

Technical Q & A

Determining & Verifying Truss Repairs

by Ryan J. Dexter, PE.

Understand who is responsible for Repair Details when dealing with a damaged or altered truss.

Many of the questions we receive at WTCA are focused around typical scope of work issues. Often these questions are from building departments asking about standard design responsibilities. That is one of the many reasons why the metal plate connected wood truss industry's design standard, *ANSI/TPI 1*, contains an entire chapter devoted to this issue—Chapter 2. The following question involves verification that Repair Details were followed to repair damaged trusses.

Question

I am a building inspector who often encounters trusses that have been repaired due to damage, jobsite modifications or installation errors. How are the Repair Details determined and who is responsible for making sure the repairs are done correctly?

Answer

Sophisticated software is used to design metal plate connected wood trusses to withstand loads specified by the Building Designer congruent with the governing building code and transfer these loads throughout the truss members into the bearings, which eventually take that load into the foundation. Truss Design Drawings are included with the truss packages and indicate the maximum forces passed through the different members of the truss for the load conditions considered in the design of the truss. When a truss member is damaged, the anticipated flow of loads through the truss is disrupted, and that load must be resisted by another member(s). Thus, adjacent truss members can quickly become overloaded if a truss is damaged or altered. If a truss is damaged or altered it must be either replaced or repaired. In most cases, the truss can easily be repaired in service.

There are no standard Repair Details available to cover every situation because the extent and location of damage, the magnitude and direction of forces, and the truss configurations are different for every case. However, there are typical ways in which a repair is specified. Truss designers most often specify plywood or OSB gussets over damaged plates or joints, metal nail-on plates, lumber scabs or repair frames over broken chords or webs, or truss plates applied by a portable press. The size of the repair, and the location and number of fasteners is what is engineered based upon the given loads and forces. The *National Design Specification® for Wood Construction (NDS®)*, published by the American Wood Council of the American Forest and Paper Association (AF&PA), is the primary resource for fastener design values in wood. This, together with the *NDS Supplement* for lumber, which provides the lumber design values, is what is used to prepare the proper engineered Repair Details.

There must be a specific signed and sealed Repair Detail for each and every damaged or altered truss. If the Repair Detail is followed exactly, the truss will perform to its original intended capacity. In other words, the truss as repaired will be just as strong as any undamaged or unaltered truss.

ANSI/TPI 1-2002, as adopted by reference in the 2006 International Building Code® (IBC) [i.e., Sections 101.2, 2303.4, and Chapter 35 "Reference Standards"], states in part:

2.6.3 ...In the event of such damage and unless otherwise specified by Contract, the

Contractor shall contact the appropriate design professional to determine an adequate field repair and the Contractor shall be responsible to construct any such field repair.

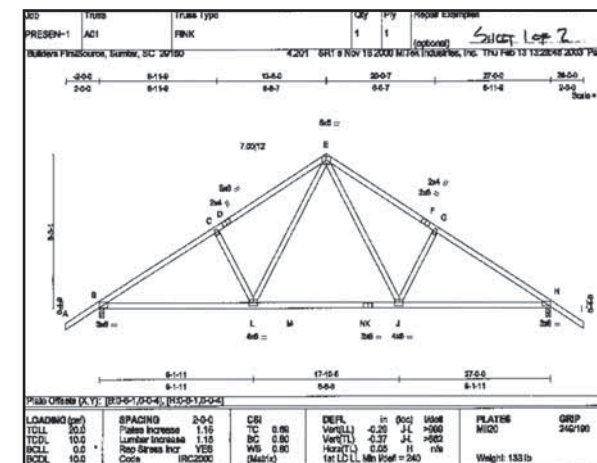
The latest draft of ANSI/TPI 1-2007 (which is currently undergoing Public Comment) states:

2.5.3.6 Truss Damage Responsibilities. In the event of damage, unless otherwise specified by Contract, the Contractor shall:

- (1) Contact the Building Designer or Truss Designer to determine an adequate field repair, and
- (2) Have all Truss repair designs approved in writing by the Building Designer or Truss Designer prior to the construction of the repair.
- (3) Be responsible to construct any such field repair consistent with the instructions and details provided.

According to our industry standard design responsibilities, the Contractor needs to obtain a Repair Detail and construct the repair exactly as stated by the Building Designer or Truss Designer. Building Officials should be provided with the

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Sample Repair Detail to repair a truss after it was shortened four inches (courtesy of BCSI-B5: Truss Damage, Jobsite Modifications & Installation Errors)

Key Industry Definitions from ANSI/TPI 1

Building Designer:

Owner of the Building or the person that contracts with the Owner for the design of the Framing Structural System and/or who is responsible for the preparation of the Construction Documents. When mandated by the Legal Requirements, the Building Designer shall be a Registered Design Professional.

Building Official:

Officer or other designated authority charged with the administration and enforcement of the Building Code, or a duly authorized representative.

Contract:

Legally recognized agreement between two parties.

Contractor:

Owner of a Building, or the person who contracts with the Owner, who constructs the Building in accordance with the Construction Documents and the Truss Submittal Package. The term "Contractor" shall include those subcontractors who have a direct contract with the Contractor to construct all or a portion of the construction.

Repair Detail:

A written, graphic or pictorial depiction of the required fix to an altered or damaged component or part.

Truss Design Drawing:

Written, graphic and pictorial depiction of an individual Truss that includes the information required in ANSI/TPI 1.

Truss Designer:

Person responsible for the preparation of the Truss Design Drawings.

Truss Manufacturer:

Person engaged in the fabrication of Trusses.

at a glance

- ❑ When a truss member is damaged, the anticipated flow of loads through the truss is disrupted, and that load must be resisted by another member(s). Thus, adjacent truss members can quickly become overloaded if a truss is damaged or altered.
- ❑ There are no "standard" Repair Details available to cover every situation.
- ❑ If the Repair Detail is followed exactly, the truss will perform to its original intended capacity.
- ❑ Therefore, any provisions concerning the implementation and/or verification of truss repairs by the Truss Manufacturer/Truss Designer must be agreed to ahead of time during the initial contracting process.

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Repair Detail and it should be reviewed and verified in the same manner as with a Truss Design Drawing.

It is possible to have someone other than the Contractor and Building Inspector construct and verify that truss repairs. A Design/Build firm or the Truss Manufacturer/Truss Designer could be contracted to come to the jobsite to perform the repair and verify the repairs were done properly. Getting paid for this work can be a point of contention, since the cost associated with the repair construction and verification can be high. If, however, a special repair provision is provided in the permit application and is then known up front, the responsibility of verifying truss repairs can be written into the contract. The typical scope of work for a Truss Manufacturer/Truss Designer includes the design of repairs, if needed, but not the construction and verification of those repairs.

Therefore, any provisions concerning the implementation and/or verification of truss repairs by the Truss Manufacturer/Truss Designer must be agreed to ahead of time during the initial contracting process. **SBC**

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www.sbcmag.info • admgr@sbcmag.info