. Roof uplift loading is determined using *ASCE 7-10*.
- 1.2. Connection capacity of fasteners is determined in accordance with *2015 National Design Specification for Wood Construction*.

#### 2. Trusses:

- 2.1. Trusses are assumed to be a maximum of 24" o.c. and the lay-on gable frame members are a maximum of 24" o.c.
  - 2.1.1. Layout shows both the connection location under analysis as well as the tributary area of that connection.
  - 2.1.2. The connection point represents the worst-case location of a typical layout based on the largest tributary area.

#### 3. Capacity:

- 3.1. Connection into lay-on gable is made with (4) 0.131 x 3.25" nails toe nailed at each lay-on gable web location.
  - 3.1.1. Nails are toenailed at 70° angle from the vertical.
- 3.2. Connection into hip truss is made with (1) 0.131 x 3.25" nail spaced at 12" o.c.
- 3.3. Roof slope may be  $4/12 \leq \theta \leq 12/12$  ( $18^\circ \leq \theta \leq 45^\circ$ ). Upper and lower bounds are considered to ensure the required capacity is available throughout the range.

The seal on this design drawing indicates acceptance of professional engineering responsibility solely for the component(s) depicted. The design assumptions, loading conditions, suitability and use of this component for any particular building is the responsibility of the building designer or owner of the components, per *ANSI/TPI 1*. The responsibilities and duties of the component designer, component design engineer and component manufacturer shall be in accordance with the latest edition of *ANSI/TPI 1* Chapter 2 unless otherwise defined by a contract agreed upon by the parties involved.

