



STRUCTURAL DESIGN CALCULATIONS

PROJECT: SCOOTERS COFFEE

LOCATION: 1816 N REYNOLDS RD.
BRYANT, ARKANSAS 72022

BUILDING CODE: 2012 INTERNATIONAL BUILDING CODE

DESIGN LOADS: 115 MPH DESIGN WIND SPEED (ULTIMATE)
20 PSF ROOF DEAD LOAD
20 PSF ROOF LIVE LOAD

DATE: AUGUST 31, 2022



PROJECT: SCOOTERS COFFEE JOB NO.: 22434
SUBJECT: DESIGN LOADS DATE: 8/31/2022
BY: CMB

ALL DESIGN LOADS PER THE 2012 INTERNATIONAL BUILDING CODE AND ASCE 7-10.

- ROOF LIVE LOAD (TABLE 4.3-1, ASCE7-10)
 - ORDINARY FLAT, PITCHED, AND CURVED ROOFS: 20 PSF

- ROOF DEAD LOAD (TABLE C3-1, ASCE7-10)
 - ROOFING (BITUMINOUS): 1.5 PSF
 - ROOF DECK (3/4" PLYWOOD): 2.4 PSF
 - INSULATION (3" RIGID): 4.5 PSF
 - WOOD JOIST: 4.0 PSF
 - HVAC ALLOWANCE: 4.0 PSF
 - CEILING SYSTEM, LIGHTING, ETC.: 3.6 PSF

$\Sigma =$ 20 PSF

- GROUND SNOW LOAD, P_g
 - $P_g = 10$ PSF

- MAIN WIND-FORCE RESISTING SYSTEM (SIMPLE DIAPHRAGM, LOW-RISE BUILDING) PER TABLE 28.5-1 OF ASCE 7-10

STEP 1: DETERMINE RISK CATEGORY OF BUILDING OR OTHER STRUCTURE

RISK CATEGORY II (TABLE 1.5-1)

STEP 2: DETERMINE THE BASIC WIND SPEED, V, FOR APPLICABLE RISK CATEGORY

$$V_{ULT} = 115 \text{ MPH}, V_{ASD} = \sqrt{0.6}V_{ULT} = \sqrt{0.6}(115) = 89 \text{ MPH (FIGURE 26.5-1B)}$$

STEP 3: DETERMINE WIND LOAD PARAMETERS

EXPOSURE CATEGORY B (SECTION 26.7)

$K_{zt} = 1.0$ (SECTION 26.8)

STEP 4: ENTER FIGURE TO DETERMINE WIND PRESSURES FOR $h=30$ FT, P_{S30} (FIGURE 28.6-1) (ROOF ANGLE 0 TO 5°)

| | | | |
|-------------|-------|-----|------------------|
| $P_{S30} =$ | +21.0 | PSF | ZONE A |
| = | -10.9 | PSF | ZONE B |
| = | +13.9 | PSF | ZONE C |
| = | -6.5 | PSF | ZONE D |
| = | -25.2 | PSF | ZONE E |
| = | -14.3 | PSF | ZONE F |
| = | -17.5 | PSF | ZONE G |
| = | -11.1 | PSF | ZONE H |
| = | -35.3 | PSF | OVERHANG, ZONE E |
| = | -27.6 | PSF | OVERHANG, ZONE G |

STEP 5: ENTER FIGURE TO DETERMINE ADJUSTMENT FOR BUILDING HEIGHT AND EXPOSURE, λ

$$\lambda = 1.00 \text{ (H = 13.0 FT, EXPOSURE B) – FIGURE 28.6-1}$$

STEP 6: DETERMINE ADJUSTED WIND PRESSURES, P_s

$P_s = \lambda K_{zt} P_{s30}$ (EQUATION 28.6-1)

| | | | |
|---------|-------|-----|------------------|
| $P_s =$ | +21.0 | PSF | ZONE A |
| = | -10.9 | PSF | ZONE B |
| = | +13.9 | PSF | ZONE C |
| = | -6.5 | PSF | ZONE D |
| = | -25.2 | PSF | ZONE E |
| = | -14.3 | PSF | ZONE F |
| = | -17.5 | PSF | ZONE G |
| = | -11.1 | PSF | ZONE H |
| = | -35.3 | PSF | OVERHANG, ZONE E |
| = | -27.6 | PSF | OVERHANG, ZONE G |

PER SECTION 28.6.4 OF ASCE 7-10, THE LOAD EFFECTS OF THE DESIGN WIND PRESSURES FROM SECTION 28.6.3 SHALL NOT BE LESS THAN A MINIMUM LOAD DEFINED BY ASSUMING THE PRESSURES, P_s , FOR ZONES A AND C EQUAL TO +16 PSF, ZONES B AND D EQUAL TO +8 PSF, WHILE ASSUMING P_s FOR ZONES E, F, G, AND H ARE EQUAL TO 0 PSF.

