

Timber-Strong Proposal Presentation



Sky High Structures

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Zac Timmons, Rivka De Conto, Sydney Gibson, Heavenlee Seria

Project Introduction

Purpose: Design & Construct a two-story, small scale, light-framed wooden structure

Client: Mark Lamer, P.E.

Location: 2026 ISWS Competition
University of Utah, Salt Lake City, UT

Background:

- 2026 Timber Strong Design Competition Rules
- Framing plan design
- Structural calculations
- BIM creation
- Construction drawing



Figure 1: Timber-Strong 2022 Winners [2]

Task 1: Research

- **Task 1.1:** Research Past Competition Teams
- **Task 1.2:** Research Competition Rules
- **Task 1.3:** Research Structural Systems
- **Task 1.4:** Research Material Availability



Figure 2: ASCE Timber-Strong Design Build 2026 Rules Cover Page [1]

Task 2: Design Selection

- **Task 2.1:** Brainstorm Structural Systems
- **Task 2.2:** Identify Viable Design Options
- **Task 2.3:** Select Design

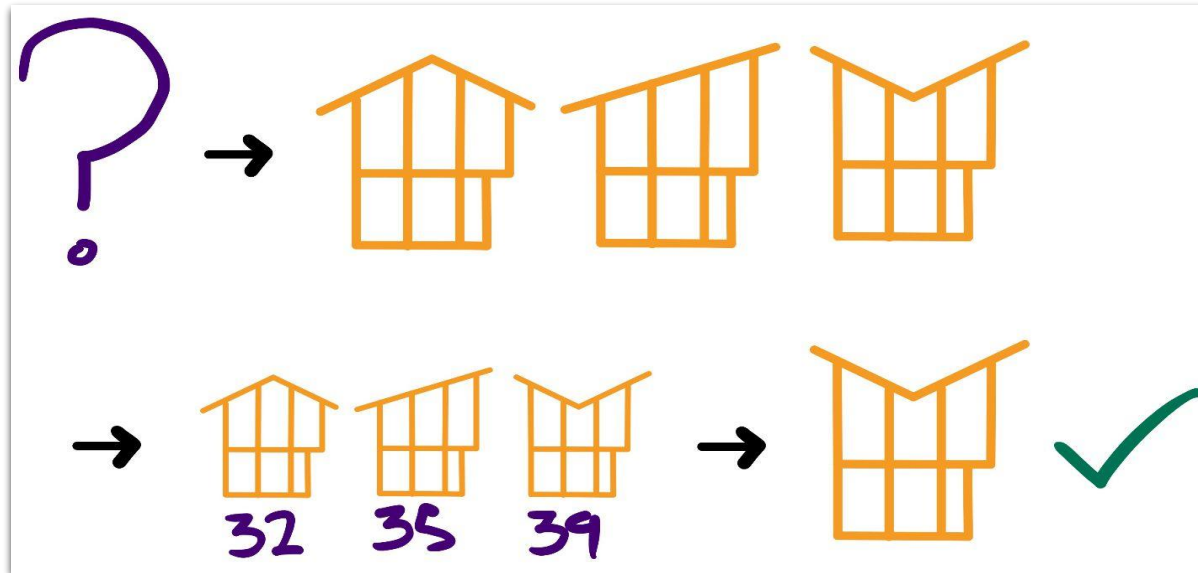


Figure 3: Conceptual Design Selection Process [1]

Task 3: Final Structural Analysis & Design

- **Task 3.1:** Draft Framing Plan
- **Task 3.2:** Gravity Design
 - **Task 3.2.1** Roof Design
 - **Task 3.2.2** 2nd Level Bearing Wall Design
 - **Task 3.2.3** 2nd Level Design
 - **Task 3.2.4** 1st Level Bearing Wall Design
- **Task 3.3:** Diaphragm Design
 - **Task 3.3.1** Calculate Diaphragm Forces
 - **Task 3.3.2** Select Diaphragm Parameters
 - **Task 3.3.3** Diaphragm Connection Design
- **Task 3.4:** Shear Wall Design
 - **Task 3.4.1** Calculate Shear Wall Forces
 - **Task 3.4.2** Select Shear Wall Parameters
 - **Task 3.4.3** Shear Wall Connection Design
- **Task 3.5:** Uplift Connection Design

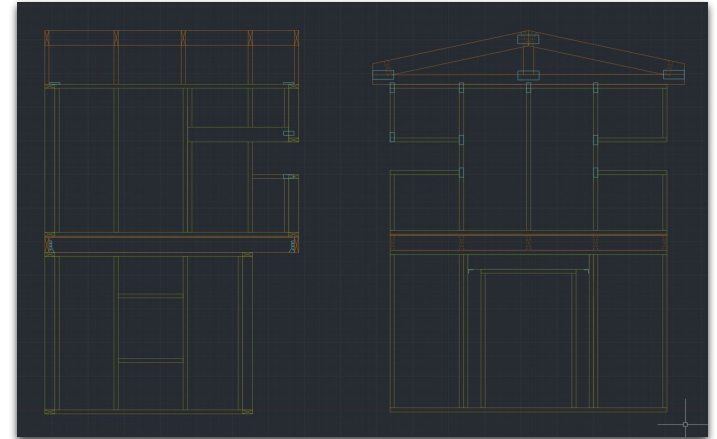


Figure 5: Example of AutoCAD Framing Plan [3]

Task 3: Final Structural Analysis & Design (Cont.)