DrJ Design Detail

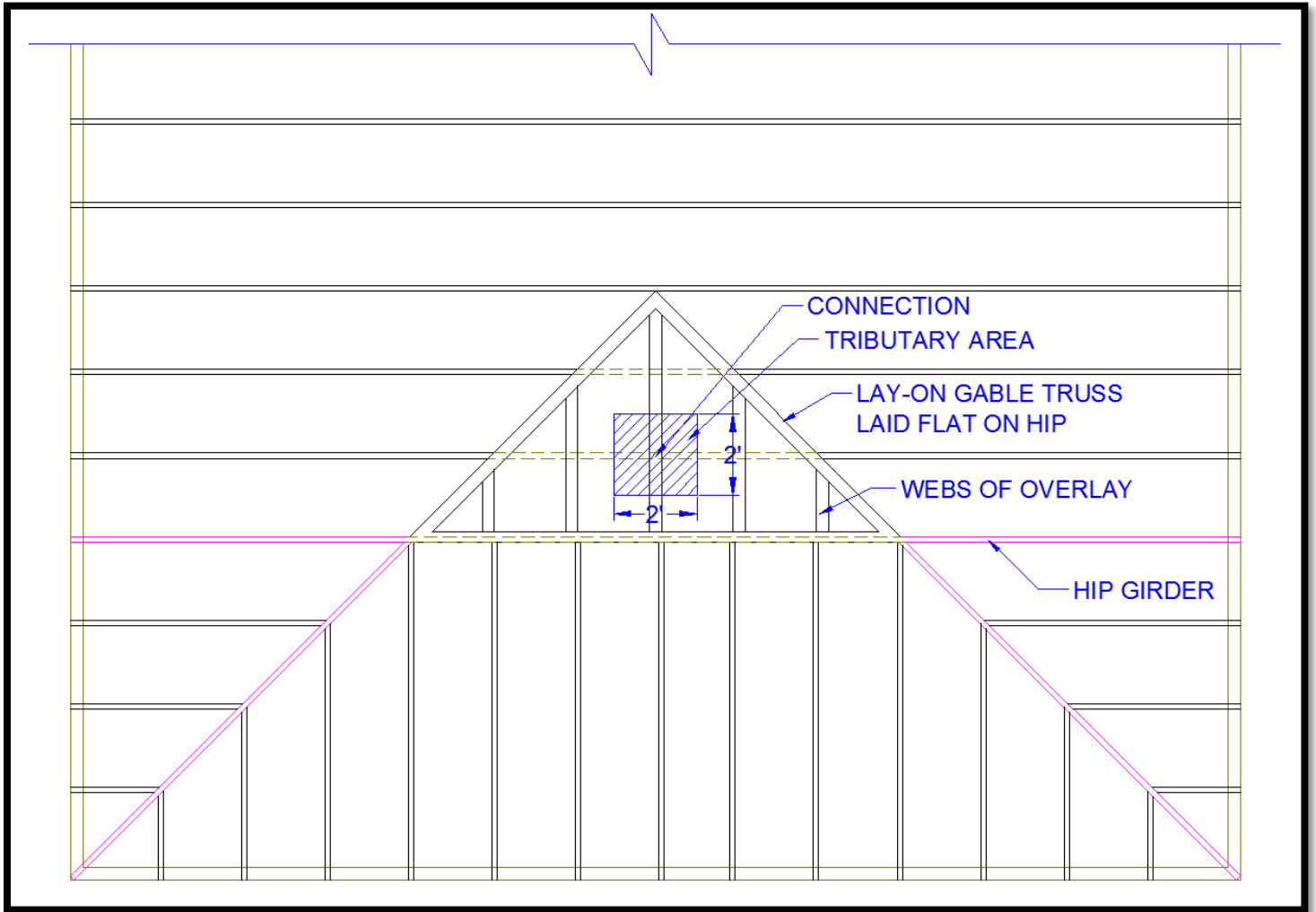


Figure 1: Truss Layout

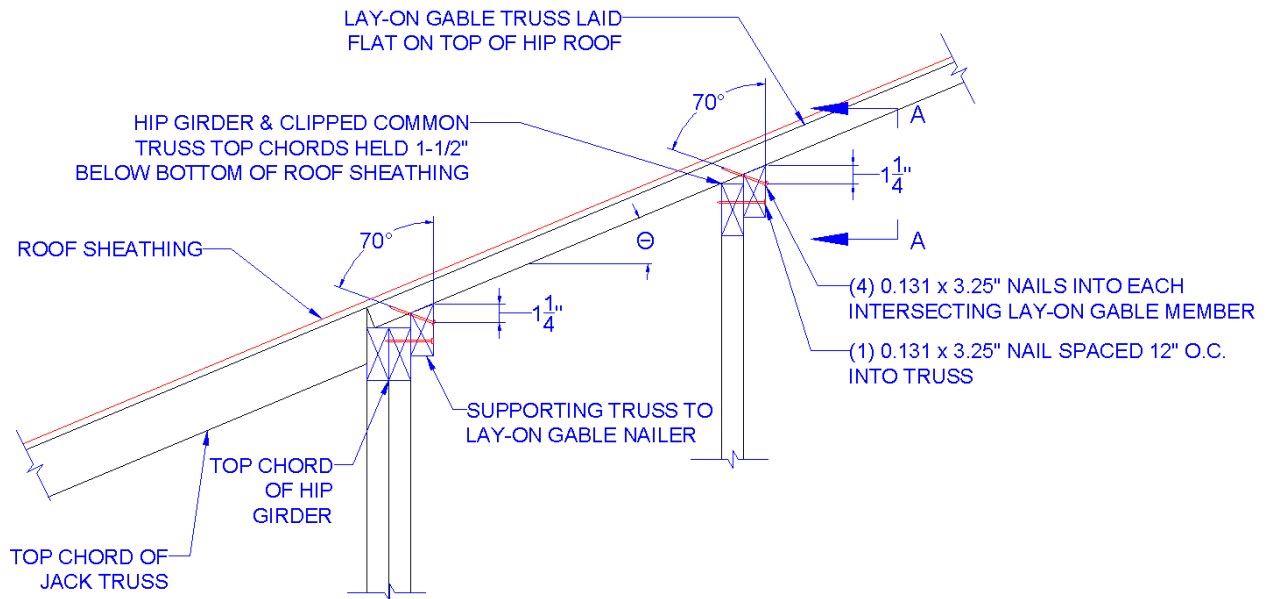
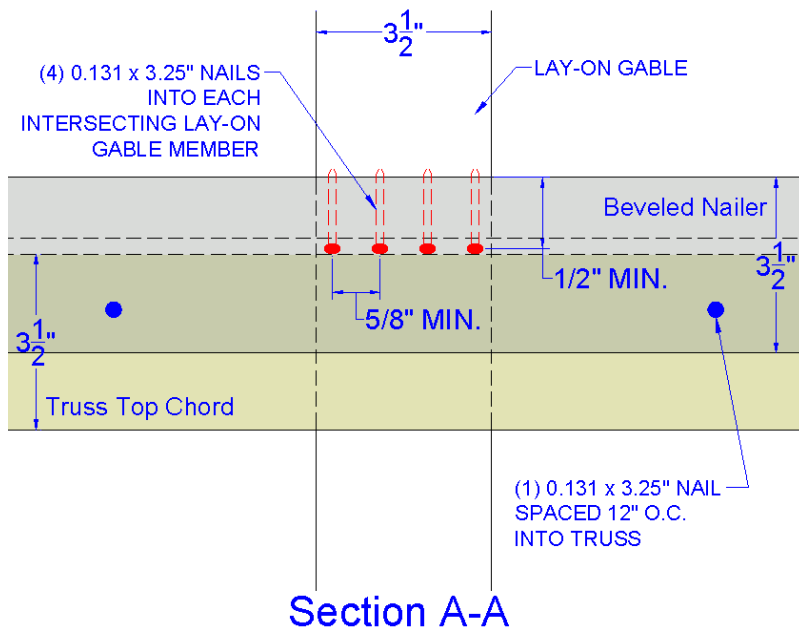


