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SECTION 06 17 19 CROSS-LAMINATED TIMBER

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PART 1 GENERAL

1. SECTION INCLUDES

- A. Roof accessories including the following:
 - 1. Fall Arrest Guardrails
 - a. Wood Rail
 - b. Wire Rope Rail
 - 2. Deck Mounted Fall Arrest Anchor Points

2. RELATED SECTIONS

- A. Section 01 56 00 – Temporary Barriers and Enclosures
- B. Section 07 70 00 – Roof and Wall Specialties and Accessories

3. REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Some referenced standards and criteria for Glued-Laminated Wood are being applied to Cross-Laminated Timber (CLT) as a similar material by reference in this section.

- A. American Institute of Steel Construction (AISC) AISC 360 (2016) Specification for Structural Steel Buildings
- B. American Institute of Timber Construction (AITC) AITC 109 (2007) Standard for Preservative Treatment of Structural Glued Laminated Timber
- C. American Society of Civil Engineers (ASCE) ASCE 7-16 (2017; Errata 2018; Supp 1 2018) Minimum Design Loads and Associated Criteria for Buildings and Other Structures
- D. American Wood Council (AWC) AWC NDS (2015) National Design Specification (NDS) for Wood Construction
- E. American Wood Protection Association (AWPA) AWPA T1 (2023) Use Category System: Processing and Treatment Standard AWPA U1 (2023) Use Category System: User Specification for Treated Wood
- F. APA - The Engineered Wood Association (APA) ANSI/APA PRG 320 (2012) Standard for Performance Rated Cross-Laminated Timber APA EWS S580D (2013) Technical Note: Preservative Treatment of Glued Laminated Timber APA EWS T300 (2007) Technical Note: Glulam Connection Details

- G. ASTM International (ASTM) ASTM A36/A36M (2019) Standard Specification for Carbon Structural Steel ASTM A276/A276M (2017) Standard Specification for Stainless Steel Bars and Shapes ASTM A666 (2023) Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar ASTM A1011/A1011M (2023) Standard Specification for Steel Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength FPIInnovations (FPI) SP-529E (2013) CLT Handbook, Cross-Laminated Timber (U.S. Edition)
- H. International Code Council (ICC) ICC IBC (2021) International Building Code
- I. International Organization for Standardization (ISO) ISO ISO/IEC 17020 (2012) Conformity Assessment - Requirements for the Operation of Various Types of Bodies Performing Inspection ISO ISO/IEC 17065 (2012) Conformity Assessment - Requirements for Bodies Certifying Products, Processes and Services
- J. American National Standards Institute (ANSI): ANSI/ASSP Z359.18 - 2017 - Safety Requirements for Anchorage Connectors for Active Fall Protection Systems.
- K. American national standards institute (ANSI): ANSI/ASSP Z359.14 - 2021 – SRL Class 2
- L. American welding society: AWS D1.1 - Structural Welding Code - Steel.
- M. California Occupational Safety & Health Administration (CAL OSHA): 1620 - Design of Temporary Railing.
- N. California Occupational Safety & Health Administration (CAL OSHA): 1621 - Railings and Toe Boards.
- O. California Occupational Safety & Health Administration (CAL OSHA): 1632 - Floor, Roof and Wall Openings to Be Guarded
- P. California Occupational Safety & Health Administration (CAL OSHA): 3211 - Wall Openings.
- Q. California Occupational Safety & Health Administration (CAL OSHA): 3212 - Floor Openings, Floor Holes and Roofs.
- R. California Occupational Safety & Health Administration (CAL OSHA): 3213 - Service Pits and Yard Surface Openings.
- S. California Occupational Safety & Health Administration (CAL OSHA): 3214 - Stair Rails and Handrails.
- T. Occupational Safety and Health Administration (OSHA): 29 CFR 1910.28 Duty to Have Fall Protection and Falling Object Protection.
- U. Occupational Safety and Health Administration (OSHA): 29 CFR 1910.29. Walking-Working Surfaces.
- V. Occupational Safety and Health Administration (OSHA): 29 CFR 1926.500 - Scope, Application, and Definitions Applicable to this Subpart.

