



**CERTIFICATION**



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## **Technical Evaluation Report**

### **TER 1011-04**

Trussway Truss Reaction & Bearing  
Capacities for Proprietary Top Chord  
Bearing Floor Trusses

**Trussway Industries, LLC**

#### **Product:**

**Proprietary truss reaction and  
bearing capacities as tested and  
analyzed**

Issue Date:

April 24, 2012

Revision Date:

September 5, 2019

Subject to Renewal:

April 1, 2020

For the most recent version or a sealed copy of this Technical Evaluation Report (TER), visit [drjcertification.org](http://drjcertification.org).



## Technical Evaluation Report (TER)

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Trussway Industries, LLC

9411 Alcorn St  
Houston, TX 77093-6753  
713-691-6900 (office)  
713-691-2064 (fax)  
[trussway.com](http://trussway.com)

### DIVISION: 06 00 00 – WOOD, PLASTICS, AND COMPOSITES

Section: 06 02 00 – Design Information

Section: 06 05 23 – Wood, Plastic, and Composite Fastenings

Section: 06 11 00 – Wood Framing

Section: 06 17 00 – Shop-Fabricated Structural Wood

Section: 06 17 53 – Shop-Fabricated Wood Trusses

#### 1. Product Evaluated:

- 1.1. Proprietary truss reaction and bearing capacities as tested and analyzed.
- 1.2. For the most recent version of this Technical Evaluation Report (TER), visit [drjengineering.org](http://drjengineering.org). For more detailed state professional engineering and code compliance legal requirements and references, visit [drjengineering.org/statelaw](http://drjengineering.org/statelaw). DrJ is fully compliant with all state professional engineering and code compliance laws.
- 1.3. This TER can be used to obtain product approval in any country that is an IAF MLA Signatory (all countries found [here](#)) and covered by an [IAF MLA Evaluation](#) per the [Purpose of the MLA](#) (as an example, see [letter to ANSI](#) from the Standards Council of Canada). Manufacturers can go to jurisdictions in the U.S., Canada and other [IAF MLA Signatory Countries](#) and have their products readily approved by authorities having jurisdiction using [DrJ's ANSI accreditation](#).
- 1.4. Building code regulations require that evaluation reports are provided by an approved agency meeting specific requirements, such as those found in [IBC Section 1703](#). Any agency accredited in accordance with ANSI ISO/IEC 17065 meets this requirement within ANSI's scope of accreditation. For a list of accredited agencies, visit ANSI's [website](#). For more information, see [drjcertification.org](http://drjcertification.org).
- 1.5. Requiring an evaluation report from a specific private company (i.e. ICC-ES, IAPMO, CCMC, DrJ, etc.) can be viewed as discriminatory and is a violation of international, federal, state, provincial and local anti-trust and free trade regulations.
- 1.6. DrJ's code compliance work:
  - 1.6.1. Conforms to code language adopted into law by individual states and any relevant consensus based standard such as an ANSI or ASTM standard.
  - 1.6.2. Complies with accepted engineering practice, all professional engineering laws and by providing an engineer's seal DrJ takes professional responsibility for its specified scope of work.

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### 2. Applicable Codes and Standards:<sup>1</sup>

- 2.1. 2012, 2015 and 2018 International Residential Code (IRC)
- 2.2. 2012, 2015 and 2018 International Building Code (IBC)
- 2.3. ANSI/TPI 1 – National Design Standard for Metal Plate Connected Wood Truss Construction