Figure 2: Connection Details

## DrJ Design Detail

Minimum Fastener & Edge Distances Minimums			
Supporting Truss			
Description	Description	Description	Description
Edge Distance	NDS Table 11.5.1C Perpendicular to Grain Loaded Edge	4D	$4 \times (0.131") = \frac{1}{2}"$
Spacing Between Rows	NDS Table 11.5.1D Perpendicular to Grain $L/D=11 > 6$	5D	$5 \times (0.131") = \frac{5}{8}"$
Lay-On Gable			
Description	Reference	Value	Calculated
Edge Distance	NDS Table 11.5.1C Parallel to Grain $L/D=11 > 6$	1.5D	$1.5 \times (0.131") = \frac{3}{16}"$
Spacing Between Rows	NDS Table 11.5.1D Parallel to Grain	Max of 1.5D and $\frac{1}{2}$ spacing between rows	$1.5 \times (0.131") = \frac{3}{16}"$ $0.5 \times (0.655") = \frac{5}{16}"$

**Table 1:** Fastener Spacing & Edge Distance Minimums



**Figure 3:** Visualization of Fastener Spacing & Edge Distances

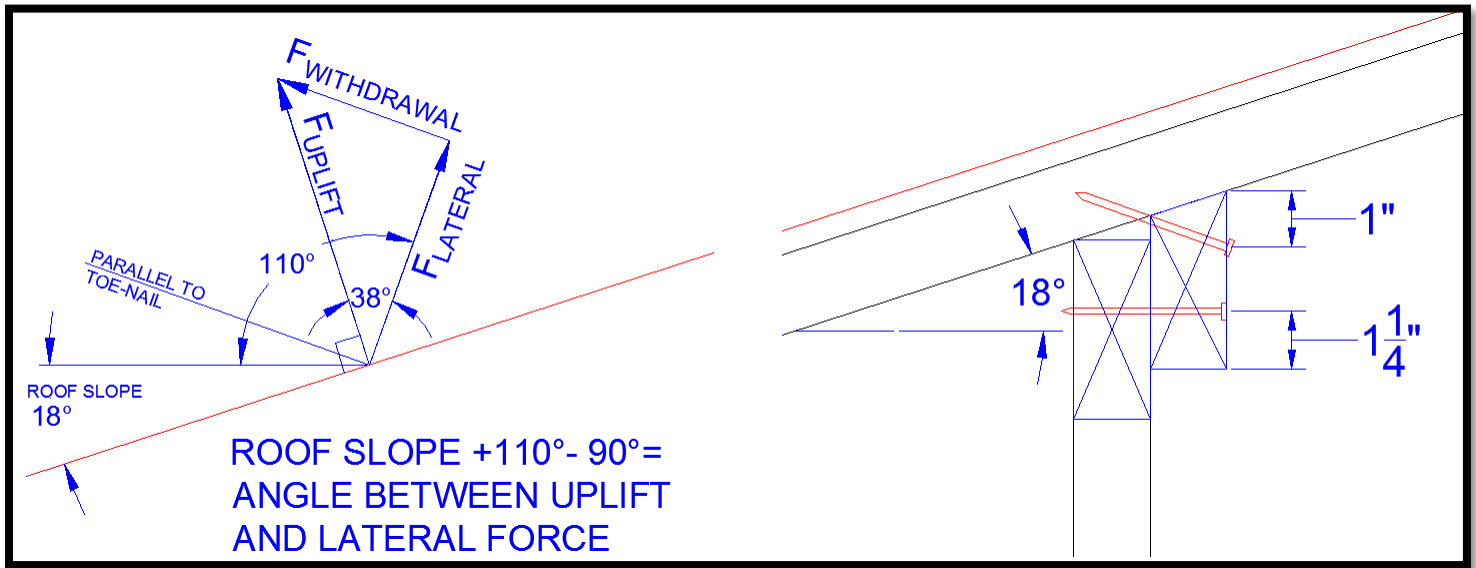


Figure 4: Visualization of Pure Withdrawal & Pure Lateral Loading