- W. Occupational Safety and Health Administration (OSHA): 29 CFR 1926.501 - Duty to Have Fall Protection.
- X. Occupational Safety and Health Administration (OSHA): 29 CFR 1926.502 - Fall Protection Systems Criteria and Practices.
- Y. Occupational Safety and Health Administration (OSHA): 29 CFR 1926.503 - Training Requirements.

2. SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Drawings showing plans, elevations, sections and details of components. Show member sizes and part identification, fasteners, anchors, fittings and evidence of compliance with structural performance requirements.
- D. Manufacturer's Certificates:
 - 1. Certify that Railings and Base Castings are made in USA. Provide steel mill and foundry certificates for verification prior to shipment.
 - 2. Manufacturer must be American Welding Society Welding Certified for Welding Standards AWS D1.1 and AWS D1.3. Third party qualification documentation required prior to shipment.

3. QUALITY ASSURANCE

- A. Qualifications for Cross Laminated Timber (CLT) Manufacturer:
 - 1. Provide panels that meet ANSI/APA PRG 320 standards, factory produced by an American Institute of Timber Construction (AITC) or APA - The Engineered Wood Association (APA) licensed manufacturer. Factory mark every panel with AITC Quality Mark or APA-EWS trademark and provide a certificate of conformance. Marks must not be visible in final assembly. Manufacture of the panels must conform to AWC NDS and SP-529E.
- B. Certifications:
 - 1. Submit certificates for cross-laminated timber panels. Include a product report or laboratory report issued by a U.S. product certification agency accredited under ISO ISO/IEC 17065 or a U.S. product inspection agency accredited under ISO ISO/IEC 17020. Include the following information in the certification:
 - a. CLT Manufacturer's Standards
 - b. CLT stress grade and appearance classification
 - c. Lay-up of wood, species and grades used
 - d. Connection Hardware Standards in accordance with CLT Manufacturer's specifications
 - e. Manufacturer's panel durability tests and testing results
 - f. Ensure material tested is typical of a production run of the same material used in the project. Conduct tests on the same production lot(s) for delivery of the panels.

C. Surfaces

1. Submit three samples, 100 millimeter 4 inches minimum square by three laminate thickness for industrial grade faced product and 300 millimeter 12 inches square by three laminate thickness sample for visual/architectural grade panels to illustrate the quality and color of exposed-to-view surfaces.

4. DELIVERY, STORAGE, AND HANDLING

- A. Deliver the panels to the project site in covered or protected systems in accordance with manufacturer's standards or recommended instructions for proper handling and storage. Label and deliver in sequence of construction for the project, equipped with loading straps by the manufacturer, erected by certified crane operators and fabrication handlers and protected for prolonged inclement weather conditions after erected. Replace any damaged or deteriorated panels.
- B. Submit manufacturer's instructions for handling, erection procedures, sequencing, administration of screws and attachments and recommended tools and tolerances. Note applicable safety precautions and standards. Have a copy of all instructions present on the project site.
- C. Deliver materials to the job site in good condition and adequately protected against damage.
- D. Inspect rail sections for damage before signing the receipt from the trucking company. Truck driver must note damaged goods on the bill of lading if damaged product is found.

5. WARRANTY

- A. Warranty: Provide manufacturer's limited two year warranty.

2.PRODUCTS

2.1. MANUFACTURERS

- A. Acceptable Manufacturer: Safety Anchor Posts System, 9630 Bruceville Rd. #160, Elk Grove, CA 95757. Phone: (800) 377-1632, www.safetyanchorpost.com, info@safetyanchorpost.com
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2. ANCHORED RAILING SYSTEM

- A. Edge Protection: Provide Safety Anchoring Post System pedestrian/Worker egress barrier system on roof, including pipe railings, uprights, bases, accessories and fittings. For cast-in-place anchors.

1. Product: SAP42D Guardrail System.
 - a. System top and mid rail provided in accordance with OSHA Standards - 29 CFR 1910.29 (b)(1-14).
 - b. Structural Load: 200 lb (90.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502.
 - c. When D-Ring specified system in accordance with OSHA Standards - 29 CFR 1926.501 (b)(1-15).
 - d. When D-Ring specified fall arrest Load: 5,000 lbs. (2,268 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502

2. Product: SAP Handrail System.
 - a. System top and mid rail provided in accordance with OSHA Standards - 29 CFR 1910.29 (b)(1-14).
 - b. Structural Load: 200 lb (90.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502.