### 3. Performance Evaluation:

- 3.1. Trussway has undertaken top chord bearing reaction tests on its proprietary floor truss connection details to provide improved floor truss end reaction capacities.
  - 3.1.1. This testing provides the data needed to update *ANSI TPI 1* Table 7.4-1 Top Chord and Intermediate-Height Bearing Limits, for proprietary use as defined herein.
  - 3.1.2. These end reaction limits are for use by Trussway's engineering department exclusively.
    - 3.1.2.1. The limits are based on the design methods developed through testing and analysis.
  - 3.1.3. Trussway floor truss design will be performed using the methods found in *ANSI/TPI 1* and the tested performance methods as appropriate.
- 3.2. Any code compliance issues not specifically addressed in this section are outside the scope of this TER.
- 3.3. The design and manufacture of wood floor trusses follows the requirements defined in *ANSI/TPI 1* as referenced by [IBC Chapter 35](#) and [IRC Chapter 44](#).
- 3.4. *IBC* Chapter 23 – Wood
  - 2303.4 Trusses.
    - [2303.4.1 Design](#). Wood trusses shall be designed in accordance with the provisions of this code and accepted engineering practice. Members are permitted to be joined by nails, glue, bolts, timber connectors, metal connector plates or other *approved* framing devices.
    - [2303.4.6 TPI 1 specifications](#). In addition to Sections 2303.4.1 through 2303.4.5, the design, manufacture and quality assurance of metal-plate-connected wood trusses shall be in accordance with TPI 1. Job-site inspections shall be in compliance with Section 110.4, as applicable.
- 3.5. *IRC* Chapter 5 – Floors
  - R502.11 Wood trusses.
    - [R502.11.1 Design](#). Wood trusses shall be designed in accordance with *approved* engineering practice. The design and manufacture of metal-plate-connected wood trusses shall comply with *ANSI/TPI 1*. The truss design drawings shall be prepared by a registered professional where required by the statutes of the *jurisdiction* in which the project is to be constructed in accordance with Section R106.1.

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<sup>1</sup> Unless otherwise noted, all references in this code compliant technical evaluation report (TER) are from the 2015 version of the codes and the standards referenced therein, including, but not limited to, *ASCE 7*, *SDPWS* and *WFCM*. This product also complies with the 2000-2012 and 2018 versions of the *IBC* and *IRC* and the standards referenced therein. As required by law, where this TER is not approved, the building official shall respond in writing, stating the reasons this TER was not approved. For variations in state and local codes, if any see [Section 8](#).

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### 4. Product Description and Materials:

4.1. A Trussway top chord bearing floor truss is individually described on a truss design drawing (TDD).

### 5. Applications:

5.1. Allowable Trussway Floor Truss Reactions ([Table 1](#), [Table 2](#), [Figure 1](#), [Figure 2](#), [Figure 3](#), [Figure 4](#))

*ANSI TPI 1 Section 7.4.2 Top Chord Bearing Parallel Chord Trusses.*

Top Chord bearing parallel chord Trusses with a gap between the inside of the bearing and the first diagonal or vertical web exceeding ½ in. (13 mm) shall be designed considering effects of shear and bending on the extended chord. In all cases involving gaps that are equal to or less than ½ in. (13 mm) on Top Chord bearing Trusses and for intermediate-height bearing Trusses, reaction at the bearings shall not exceed the limits shown in Table 7.4-1 for the configurations shown, unless otherwise established by test or alternate analysis method.

Table 1: Alternate Table 7.4-1 Top Chord & Intermediate-Height Bearing Limits for Trussway Floor Trusses							
Bearing Detail Figures 1-3	Number of Top Chords	End Vertical Web	Top Chord	Maximum Allowable R (lbs.)	A	B	C
7.4-1 (a)	1	1	4x2	600	½"	1/8"	1/8"
Trussway 7.4-1 (a)	2	0	4x2	1,000	1½"	–	–
7.4-1 (b)	2	1	4x2	1,600	½"	1/8"	1/8"
7.4-1 (b)	2	1	3x2	1,150	½"	1/8"	1/8"
7.4-1 (c)	2	0	4x2	1,600	½"	1/8"	1/8"
7.4-1 (c)	2	0	3x2	1,150	½"	1/8"	1/8"
7.4-1 (d)	2	0	4x2	1,600	½"	–	1/8"
Trussway 7.4-1 (d)	2	0	4x2	2,000	1½"	–	–
7.4-1 (d)	2	0	3x2	1,150	½"	–	1/8"

