

SECTION 06 1753 - SHOP-FABRICATED WOOD TRUSSES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Shop fabricated wood trusses for roof and floor framing.
- B. Bridging, bracing, and anchorage.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Installation requirements for miscellaneous framing.
- B. Section 06 1000 - Rough Carpentry: Material requirements for blocking, bridging, plates, and miscellaneous framing.
- C. Section 06 1000 - Rough Carpentry: roof and floor sheathing.

1.03 REFERENCE STANDARDS (LATEST EDITION)

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- B. TPI 1 - National Design Standard for Metal Plate Connected Wood Truss Construction; Truss Plate Institute.
- C. TPI DSB - Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses; Truss Plate Institute.
- D. TPI BCSI – Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses.
- E. WWPA G-5 - Western Lumber Grading Rules; Western Wood Products Association.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on plate connectors, bearing plates, and metal bracing components.
- C. Shop Drawings: Show truss configurations, sizes, spacing, size and type of plate connectors, cambers, framed openings, bearing and anchor details, and bridging and bracing. Show location, pitch, span, camber configuration, and spacing for each type of truss required. Indicate sizes, stress grades, and species of lumber. Indicate locations, sizes, and material for permanent bracing required to prevent buckling of individual truss members due to design loads. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates. Provide splice details and bearing details.
 - 1. Include identification of engineering software used for design.
 - 2. Provide shop drawings and design calculations stamped and sealed by design engineer.

- D. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- E. Qualification Data: For fabricator.
- F. Material Certificates: For dimensional lumber specified to comply with minimum specific gravity. Indicate species and grade selected for each use and specific gravity.

1.05 QUALITY ASSURANCE

- A. Designer Qualifications: Perform comprehensive engineering design and prepare shop drawings by or under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.
- B. Fabricator Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience. A manufacturer that is a member of TPI, that complies with quality-control procedures in TPI 1 and that involves third-party inspection by an independent testing and inspecting agency acceptable to Engineer and authorities having jurisdiction.
 - 1. Fabricator's responsibilities include providing professional engineering services needed to assume engineering responsibility.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Handle and store trusses in accordance with TPI BCSI 1.
- B. Store trusses flat, off of ground, and adequately supported to prevent lateral bending. Protect trusses from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.
- C. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

1.07 COORDINATION

- A. Coordinate installation of metal-web joists that are anchored to or that receive other work. Furnish setting drawings, templates, and instructions for anchorage installation, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 PRODUCTS

2.01 TRUSSES

- A. Delegated Design: Engage a qualified professional engineer to design metal-plate-connected wood trusses.
- B. Wood Trusses: Designed and fabricated in accordance with TPI 1 and TPI DSB-89 to achieve structural requirements indicated.
 - 2. Connectors: Steel plate.
 - 3. Structural Design: Comply with applicable code for structural loading criteria and load indicated on Plans.

4. Floor Deflection: For spans less than 20 feet; vertical deflection of 1/240 and 1/360 of spans for total load and live load, respectively. For spans 20 feet or greater; vertical deflection of 1/480 of spans for total load.
 5. Roof Deflection: Vertical deflection of 1/240 and 1/360 of spans for total load and live load, respectively.
- C. Minimum Chord Size for Roof Trusses:
1. Bottom Chord to be 2x6 inches nominal minimum for spans 36 feet or greater.
 2. Top Chord to be 2x6 inches nominal minimum for spans 40 feet or greater.
- D. Comply with applicable requirements and recommendations of the following.
1. TPI 1 - National Design Standard for Metal Plate Connected Wood Truss Construction.
 2. TPI DSB - Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses; Truss Plate Institute.
 3. TPI BCSI – Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses.
 4. Wood Structural Design Standard: Comply with applicable requirements in AF&PA’s “National Design Specifications for Wood Construction” and its “Supplement”.
- E. Manufacturer shall supply trusses, bridging, hangers, blocking and other accessories necessary for the proper erection and performance of metal-plate-connected wood trusses.
- F. Manufacturer shall inspect all trusses, beams, bridging, hangers, blocking and other accessories necessary for the proper erection and performance of metal-plate-connected wood trusses.