3. Product: SAP5x8 Panel:
 - a. System top and mid rail provided in accordance with OSHA Standards - 29 CFR 1926.502 (J) (4-5).
 - b. Structural Load: 200 lbs. (90.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502.

4. Product: SAP U-Channel and Toe Board
 - a. System top and mid rail provided in accordance with OSHA Standards - 29 CFR 1926.502 (J)(1-4).
 - b. Structural Load: 50 lbs. (22.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502.

5. Height: (60, 42, 21) inches (1524, 1067, 533 mm), minimum.

6. Railings: 2x4 top and mid-rail, free of sharp edges and snag points.

7. Mounting Bases:
 - a. SAPS CLT3 Anchor

8. Accessories:
 - a. Toe Board Brackets.
 - b. Fall Arrest D-Ring
 - c. Panel (8'x5' and 9'-6"x5')
 - d. Whisker Set Plug

9. Finish: Steel surfaces.
 - a. Hot dip zinc galvanized.
 - b. Factory finished powder coat paint.
 - c. Color: None.
 - d. Color: Safety Yellow.
 - e. Color: _____.
 - f. Color: Specified by Architect.

- B. Edge Protection: Provide Safety Anchoring Post System pedestrian/Worker egress barrier system on roof, including pipe railings, uprights, bases, accessories and fittings. For cast-in-place anchors.
1. Product: SAP Guardrail SAP60DW with SAPS Kicker Braces– Wire Rope System.
 - a. System top and mid rail provided in accordance with OSHA Standards - 29 CFR 1910.29 (b)(1-14).
 - b. Structural Load: 200 lb (90.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502.
 - c. When D-Ring is specified system in accordance with OSHA Standards - 29 CFR 1926.501 (b)(1-15).
 - d. When D-Ring is specified fall arrest Load: 5,000 lbs. (2,268 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502
 2. Product: SAP Handrail System.
 - a. System top and mid rail provided in accordance with OSHA Standards - 29 CFR 1910.29 (b)(1-14).
 - b. Structural Load: 200 lbs. (90.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502.
 3. Product: SAP5x8 Panel:
 - a. System top and mid rail provided in accordance with OSHA Standards - 29 CFR 1926.502 (J) (4-5).
 - b. Structural Load: 200 lbs. (90.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502.
 4. Product: SAP U-Channel and Toe Board
 - a. System top and mid rail provided in accordance with OSHA Standards - 29 CFR 1926.502 (J)(1-4).
 - b. Structural Load: 50 lbs. (22.7 kg), minimum, in any direction to all components in accordance with OSHA Regulation 29 CFR 1926.502.
 5. Height: (60, 42, 21) inches (1524, 1067, 533 mm), minimum.
 6. Railings: Wire Rope
 7. Mounting Bases:
 - a. CLT3 Anchor
 8. Accessories:
 - a. Toe Board Brackets.
 - b. Fall Arrest D-Ring
 - c. Panel (8'x5' and 9'-6"x5')
 - d. Whisker Set Plug
 - e. Horizontal Guard Rail Line

9. Finish: Steel surfaces.

- a. Hot dip zinc galvanized.
- b. Factory finished powder coat paint.
- c. Hot dip zinc galvanized and factory finished powder coat paint.
- d. Color: None.
- e. Color: Safety Yellow.
- f. Color: _____.
- g. Color: Specified by Architect.

2.3. DRAWINGS

- A. Provide installation drawings for CLT panels showing sequence of placement, location, sizes, overall dimensions, reinforcement, screw and attachment locations, safe handling directions and any special erection instructions. Include any reinforcement necessary for safe handling and erection of panels. Identify each panel and the corresponding sequence and procedure followed during installation, and location and details of anchorage devices that are embedded in other construction on layout drawings

2.4. CONFORMANCE CERTIFICATION

- A. Submit signed and sealed documentation prepared by a licensed professional [engineer] [architect] verifying conformance with ASCE 7-16, AWC NDS and ICC IBC standards.