Table 2: Top Chord & Intermediate-Height Bearing Limits for 45° Bearing Wall Conditions for Trussway Floor Trusses								
Bearing Detail Figure 4	Number of Top Chords	End Vertical Web	Top Chords	Maximum Allowable R (lbs.)	A	A2	B	C
Trussway 7.4-1 (a) (AB)	2	0	4x2	1,000	½"	4"	–	–
Trussway 7.4-1 (d) (AB)	2	0	4x2	1,700	½"	4"	–	–

Figure 1: Trussway Alternative Bearing Detail (left) & TPI 1 Figure 7.4-1(a) (right)

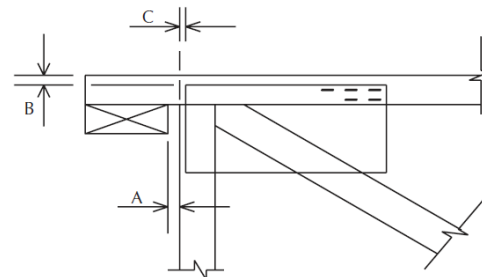
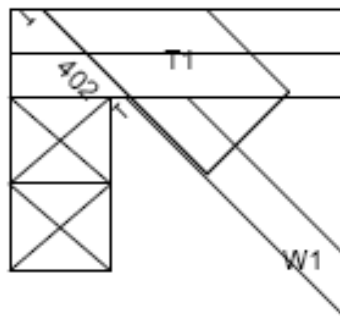


Figure 7.4-1(a)

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Figure 2: TPI 1 Figure 7.4-1(b) & Figure 7.4-1(c)

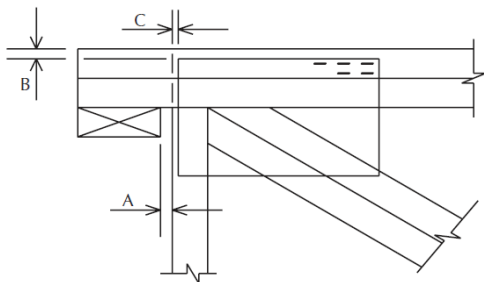


Figure 7.4-1(b)

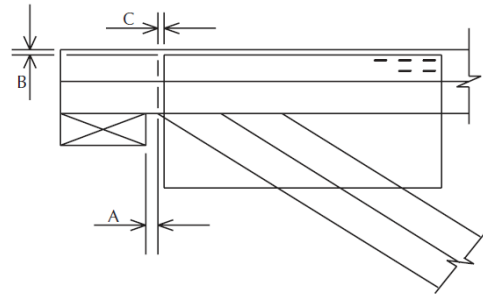


Figure 7.4-1(c)

Figure 3: Trussway Alternative Bearing Detail (left) & TPI 1 Figure 7.4-1(d) (right)

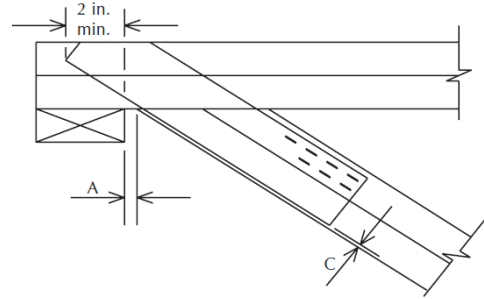
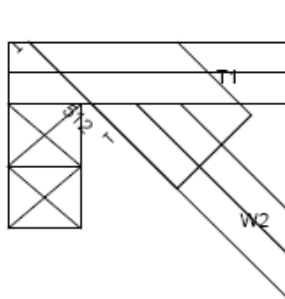
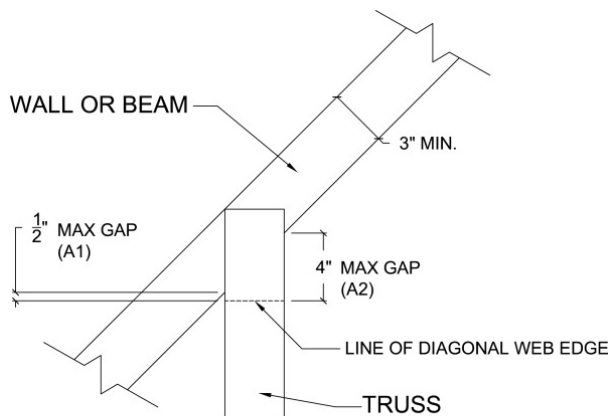