2.02 MATERIALS

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Moisture Content: Provide dry lumber with 19 percent maximum moisture content at time of dressing.
 2. Lumber fabricated from old growth timber is not permitted.
 3. Factory mark each piece of lumber with grade stamp of grading agency.
 4. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
 5. Provide dressed lumber, S4S.
- B. Steel Connectors: Hot-dipped galvanized steel sheet, ASTM A653/A653M Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A) or Type B (HSLAS Type B), Grade 33/230, with G60 coating; die stamped with integral teeth; thickness as required by design, and not less than 0.036 inch thick.
1. Obtain steel connectors plates from single manufacturer.
 2. Fabricate connector plates to comply with TPI 1.
- C. Truss Bridging: Type, size and spacing recommended by truss manufacturer.
- D. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 061000 “Rough Carpentry”.

2.03 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacturer.

1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
 2. Where trusses are exposed to weather, in ground contact, made from pressure-preservative treated wood, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153.
- B. Nails, Brads, and Staples: ASTM F1667.

2.04 METAL FRAMING ANCHORS AND ACCESSORIES

- A. Manufacturer: Subject to compliance with requirements, available manufacturers offering products that may be incorporated in to the Work include, but are not limited to, the following:
1. Simpson Strong-Tie Company, Inc.
- B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653, G60 coating designation.
- D. Truss Tie-Downs: Bent strap tie for fastening trusses to wall studs below. Tie fastens to one side of truss and top plate.
- E. Truss Clips: Angle clips for bracing bottom chord of trusses at non-load-bearing walls, 1-1/4 inches wide by 0.050 inch thick. Clip is fastened to truss through slotted holes to allow for truss deflection.

2.05 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: SSPC-Paint 20, with dry file containing a minimum of 94 percent zinc dust by weight.

2.06 FABRICATION

- A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.
- B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.
- C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
- D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.
- E. Verify weights and locations of concentrated loads from mechanical units, mechanical piping or ducting, electrical units, folding partitions and other concentrated loads prior to truss fabrication.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that supports and openings are ready to receive trusses.

3.02 PREPARATION

- A. Coordinate placement of bearing items.

3.03 ERECTION

- A. Install trusses in accordance with manufacturer's instructions and TPI DSB-89 and TPI BCSI 1; maintain a copy of each TPI document on site until installation is complete.
- B. Install wood trusses only after supporting construction is in place and is braced and secured.
- C. If trusses are delivered to Project Site in more than one piece, assemble trusses before installing.
- D. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- E. Set members level, square, true to line and plumb, in correct position, and securely fasten to supporting construction. Space trusses as indicated; adjust and align trusses in location before permanently fastening.
- F. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure plumb, and in true alignment until completion of erection and installation of permanent bracing.
- G. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.
- H. Securely connect each truss ply required for forming built-up girder trusses.
 - 1. Anchor trusses to girder trusses as indicated.
- I. Do not field cut or alter structural members. Do not cut, drill, notch, or remove truss members.
- J. Install and fasten permanent bridging and bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams. Install and brace trusses according to TPI recommendations and as indicated.
 - 1. Install bracing to comply with Section 061000 "Rough Carpentry".
 - 2. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.
- K. Install headers and supports to frame openings required.
- L. Frame openings between trusses with lumber in accordance with Section 06 1000.
- M. Coordinate placement of decking with work of this section.
- N. Replace wood trusses that are damaged or do not meet requirements.

1. Damage trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Engineer.
- O. Temporary construction loads that cause stresses beyond design limits are not permitted.

3.04 TOLERANCES

- A. Install wood trusses within installation tolerances in TPI 1.

3.05 REPAIRS AND PROTECTION

- A. Protect wood trusses from weather. If, despite protection, wood trusses become wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Repair damaged galvanized coatings on exposed surfaces with galvanized repair paint according ASTM A780 and manufacturer's written instructions.

3.06 WARRANTY

- A. The products delivered shall be free from manufacturing errors or defects in workmanship and material. The products, when correctly installed and maintained, shall be warranted to perform as designed for the normal and expected life of the building.

END OF SECTION