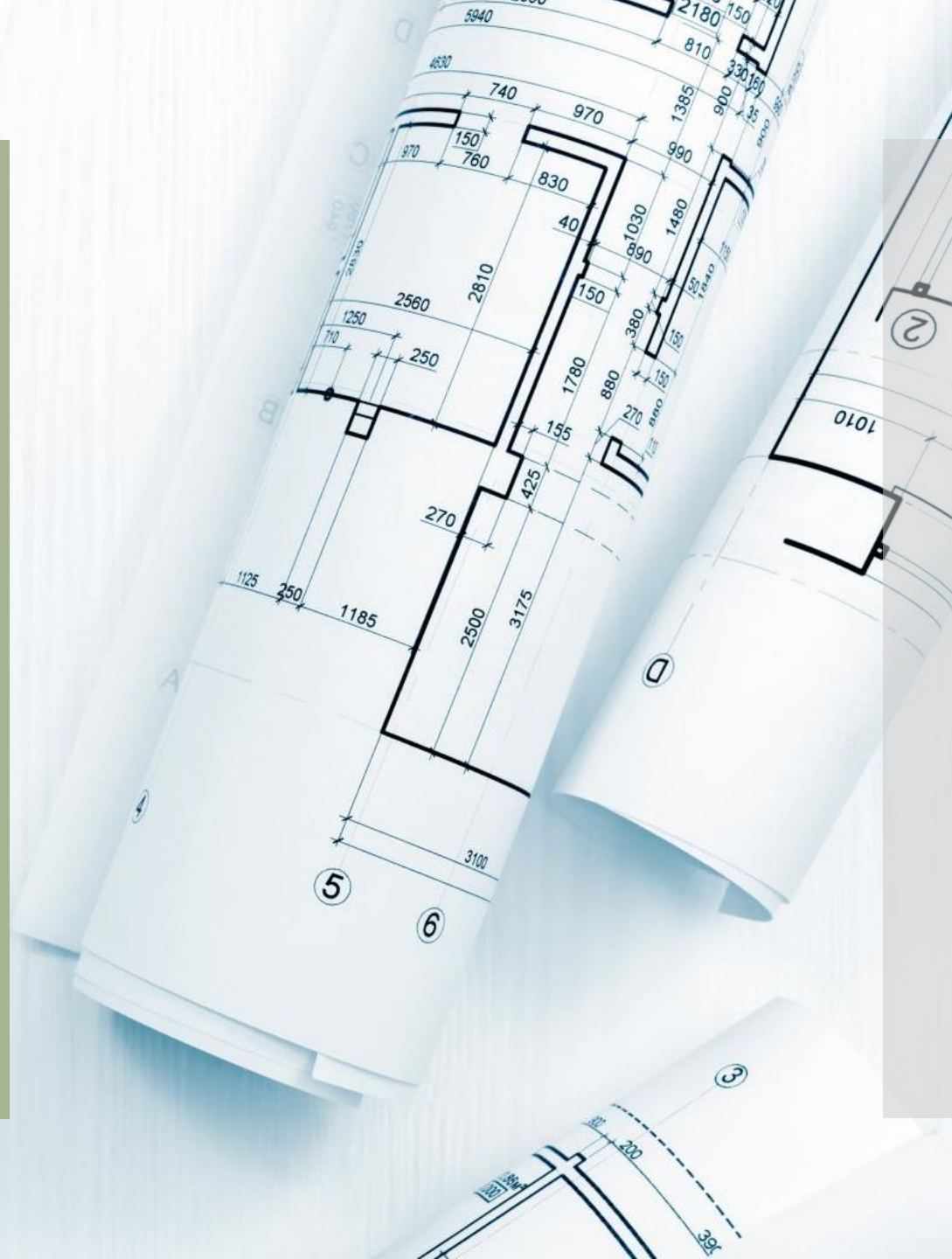


Multi-Material Residential Structure

Structural Engineering

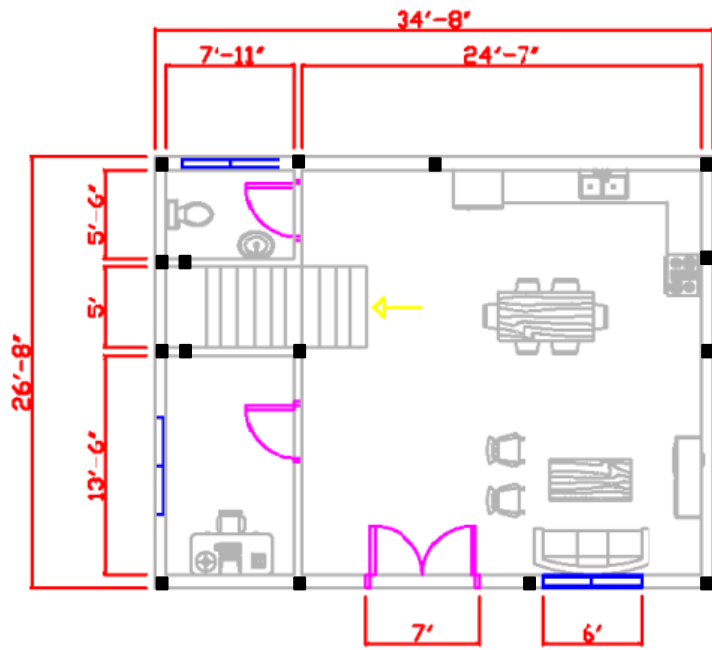
C.M

Fall 2021

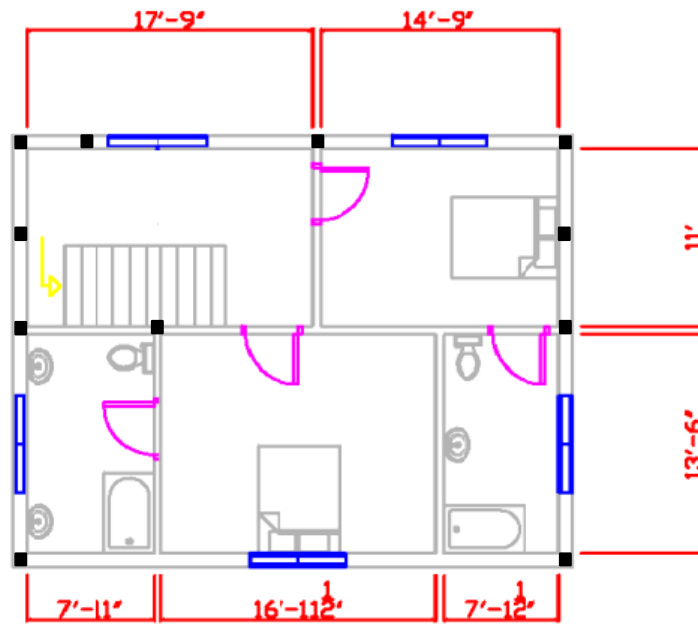


ASCE Standards

- Two-story single family residential structure
- Located in Pennsylvania
- For proper market placement,
 - At least two bedrooms
 - At least two bathrooms
 - At least 1500 livable square feet



First Floor



Second Floor

2D Floor Plan
AutoCAD

ASCE Standards

- Support Columns
 - Concrete Support Columns
 - Conc4000NW with a shape of CRECT12x12
 - Steel Support Columns
 - A992 Steel with a shape of W6x8.5
- Roof Trusses
 - Chords
 - Glulam DF Balanced Wood with a shape of 6.75X7.5FS
 - At most 2' apart
 - Purlins
 - Glulam DF Balanced Wood with a shape of 5.5X7.5FS
 - Bracing
 - Glulam DF Balanced Wood with a shape of 3.5X5.5FS
- Second Story Floor
 - Beams
 - Glulam DF Balanced Wood with a shape of 5.5X7.5FS
 - At most 1' apart
 - Girders
 - A992 Steel with a shape of W5X19