MINIMUM WIND PRESSURES, P_s

| | | | |
|---------|-------|-----|--------|
| $P_s =$ | +16.0 | PSF | ZONE A |
| = | +8.0 | PSF | ZONE B |
| = | +16.0 | PSF | ZONE C |
| = | +8.0 | PSF | ZONE D |
| = | 0 | PSF | ZONE E |
| = | 0 | PSF | ZONE F |
| = | 0 | PSF | ZONE G |
| = | 0 | PSF | ZONE H |

- COMPONENTS & CLADDING (SIMPLIFIED METHOD) PER TABLE 30.5-1 OF ASCE 7-10

STEP 1: DETERMINE RISK CATEGORY OF BUILDING OR OTHER STRUCTURE

RISK CATEGORY II (TABLE 1.5-1)

STEP 2: DETERMINE THE BASIC WIND SPEED, V, FOR APPLICABLE RISK CATEGORY

$$V_{ULT} = 115 \text{ MPH}, V_{ASD} = \sqrt{0.6}V_{ULT} = \sqrt{0.6}(115) = 89 \text{ MPH (FIGURE 26.5-1B)}$$

STEP 3: DETERMINE WIND LOAD PARAMETERS

EXPOSURE CATEGORY B (SECTION 26.7)

$K_{zt} = 1.0$ (SECTION 26.8)

STEP 4: ENTER FIGURE TO DETERMINE WIND PRESSURES AT $h=30$ FT, P_{NET30} (FIGURE 30.5-1) (ROOF ANGLE 0 TO 7°)

| | | |
|---------------|-----------|---|
| $P_{NET30} =$ | +7.7 PSF | ZONE 1, EFFECTIVE AREA = 100 FT ² |
| | -21.8 PSF | |
| = | +7.7 PSF | ZONE 2, EFFECTIVE AREA = 100 FT ² |
| | -25.8 PSF | |
| = | +7.7 PSF | ZONE 3, EFFECTIVE AREA = 100 FT ² |
| | -25.8 PSF | |
| = | +22.7 PSF | WALL, ZONE 4, EFFECTIVE AREA = 20 FT ² |
| | -24.7 PSF | |
| = | +22.7 PSF | WALL, ZONE 5, EFFECTIVE AREA = 20 FT ² |
| | -29.7 PSF | |

STEP 5: ENTER FIGURE TO DETERMINE ADJUSTMENT FOR BUILDING HEIGHT AND EXPOSURE, λ

$$\lambda = 1.0 \text{ (H = 13.6 FT, EXPOSURE B) – FIGURE 30.5-1}$$

STEP 6: DETERMINE ADJUSTED WIND PRESSURES, P_{NET}

$$P_{NET} = \lambda K_{zt} P_{NET30} \text{ (EQUATION 30.5-1)}$$
$$P_{NET} = \begin{array}{l} +7.7 \text{ PSF} \text{ ZONE 1, EFFECTIVE AREA} = 100 \text{ FT}^2 \\ -21.8 \text{ PSF} \\ \\ = +7.7 \text{ PSF} \text{ ZONE 2, EFFECTIVE AREA} = 100 \text{ FT}^2 \\ -25.8 \text{ PSF} \\ \\ = +7.7 \text{ PSF} \text{ ZONE 3, EFFECTIVE AREA} = 100 \text{ FT}^2 \\ -25.8 \text{ PSF} \\ \\ = +22.7 \text{ PSF} \text{ WALL, ZONE 4, EFFECTIVE AREA} = 20 \text{ FT}^2 \\ -24.7 \text{ PSF} \\ \\ = +22.7 \text{ PSF} \text{ WALL, ZONE 5, EFFECTIVE AREA} = 20 \text{ FT}^2 \\ -29.7 \text{ PSF} \end{array}$$

PER SECTION 30.2.2 OF ASCE 7-10, THE DESIGN WIND PRESSURE FOR COMPONENTS AND CLADDING OF BUILDINGS SHALL NOT BE LESS THAN A NET PRESSURE OF 16 PSF ACTING IN EITHER DIRECTION NORMAL TO THE SURFACE.