Figure 7.4-1(d)

Figure 4: Trussway Alternative Angled Bearing Detail

Angle can be varied as long as the maximum A1 gap is 1/2" & A2 gap is 4", or A1 is 4" & A2 is 1/2".



**PLAN VIEW - ANGLE CUT  
PLATE DETAIL  
(45° BEARING WALL)**

## Technical Evaluation Report (TER)

### 5.2. Truss Availability

- 5.2.1. Trussway proprietary and custom floor trusses are available in numerous configurations with spans, depths and spacing designed specifically for a given project.
- 5.2.2. This application will be defined and shown on the Trussway TDD.

### 5.3. Structural Applications

- 5.3.1. Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience and technical judgment.

## 6. Installation:

- 6.1. Installation shall comply with the manufacturer's installation instructions, TDDs and this TER. In the event of a conflict between the manufacturer's installation instructions and this TER, the more restrictive shall govern.
- 6.2. A copy of the Trussway TDDs and any related installation details shall be available at all times on the jobsite during installation.
- 6.3. Overall design, installation and performance of Trussway floor trusses is outside the scope of this TER.

## 7. Test and Engineering Substantiating Data:

- 7.1. Testing undertaken at the SBC Research Institute (SBCRI), under contract with Qualtim, Inc., including additional calculations and analysis.
- 7.2. The product(s) evaluated by this TER fall within the scope of one or more of the model, state or local building codes for building construction. The testing and/or substantiating data used in this TER is limited to buildings, structures, building elements, construction materials and civil engineering related specifically to buildings.
- 7.3. The provisions of model, state or local building codes for building construction do not intend to prevent the installation of any material or to prohibit any design or method of construction. Alternatives shall use consensus standards, performance-based design methods or other engineering mechanics based means of compliance. This TER assesses compliance with defined standards, accepted engineering analysis, performance-based design methods, etc. in the context of the pertinent building code requirements.
- 7.4. Some information contained herein is the result of testing and/or data analysis by other sources, which DrJ relies on to be accurate, as it undertakes its engineering analysis.
- 7.5. DrJ has reviewed and found the data provided by other professional sources are credible. The information in this TER conforms with DrJ's procedure for acceptance of data from approved sources.
- 7.6. DrJ's responsibility for data provided by approved sources conforms with [IBC Section 1703](#) and any relevant professional engineering law.
- 7.7. Where appropriate, DrJ's analysis is based on design values that have been codified into law through codes and standards (e.g., IRC, WFCM, IBC, SDPWS, NDS, ACI, AISI, PS-20, PS-2, etc.). This includes review of code provisions and any related test data that aids in comparative analysis or provides support for equivalency to an intended end-use application. Where the accuracy of design values provided herein is reliant upon the published properties of commodity materials (e.g. lumber, steel, concrete, etc), DrJ relies upon grade/properties provided by the raw material supplier to be accurate and conforming to the mechanical properties defined in the relevant material standard.

## 8. Findings:

- 8.1. When used in accordance with this TER and a Trussway TDD, the details herein comply with the requirements for the design and manufacture of wood floor trusses as defined in *ANSI/TPI 1* and referenced by [IBC Section 2303.4](#) and [IRC Section R502.11](#).

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- 8.2. [IBC Section 104.11](#) ([IRC Section R104.11](#) and [IFC Section 104.9](#) are similar) states:

104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code. ... Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons the alternative was not *approved*.

