STRUCTURAL ENGINEERING AND INSPECTIONS, INC.
S E I

Technical Bulletin 09-005

Pre-engineered Trusses, Beams and Joists Engineer of Record (EOR) to Delegated Engineer (DE). Written engineering requirements

NOTE: The contractor shall review and forward this document to the Delegated Engineer prior to start of any SEI project.

Listed below is a combination of notes for design of Pre-engineered Trusses, Beams, and Joists as well as Components / Systems. Including, but not limited to:

From: SEI - General Structural Notes Page

1.2. Design Loads: (See plan for special loads to be considered)

1.2.0. Load cases to be considered per Florida Building Code Chapter 16

1.2.1. Roof: 20 psf Top Chord Live Load @ 1.25 duration
7 psf Top Chord Dead Load, shingle roof
15 psf Top Chord Dead Load, tile roof
10 psf Bottom Chord Live Load (non-concurrent) EXCEPT A 20 PSF BOTTOM CHORD LIVE LOAD SHALL BE CONCURRENTLY APPLIED WHENEVER THERE IS A 42" CLEAR HEIGHT DISTANCE BETWEEN THE BOTTOM CHORD AND EITHER THE WEB OR TOP CHORD FOR AT LEAST 24" IN THE PLANE OF THE TRUSS
10 psf Bottom Chord Dead Load, gypsum ceiling.

1.2.2. Floor: 40 psf Live Load @ 1.00 duration
15 psf Dead load

1.2.3. Balcony: 60 psf Live Load @ 1.00 duration for equal or less than 100 ft^2
100 psf Live Load @ 1.00 duration for greater than 100 ft^2.

1.2.4. Combined Roof (RF), Floor (FL), Wall (WL) shall include load cases:
RF DL + RF LL + FL DL + FL LL + WL DL @ 1.25 Duration, and RF DL + FL LL + FL DL + WL DL @ 1.00 duration. (DL = Dead Load, LL = Live Load)

1.2.5. Wind: See Individual Signed and Sealed Drawings by Structural Engineering and Inspections, Inc. Maximum dead load in Wind Load Case(s) for Roof Trusses: 6 psf for shingle, 10 psf for tile @ 1.6 duration and Floor Trusses: 3 psf.

Contractor shall verify the actual dead loads of the material used are in line with the design assumptions. SEI shall be notified of all discrepancies prior to commencement of any work.

6.5. Pre-engineered beams shall be TrusJoist, Georgia Pacific or equal with a minimum allowable bending stress of 2950 psi and modulus of elasticity of 1,900,000 psi. Sign and sealed engineering must be forwarded to the Engineer of Record for review prior to construction.

6.6. All pre-engineered beams supporting brick veneers shall be designed with an additional plf load using 40 psf x surface area of brick. Deflection shall not exceed l/600.

6.7. Pre-engineered rim boards shall be TrusJoist, Georgia Pacific or equal with a minimum allowable bending stress of 1700 psi and modulus of elasticity of 1,300,000 psi. Sign and sealed engineering must be forwarded to the Engineer of Record for review prior to construction.

7. Pre-Engineered, Pre-Fabricated Wood Trusses.

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7.2. Individual trusses are to be designed by the truss manufacture per ANSI/TPI-02 to safely carry the design loads indicated on the structural plans.

7.3. Shop drawings shall be submitted for review and approval by the Engineer of Record prior to fabrication. Shop drawings shall indicate: span, pitch, bearing size and location, individual plate size and locations, size/species/grade of lumber and locations, o.c. spacing, maximum deflection and location, truss top chord, bottom chord and web bracing. Gravity load case design assumptions and information including; top chord live load, top chord dead load, bottom chord live load, bottom chord dead load, repetitive stress increase, duration stress increase, reactions at bearing locations, Uplift loads case design assumptions and information including; ASCE7-02 designation, wind speed, exposure, mean roof height, end zone, enclosure, importance factor, uplift dead load, uplift reaction, and duration factor. Drawings shall bear the impression seal of a Florida Professional Engineer responsible for the design. The review of the shop drawing shall not relieve the Contractor from his responsibility for seeing that the work is completed, accurate and in compliance with the drawings. The Engineer of Record reserves the right to make changes to the structural plans after the shop drawings have been reviewed.