- MAIN WIND-FORCE RESISTING SYSTEM (PARAPETS) PER SECTION 28.3.2 OF ASCE 7-10

$$P_p = q_p (GC_{pN}) \text{ (EQUATION 28.3-2)}$$

$$q_p = 0.00256K_zK_{zt}K_dV^2 \text{ (EQUATION 26.10-1)}$$

$$K_z = 0.70 \text{ (H = 19 FT, EXPOSURE B, TABLE 28.3-1)}$$

$$K_{zt} = 1.0 \text{ (SECTION 26.8.2)}$$

$$K_d = 0.85 \text{ (TABLE 26.6-1)}$$

$$V_{ULT} = 115 \text{ MPH (FIGURE 26.5-1B)}$$

$$q_p = 0.00256(0.70)(1.0)(0.85)(115)^2 = 20.1 \text{ PSF}$$

$$P_p = 20.1 \text{ PSF (+1.5)} = +30.2 \text{ PSF (WINDWARD PARAPET)}$$

$$P_p = 20.1 \text{ PSF (-1.0)} = -20.1 \text{ PSF (LEEWARD PARAPET)}$$

- COMPONENTS & CLADDING (PARAPETS) PER TABLE 30.9-1 OF ASCE 7-10

STEP 1: DETERMINE RISK CATEGORY OF BUILDING OR OTHER STRUCTURE

RISK CATEGORY II (TABLE 1.5-1)

STEP 2: DETERMINE THE BASIC WIND SPEED, V, FOR APPLICABLE RISK CATEGORY

$$V_{ULT} = 115 \text{ MPH, } V_{ASD} = \sqrt{0.6}V_{ULT} = \sqrt{0.6}(115) = 89 \text{ MPH (FIGURE 26.5-1B)}$$

STEP 3: DETERMINE WIND LOAD PARAMETERS

$$K_d = 0.85 \text{ (TABLE 26.6-1)}$$

EXPOSURE CATEGORY B (SECTION 26.7)

$$K_{zt} = 1.0 \text{ (SECTION 26.8)}$$

ENCLOSED BUILDING (SECTION 26.10)

INTERNAL PRESSURE COEFFICIENT, $GC_{pi} = \pm 0.18$ (TABLE 26.11-1)

STEP 4: DETERMINE VELOCITY PRESSURE EXPOSURE COEFFICIENT

$$K_h = 0.70 \text{ (H = 19 FT, EXPOSURE B, TABLE 30.3-1)}$$

STEP 5: DETERMINE VELOCITY PRESSURE q_p

$$q_p = 0.00256K_h K_{zt} K_d V^2 \text{ (EQUATION 30.3-1)}$$

$$q_p = 0.00256(0.70)(1.0)(0.85)(115)^2 = 20.1 \text{ PSF}$$

STEP 6: DETERMINE EXTERNAL PRESSURE COEFFICIENT FOR WALL AND ROOF SURFACES
ADJACENT TO PARAPET, (GC_p)