- 8.3. This product has been evaluated in the context of the codes listed in [Section 2](#), and is compliant with all known state and local building codes. Where there are known variations in state or local codes that are applicable to this evaluation, they are listed here:

8.3.1. No known variations

- 8.4. This TER uses professional engineering law, the building code, ANSI/ASTM consensus standards and generally accepted engineering practice as its criteria for all testing and engineering analysis. DrJ's professional engineering work falls under the jurisdiction of each state Board of Professional Engineers, when signed and sealed.

### 9. Conditions of Use:

- 9.1. Where required by the authority having jurisdiction (AHJ) in which the project is to be constructed, this TER and the installation instructions shall be submitted at the time of permit application.
- 9.2. Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the code official for review and approval.
- 9.3. Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed and/or by the Building Designer (e.g., Owner, Registered Design Professional, etc.).
- 9.4. When installed in accordance with this TER, Trussway floor truss end reactions are rated for allowable load carrying capacities as defined in this report.
- 9.5. Trussway floor truss end reactions may be used as part of a fire-resistance-rated assembly in accordance with the fire assembly details and all local building code requirements.
- 9.6. Trussway TDDs, truss placement diagrams (TPDs) and any related installation instructions shall be shipped to the jobsite with the Trussway trusses or otherwise be available on the jobsite for inspection.
- 9.7. Trussway trusses are manufactured in Houston, Texas; Fort Worth, Texas; Fountain, Colorado; Orlando, Florida; Fredericksburg, Virginia; and Acworth (Cartersville), Georgia under a quality control program with quality control inspections in accordance with *TPI 1 - 2014* Section 3.1 and 3.2.
- 9.8. Design
- 9.8.1. Building Designer Responsibility
- 9.8.1.1. Unless the AHJ allows otherwise, the Construction Documents shall be prepared by a Building Designer for the Building and shall be in accordance with [IRC Section R106](#) and [IBC Section 107](#).
- 9.8.1.2. The Construction Documents shall be accurate and reliable and shall provide the location, direction and magnitude of all applied loads and shall be in accordance with [IRC Section R301](#) and [IBC Section 1603](#).
- 9.8.2. Construction Documents
- 9.8.2.1. Construction Documents shall be submitted to the Building Official for approval and shall contain the plans, specifications and details needed for the Building Official to approve such documents.

## Technical Evaluation Report (TER)

### 9.9. Responsibilities

- 9.9.1. The information contained herein is a product, material, detail, design and/or application TER evaluated in accordance with the referenced building codes, testing and/or analysis through the use of accepted engineering practice, experience and technical judgment.
- 9.9.2. DrJ TERs provide an assessment of only those attributes specifically addressed in the Products Evaluated or Code Compliance Process Evaluated sections.
- 9.9.3. The engineering evaluation was performed on the dates provided in this TER, within DrJ's professional scope of work.
- 9.9.4. This product is manufactured under a third-party quality control program in accordance with [/IRC Section R104.4](#) and [R109.2](#) and [/IBC Section 104.4](#) and [110.4](#).
- 9.9.5. The actual design, suitability and use of this TER, for any particular building, is the responsibility of the Owner or the Owner's authorized agent, and the TER shall be reviewed for code compliance by the Building Official.
- 9.9.6. The use of this TER is dependent on the manufacturer's in-plant QC, the ISO/IEC 17020 third-party quality assurance program and procedures, proper installation per the manufacturer's instructions, the Building Official's inspection and any other code requirements that may apply to demonstrate and verify compliance with the applicable building code.

### 10. Identification:

- 10.1. Each Trussway floor truss covered by this TER shall be identified on the TDD and/or the TPD with the truss type using proprietary end reactions.
- 10.2. Additional technical information can be found at [trussway.com](http://trussway.com).

### 11. Review Schedule:

- 11.1. This TER is subject to periodic review and revision. For the most recent version of this TER, visit [drjengineering.org](http://drjengineering.org).
- 11.2. For information on the current status of this TER, contact [DrJ Engineering](#).



- [Mission and Professional Responsibilities](#)
- [Product Evaluation Policies](#)
- [Product Approval – Building Code, Administrative Law and P.E. Law](#)