ASCE Standards

Dead Loads

- Self weight of structure

Live Loads

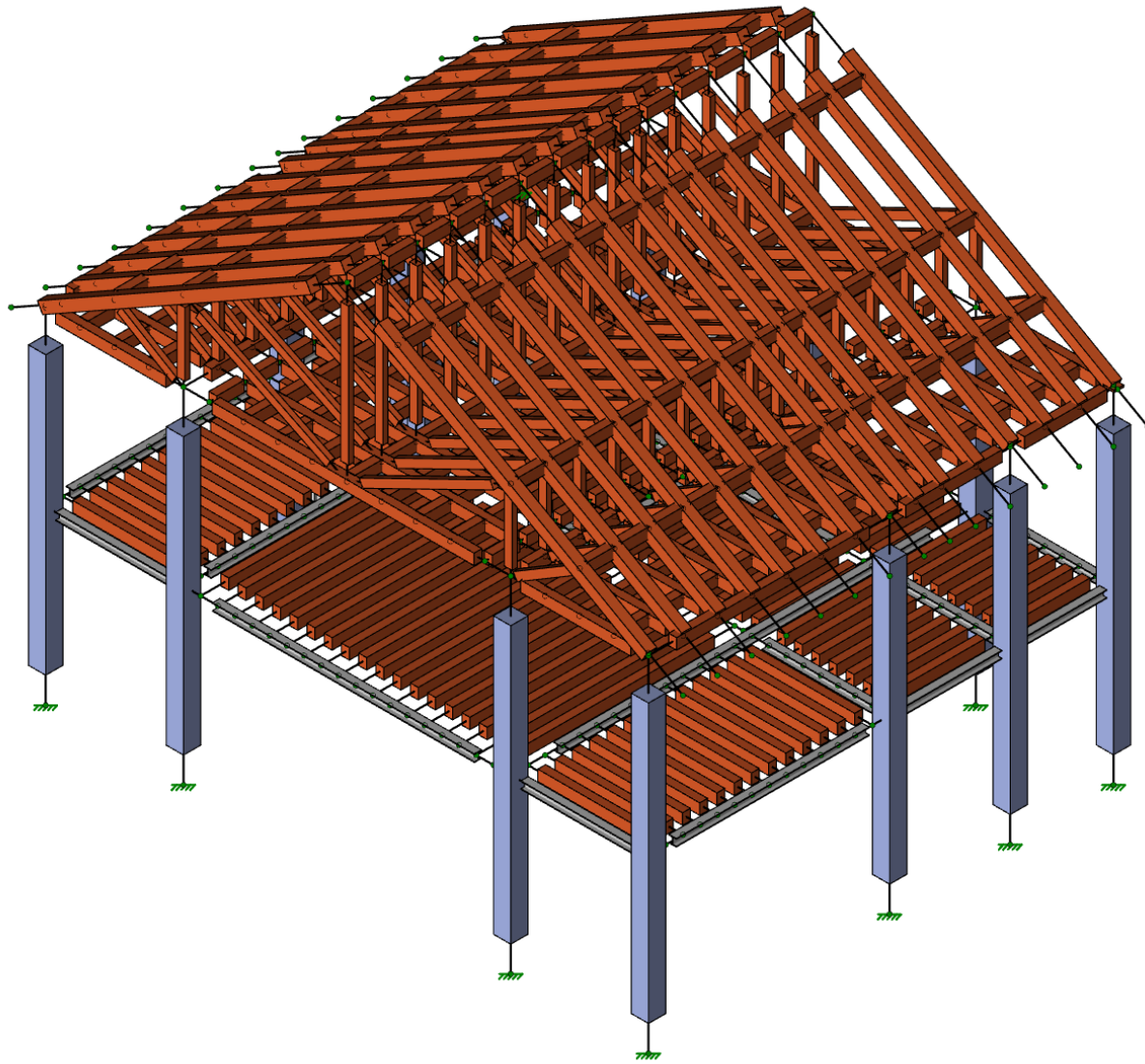
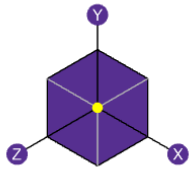
- Standard Value of -0.04 ksf for Pennsylvania
- Applied to second story floor in the Y direction

Wind Loads

- Standard Value of 0.01 ksf for Pennsylvania
- Applied to all exterior walls in the X and Z directions