- **Task 3.6:** Tiedown and Anchor Design
- **Task 3.7:** Cantilever Beam Design
 - **Task 3.7.1:** Beam Member Selection
 - **Task 3.7.2:** Overturning Stability Check
- **Task 3.8:** Final Calculation Packet
- **Task 3.9:** Final Structural Drawings
- **Task 3.10:** Building Information Model

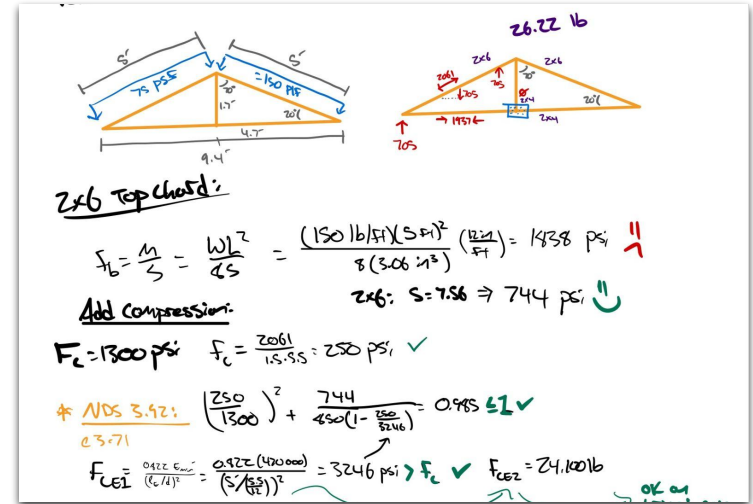


Figure 4: Sample Hand Calculations [3]

Task 4: Pre-Competition Construction Phase

- **Task 4.1:** Material Procurement
- **Task 4.2:** Prefabrication
 - **Task 4.2.1:** Wall Panels
 - **Task 4.2.2:** Floor Panels
 - **Task 4.2.3:** Roof Assembly
- **Task 4.3:** Mock Assembly & Practice
- **Task 4.4:** Transportation Prep

Task 5: Competition Construction Process

- **Task 5.1: Competition Construction**
 - Pre-Build Setup
 - First & Second Floor Framing
 - Cantilever Beam Install
 - Second-Floor Walls & Roof Framing
 - Mid-Build Inspection
 - Cantilever Deflection Test
 - Safety Oversight
- **Task 5.2: Deconstruction Phase**
 - Panel-by-Panel Deconstruction
 - Donation/Recycling Plan
 - Team Responsibility
 - Liability Waiver
 - Stability Oversight

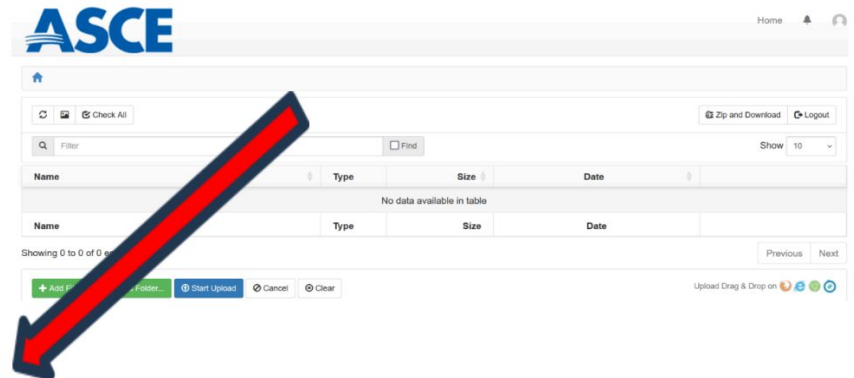
Task 6: Impact Assessment

- **Task 6.1: Carbon Footprint Calculation**
 - Determine embodied carbon in structure with WoodWorks Carbon Calculator tool
 - Determine theoretical carbon footprint of structure at the scale of full-sized building
- **Task 6.2: Triple Bottom Line Assessment**
 - Societal, Environmental & Economic impacts of the project

Task 7: Deliverables

- **Task 7.1: Competition Deliverables**
 - **Task 7.1.1:** Intent and Eligibility Form
 - **Task 7.1.2:** Ladder Safety Training
 - **Task 7.1.3:** Phase 1A Electronic Files
 - **Task 7.1.4:** Phase 1B Electronic Files
 - **Task 7.1.5:** Phase 2 Presentation
 - **Task 7.1.6:** Change Orders/Final Submittals
 - **Task 7.1.7:** Phase 3 Electronic File