7.4. The overall deflection under live load shall not exceed 1/360th of the span unless otherwise noted.

7.5. All lumber must be identified with an official grade stamp.

7.6. Truss bearing to be protected with metal shield when in contact with masonry or concrete.

7.7. Temporary bracing of the roof system shall be installed per the Handling, Installation and Bracing (BCSI-03) from the Truss Plate Institute and shall remain as part of the permanent bracing.

7.8. Do not notch, cut, remove chords or drill truss members without prior written approval from Specialty Truss Engineer.

7.9. Remove and replace trusses damaged during shipping or erection. Do not repair trusses without written approval of the Specialty Truss Engineer.

7.10. Connect truss to bearing walls with anchors as specified in these drawings. Submit alternate anchors to the Engineer of Record for approval prior to use in this project.

7.11 Truss to truss connection by truss manufacturer w/ specification and location bearing the impression seal of a Florida Professional Engineer. All connections shall be submitted for review and approval by Engineer of Record prior to construction.

7.12. All trusses supporting brick veneers shall be designed with an additional plf load using 40 psf x surface area of brick. Deflection shall not exceed l/600.

7.13 Trusses shall be designed with Hybrid Analysis... Individual truss members shall be designed using "Components and Cladding" design loading. "Truss Uplifts" shall be determined using "Main Wind Force" design loading.

7.14 Trusses installed over porch(es), lanai(s), and other similar wind exposure area(s) shall be run as "Partially Enclosed" in the effected area(s).

7.15. Truss manufacturer shall include all additional dead loads that affect the individual component design.

7.16 Trusses, Beams, and pre-engineered components shall NOT be designed with uplift in the gravity load case(s). Trusses, Beams, and pre-engineered components shall be analyzed as cantilevered, releasing the uplift reaction end. Connected truss for lateral load per SEI drawings.

8. Anchorage Notes.

   8.4. All truss to truss, pre-engineered beam, pre-engineered I-Joist or any combination of the following connections are considered part of the per-engineered system and shall be detailed as part of the truss shop drawings.

   8.6 All connectors and fasteners installed in contact w/ preservative treated lumber shall be approved for such use by their manufacturer and reviewed by S.E.I. prior to construction.

Individual Notes / and Or Truss Review Guidelines / Comments.

- Building Designer shall review these shop drawings for (including but not limited to), General Design, Life Safety, Accessibility, Electrical, Plumbing, Mechanical, etc.
- NOTE: Truss loading may include loads from walls, floors, and or roofs. The magnitude of these loads has been calculated by the manufacturer and requires verification by the truss design engineer.
- Trusses shall be modeled / analyzed with one "Pinned" bearing and the remaining "Rolled" bearing(s) unless specifically noted otherwise.
- Delegated Engineer shall sign and seal I-Joist / LVL component to I-Joist / LVL component connections.
- Gap between top chord bearing system 4x2 floor truss end vertical and ledger shall not exceed ½".
- Truss shall be designed to accommodate lateral wind applied to face.
- Delegated Truss Engineer to verify loading for chimney.
- The structural components of a buildings (including pre-engineered trusses and their supports) shall be designed to sustain local damage with the whole system / structure remaining not damaged to an extent disproportionate to the original local damage.
- Flat / wall system girders shall have a minimum of three piles and 3 points of bearing. Repetitive and duration stress increases shall not be used in standard load cases. In addition to the standard load cases, flat / wall girders shall be modeled for strength design such that each / any one of the bearings can be removed with resulting Combined Stress Index (CSI) < 2.0 for 100% Total Dead Load(s) + 50% Total Live Load(s) @ 1.25 Duration. Delegated Engineer shall have completed Building Code Core Course.
- The contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to the fabrication processes or to techniques of construction, and for the coordination of the work of all trades.
- Trusses shall be designed for the mean roof height of the building. They shall not vary.
- Individual Component Gable End Detail shall be designed and included in Delegated Engineering Truss Package.
- Truss end verticals as an individual component shall be designed for wind exposure.
- Verify floor tributary area that is not exposed to wind, is not contributing to additional uplift loading, this reporting higher girder uplift(s) than actual.