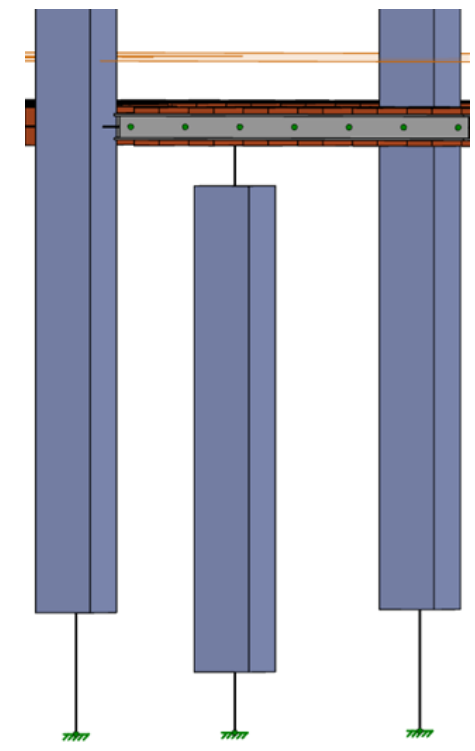
Snow Loads

- Standard Value of -0.035 k/ft for Pennsylvania
- Applied to the roof in the Y direction



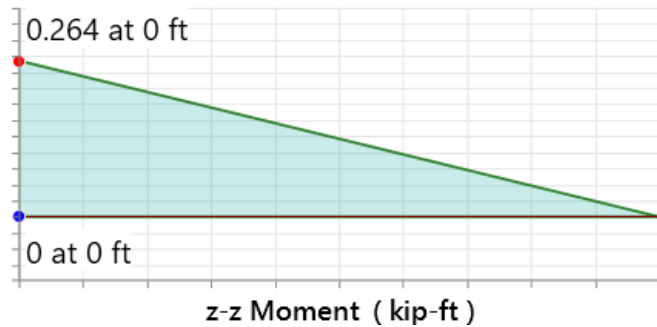
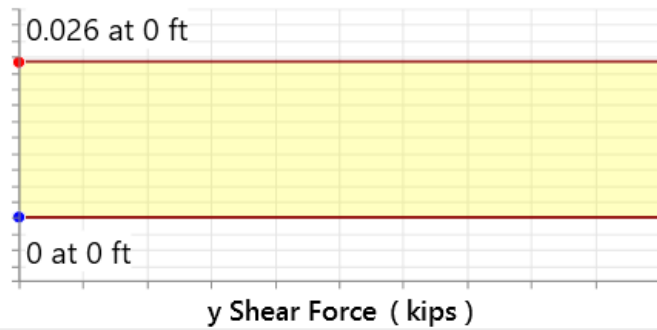
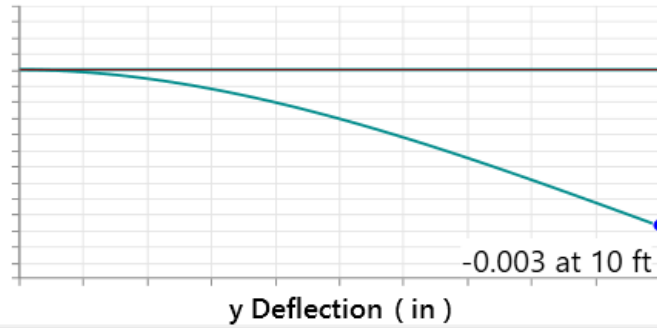
3D Structure
RISA

Shape	CRECT 12X12
Member Type	Column
Length	10.0 ft
Material Type	Concrete
Design Rule	Typical
Number of Internal Sections	97
Design Code	ACI 318-19
Material	Conc4000NW