- **Task 7.2: Capstone Deliverables**
 - Tasks 7.2.1 - 7.2.3: 30%, 60%, 90%
 - Task 7.2.4: Final Presentation
 - Task 7.2.5: Final Report
 - Task 7.2.6: Final Website



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Figure 6: ASCE Cerberus Server Portal [1]

Task 8: Project Management

- **Task 8.1:** Team Coordination
 - Meetings
 - Roles & Responsibilities
 - Communication Tools
 - Funding Management
 - Space & Equipment
- **Task 8.2:** Outreach & Volunteers
 - Sponsor Coordination
 - Volunteer Recruitment
- **Task 8.3:** Safety Oversight & Training
 - Required Certifications
 - PPE & Site Rules
 - Plan for Emergency
- **Task 8.4:** Quality Control & Compliance
 - **Task 8.4.1:** Mock Inspections
 - **Task 8.4.2:** Drawing & Rules Review
 - **Task 8.4.3:** Pre-Competition Structural Audit

Exclusions

- Snow and seismic design
- Not liable for installation of the structure during repurposing

Schedule

Task 1 - Research: 11 days

Task 2 - Design Selection: 24 days

Task 3 - Final Structural Analysis & Design: 85 days

Task 4 - Pre-Competition Construction: 52 days

Task 5 - Competition Construction: 2 days

Task 6 - Impact Assessment: 14 days

Task 7 - Deliverables: 133 days

Task 8 - Project Management: 176 days

Staffing Plan

- Senior Project Manager (**SPM**)

Design Positions:

- Project Engineer (**PrE**)
- Engineer in Training (**EIT**)

Construction Positions:

- Superintendent (**SUP**)
- Health & Safety Specialist (**HSS**)
- Construction Intern (**INT**)

Staffing Matrix

Table 5: Staffing Matrix [4]

Task /Subtasks	Position / Title						Total Hours
	SPM	SUP	PrE	HSS	EIT	INT	
Task 1: Research	2	0	4	3	8	0	17
Task 2: Design Selection	2	3	6	0	8	0	19
Task 3: Final Structural Analysis & Design	5	0	54	0	76	0	135
Task 4: Pre-Competition Construction Phase	0	39	12	33	36	36	156
Task 5: Competition Construction Process	0	5	5	5	5	5	25
Task 6: Impact Assessment	2	0	4	0	6	0	12
Task 7: Deliverables	11	10	32	6	30	3	92
Task 8: Project Management	34	26	52	26	42	42	222
Total Hours	56	83	169	73	211	86	678

Cost of Engineering Services

Table 6: Cost of Engineering Services [4]

Category	Description	Quantity	Unit	Price Per	Cost
Personnel	Senior Project Manager	56	Hr	\$ 220	\$12,320
	Project Engineer	169	Hr	\$ 165	\$27,885
	Superintendent	83	Hr	\$ 200	\$16,600
	Safety Officer	73	Hr	\$ 80	\$5,840
	Engineer in Training	211	Hr	\$ 85	\$17,935
	Construction Intern	86	Hr	\$ 60	\$5,160
	Subtotal Personnel				
Travel	Rental Van	5	Days	\$ 74	\$368
	Driving Mileage	500	Miles	\$ 0.41	\$205
	Per Diem	20	People-Day	\$ 60	\$1,200
	Hotel Room	16	Room-Night	\$ 300	\$4,800
	Subtotal Travel				
Lab Use	"The Farm" Field Station	14	Days	\$ 100	\$1,400
Subtotal Lab Use					\$1,400
Materials	Lumber	400	Linear Feet	\$ 0.75	\$300
	4x8 OSB Sheet	30	EA	\$ 15	\$460
	Fasteners and Hardware	1	Lump Sum	\$ 300	\$300
	Paint	10	Gal	\$ 10	\$100
	Primer	10	Gal	\$ 20	\$200
	Subtotal Material Cost				
Total Cost of Engineering Services					\$ 95,072

References

- [1] ASCE, *Timber-Strong Design Build Rules*. American Society of Civil Engineers, Washington, DC. [Online]. Available: <https://www.asce.org/-/media/asce-images-and-files/communities/students-and-younger-members/document/s/asce-timber-strong-design-build-rules.pdf>. [Accessed: Oct. 6, 2025].
- [2] J. Cipollini, “Timber-Strong Design Build Competition — Utah Winners,” *SE Blog*, Jun. 2022. [Online]. Available: <https://seblog.strongtie.com/2022/06/timber-strong-design-build-competition-utah-winners/>. [Accessed: Oct. 6, 2025].
- [3] Z. Timmons, *Personal Sketches*, 2025.
- [4] H. Seria, R. De Conto, S. Gibson, Z. Timmons, *Timber-Strong Design Build Competition Proposal*, 2025.