- Girders supporting trusses that are exposed to wind shall be run for wind load case(s).

- Truss Cover Page by Delegated Truss Engineer shall have:
  a) Unique Identification truss drawing numbers.
  b) Name of the Engineer of Record.
  c) Address and/or Lot/Block of the project.

- Truss manufacturer to verify truss spacing to accommodate sheathing lap on girders per SEI structural Details.

- Pre-engineered components (Trusses / TJI / LVL…) be shall designed for HVAC and Bathroom Equipment.

- Truss manufacturer shall verify Bearing Heights and Steps in Masonry.

- Delegated Truss Engineer shall verify gable end vertical spacing and/or configuration. Rough openings shall coordinate w/ FloorPlans + Elev. + SEI Details.

- Pre-engineered trusses shall be evaluated w/ ASCE 7 load combinations and worst case NDS durations factor(s).

- Delegated Truss Engineer shall verify attic area wall and ceiling drywall weight has been accounted for.

- Verify girder(s) that support wall above have been loaded properly.

- Truss Bottom Chord(s) at entry, lanai, or similar shall be designed for wind.

- Differential deflection shall be: less than 1/4"under dead load between adjacent trusses, less than 1/2" under total load between adjacent trusses.

- Trusses 60ft or greater require special installation instructions and temporary bracing system designed by Delegated Engineer.

- Billiards room loading: The following design parameters shall be used for the design of the pre-engineered framing system for a billards/game room:
  a) 60 psf top chord live load in lieu of 40 psf (75 psf total load).
  b) 0.9 duration factor since the load will be permanent in nature.
  c) 16" o/c spacing to control localized problems with the floor sheathing.
  d) Strongbacks at 5'-0" o/c to distribute the load and control localized deflection problems.
  e) Overall Total Load Truss deflection shall be limited to L/480.

- Gym room loading: The following design parameters shall be used for the design of the pre-engineered framing system for a gym room:
  a) 100 psf top chord live load in lieu of 40 psf (115 psf total load).
  b) 0.9 Duration factor since the load will be permanent in nature.
  c) 16" o/c spacing to control localized problems with the floor sheathing.
  d) Strongbacks at 5'-0" o/c to distribute the load and control localized deflection problems.
  e) Overall Total Load Truss deflection shall be limited to L/480.

- Multi-family party wall trusses shall be designed for drag strut loading.
- Trusses shall be designed for chimney and copula loading where applicable.
- Sys 42 ladder floor trusses shall have verticals 16″o/c max.
- Gable end verticals shall meet L/240 deflection criteria for stucco finish.
- Gable end verticals shall be at 16″ o/c max. for siding finish.

From: Florida Board of Professional Engineers, Florida Administrative Code 61G15

61G15-31.003 Design of Structures Utilizing Prefabricated Wood Trusses.