Detail Report

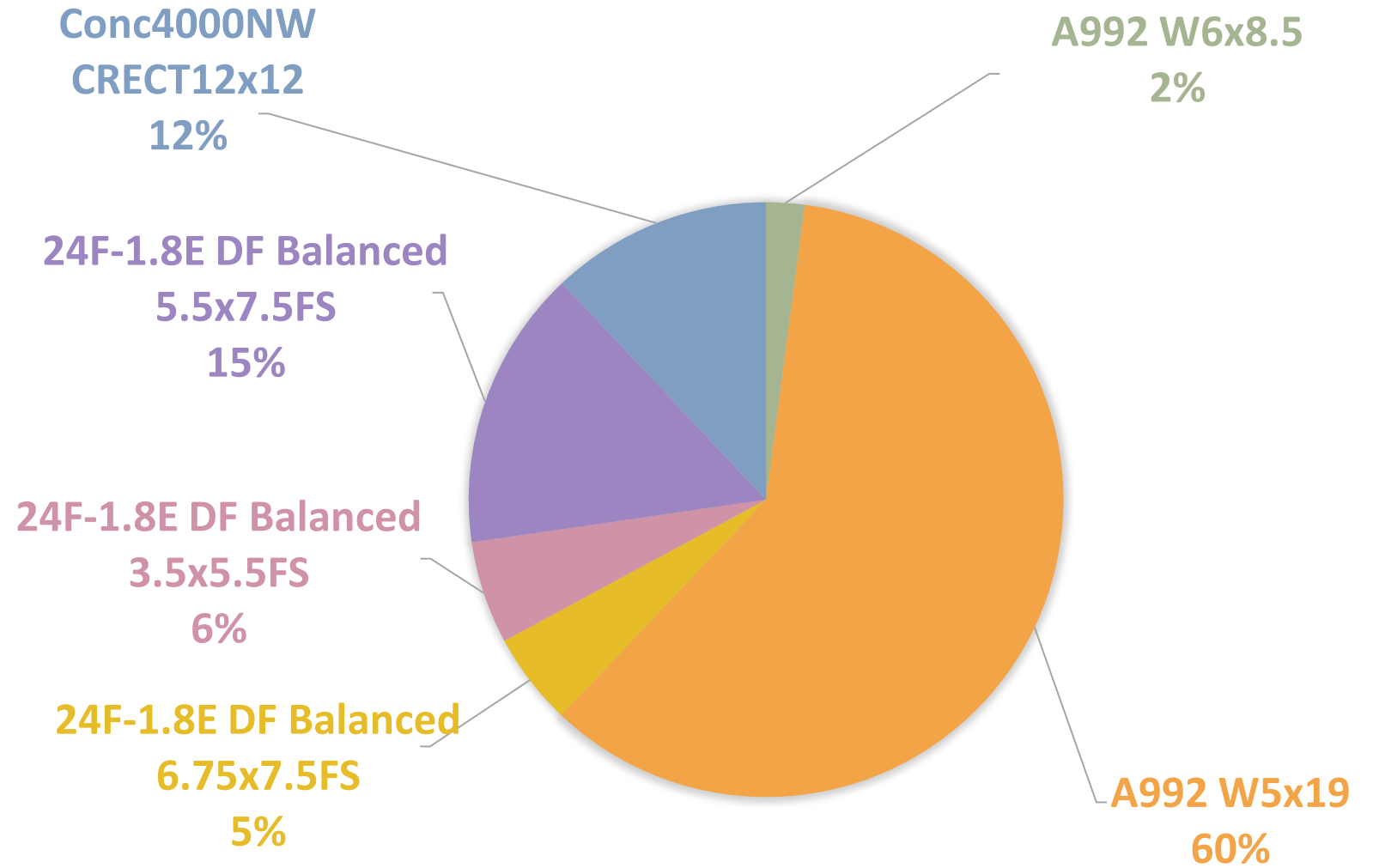
Interior Concrete Single Story Support Column



Detail Report

Interior Concrete Single Story Support Column

Material Takeoff



Material Takeoff

Total Materials Used

- Wood
 - Length: 3458 ft
 - Weight: 32.213 kips
- Steel
 - Length: 281 ft
 - Weight: 5.109 kips
- Concrete
 - Volume: 10.8 yds³
 - Weight: 42.199 kips

Total Project Cost

- Wood
 - \$0.77 per foot
 - Total wood cost is \$2,662.66
- Steel
 - \$1.25 per pound
 - Total steel cost is \$6,386.25
- Concrete
 - \$117 per cubic yard
 - Total concrete cost is \$1,263.60

Total Cost of Project: \$10,312.51

Thank you for watching!