2.5. GENERAL

- A. Provide CLT Panels fabricated in accordance with ANSI/APA PRG 320.

2.6. LUMBER

A. Stress Grade

- 1. CLT panels must be [E1] [E2] [E3] [V1] [V2] [] stress grade, graded in accordance with ANSI/APA PRG 320.

B. Appearance Classification

- 1. CLT panels must meet the [Architectural] [Industrial] appearance classification in accordance with ANSI/APA PRG 320.

C. Moisture Content

- 1. Comply with ANSI/APA PRG 320 for moisture content, up to a maximum of 15 percent, and compatible with the criteria of the certified adhesive applied.

D. Preservative, and Fire-Retardant, Treatment

1. Wherever CLT is in the exterior of the conditioned building envelope; or in direct contact with the ground, building foundation, or concrete; or in damp or humid service conditions, use preservative treated wood. [Treat exposed structural panels with a fire retardant to attain a UL flame spread rating not greater than 25.] Pressure impregnate [preservative] [fire-retardant] treated wood with an approved process for the location in accordance with AITC 109 or APA EWS S580D, AWPA T1, and AWPA U1. Any strength or stiffness reduction due to treatment must be provided by the treater. Kiln dry all wood after treatment to remove the moisture added during treatment. Moisture content throughout material after drying must be less than 15 percent.

2.7. ADHESIVE

- A. Adhesives must be certified by test for use with the species to which it is applied in accordance with ANSI/APA PRG 320. Apply and allow set times as required by the adhesive manufacturer's instructions. Also, apply pressure on the panels and for the duration during manufacture as required by the adhesive manufacturer's instructions.

2.8. FINISHES

- A. [No protective coating of the base panels is required.] [Submit custom finishes as specified by the designer and applied by the factory or on site.] [Provide cross-laminated timber members with standard factory wiped stain and clear varnish finish [as indicated by manufacturer's designations] [match sample] [as selected from manufacturer's full range] []

2.9. TIMBER HARDWARE

- A. Design connections to AWC NDS, and AISC 360 unless specifically detailed by the Engineer of Record, to resist shears, moments and forces indicated. Fabricate connective hardware in accordance with AISC 360.
- B. Clean oil, dirt, rust, and foreign matter from all metal surfaces. Provide structural steel shapes, plates, and flat bars as indicated for assembly and connection of members conforming to ASTM A36/A36M.
- C. Hot-Rolled Steel Sheet:
 1. Provide hot-rolled steel sheet complying with ASTM A1011/A1011M, structural steel, Type SS, Grade 33.
- D. Stainless Steel;
 1. Provide stainless steel bars and shapes complying with ASTM A276/A276M [Type 304] [Type 316].
 2. Provide stainless steel plate, flat bars, and sheets complying with ASTM A666 [Type 304] [Type 316].

3.EXECUTION

3.1. PREPARATION

- A. Clean oil, dirt, rust, and foreign matter from all metal surfaces.

3.2. INSTALLATION

- A. Conform to spacing and placement of panels and installation methods in accordance with the manufacturer's instruction and APA EWS T300.
- B. Provide close fits and neat appearance of joints without binding or adding additional stresses to the panel.
- C. Hoist panels in place in accordance with the manufacturer's instructions using non-marring straps and connectors.
- D. Brace erected member so as to maintain a safe working environment and stable structure.
- E. Avoid on-site cuts; however, if necessary, only with the approval of the designer or engineer of record, except for fastener drilling and other minor cutting. Coat all cuts and inside surfaces of drilled holes with end sealer.

3.3. PROTECTION

- A. After installation, cover each panel with temporary waterproof protection to maintain the low moisture content of the wood. Protect panels against excessive and repeated water deposits and standing water at all times.
- B. Maintain protection until members are enclosed within the building and final coats are ready for application.
- C. Take precautions to closely maintain the manufacturer's standard for moisture content. Elevate initial building heating/cooling gradually to the desired level. Do not reduce the relative humidity of the building rapidly.

END OF SECTION