- When a Structural Engineer of Record and a Delegated Engineer exist as may be determined by applicable Florida law, the apportionment of responsibilities between the Structural Engineer of Record and a Delegated Engineer shall be as set forth in Chapter 2 of ANSI/TPI 1-1995, wherein the Structural Engineer of Record is the Building Designer and the Delegated Engineer is the Truss Designer as those terms are defined in said standard.
- The Structural Engineer of Record shall provide design requirements in writing to the Delegated Engineer and shall review the design documents of the delegated engineer for conformance to his written instructions in accordance with Chapter 61G15-30.005, F.A.C.
- For the purposes of this rule, the following definitions shall apply:
  (a) "Truss System" shall mean an assemblage of trusses and truss girders, together with all bracing, connections, and other structural elements and all spacing and locational criteria, that, in combination, function to support the dead, live and wind loads applicable to the roof of a structure with respect to a Truss System for the roof, and the floor of a structure with respect to a Truss System for the floor. A Truss System does not include walls, foundations, or any other structural support systems.
  (b) "Truss System Engineer" shall mean an engineer who designs a Truss System.
  (c) "Truss Design Engineer" shall mean an engineer who designs individual trusses, but does not design a Truss System.
- An engineer is a Truss System Engineer if he designs a Truss System. Each of the drawings in the Truss System design package for the Truss System shall include a title block bearing the printed name, address, and license number of the Truss System Engineer and the date of the drawing. The design documentation prepared by the Truss System Engineer shall also include a truss placement plan for the Truss System, showing the location and designation of each truss. Said design documentation for the Truss System shall be signed and sealed by the Truss System Engineer. The cover or index sheet of the Truss System design package may be signed and sealed in lieu of signing and sealing each individual sheet, provided that the cover or index sheet contains the following information:
  (a) The name, address and license number of the Structural Engineer of Record, if there is one, and the name, address and license number of the Truss System Engineer.
  (b) Identification of the project, by address or by lot number, block number, section or subdivision and city or county.

(c) Identification of the applicable building code and chapter(s) that the Truss System design is intended to meet, the engineer design criteria relied upon in designing the Truss System and the truss design loading.
(d) Identification of any computer program used for engineering the Truss System.
(e) An index of the attached Truss System design drawings. The naming and numbering system utilized for the drawings shall be clear as to how many drawings there are in the set and the date and sequence number of each of these drawings shall be included.

- An engineer is a Truss Design Engineer if he designs individual trusses, but does not design the Truss System. Each of the drawings in the truss design package for individual trusses shall include a title block bearing the printed name, address, and license number of the Truss Design Engineer and the date of the drawing. The Truss Design documents prepared by the Truss Design Engineer shall be signed and sealed by the Truss Design Engineer. The cover or index sheet of the truss design package may be signed and sealed in lieu of signing and sealing each individual sheet, provided that the cover or index sheet contains the following information:
  (a) The name, address and license number of the Structural Engineer of Record, if there is one, and the name, address, and license number of the Truss Design Engineer.
  (b) Identification of the project, by address or by lot number, block number, section or subdivision and city or county.
  (c) Identification of the applicable building code and chapter(s) that the truss design is intended to meet, the engineering design criteria relied upon in designing the trusses and the truss design loading.
  (d) Identification of any computer program used for engineering the trusses.
  (e) An index of the attached truss design drawings. The naming and numbering system utilized for the drawings shall be clear as to how many drawings there are in the set and the date and sequence number of each of these drawings.

Specific Authority 471.008, 471.033(2)
Law Implemented 471.033(1)(g) FS.
History–New 1-26-93, Formerly 21H-31.003, Amended 6-16-99, 3-22-01, 4-30-03.

61G15-30.005 Request for and Review of Delegated Engineering Documents.

- An engineer of record who delegates a portion of his responsibility to a delegated engineer is obligated to communicate in writing his engineering requirements to the delegated engineer.

- An engineer of record who delegates a portion of his design responsibility to a delegated engineer shall require submission of delegated engineering documents prepared by the delegated engineer and shall review those documents for compliance with his written engineering requirements and to confirm the following:
  (a) That the delegated engineering documents have been prepared by an engineer.
  (b) That the delegated engineering documents of the delegated engineer conform with the intent of the engineer of record and meet the written criteria.
  (c) That the effect of the delegated engineer's work on the overall project generally conforms with the intent of the engineer of record.

Specific Authority 471.033(2), 471.008 FS.
Law Implemented 471.033(1)(g) FS.

History--New 1-26-93, Formerly 21H-30.005.

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