$$GC_p = +0.9 \text{ (WALL, ZONE 5, EFFECTIVE AREA = 20 FT}^2\text{)}$$

$$= -1.3 \text{ (WALL, ZONE 5, EFFECTIVE AREA = 20 FT}^2\text{)}$$

$$= -1.1 \text{ (ROOF, ZONE 3, EFFECTIVE AREA = 100 FT}^2\text{)}$$

STEP 7: CALCULATE WIND PRESSURE, P

$$\text{LOAD CASE A: } +0.9 - (-1.1) = +2.0$$

$$P = q_p(GC_p - GC_{pi}) \text{ (EQUATION 30.9-1)}$$

$$P = 20.1 \text{ PSF (+2.0 + 0.18)}$$

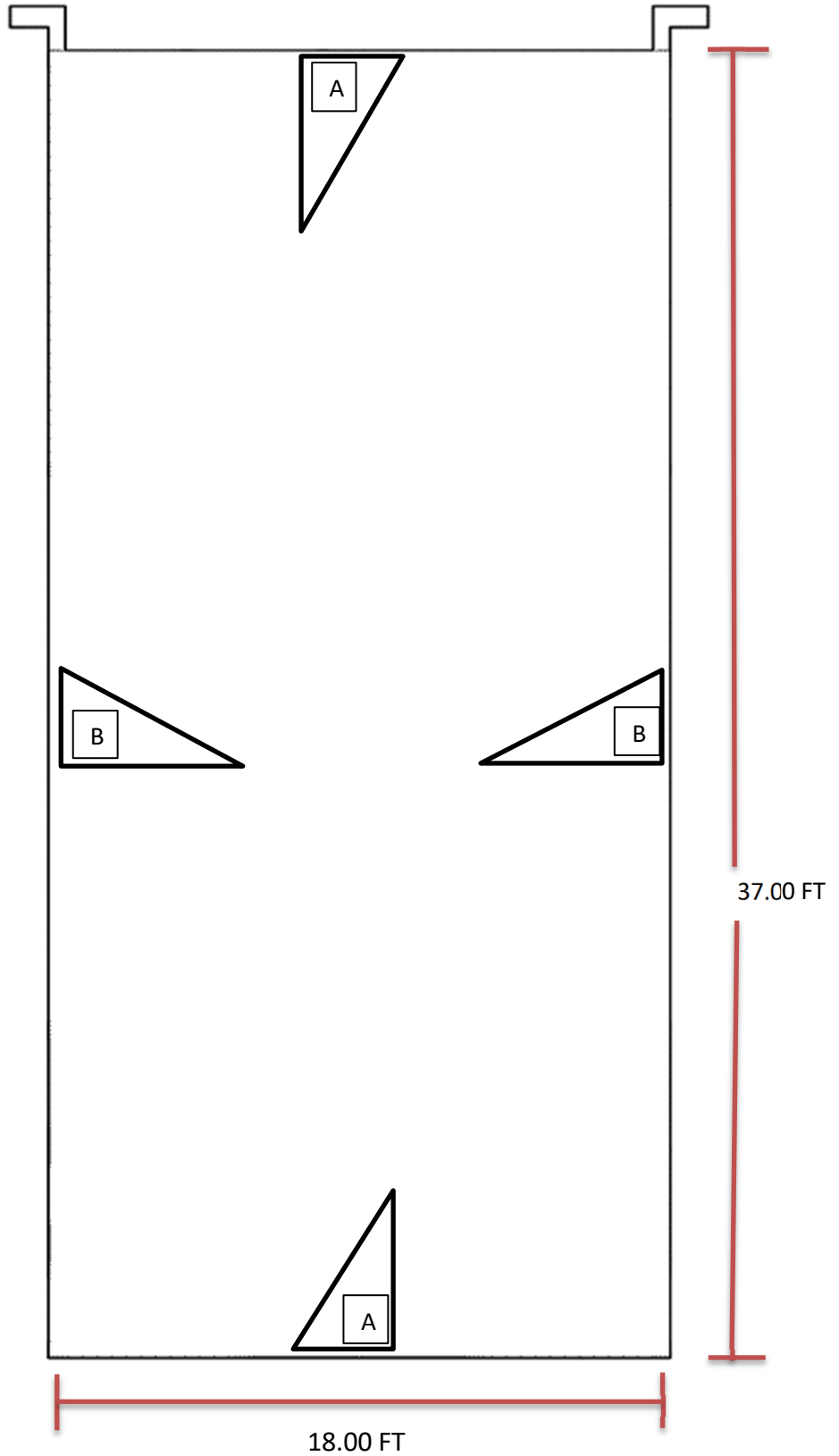
$$P = 43.8 \text{ PSF}$$

$$\text{LOAD CASE B: } +0.9 - (-1.3) = +2.2$$

$$P = 20.1 \text{ PSF (+2.2 + 0.18)}$$

$$P = 47.8 \text{ PSF}$$

B.O. DECK: 12.85 FT
 T. O. PARAPET: 18.25 FT
 PARAPET HEIGHT: 5.40 FT



B.O. DECK: 13.60 FT
 T. O. PARAPET: 19.00 FT
 PARAPET HEIGHT: 5.40 FT

GROUND SNOW LOAD (P_g) : 10.0 PSF (ASCE 7-10: 7.2)

FLAT ROOF SNOW LOAD (ASCE 7-10: 7.3)

$$P_f = .7C_e C_t I_s P_g \quad \text{Equation 7.3-1}$$

$$C_e = 1.0$$

$$C_t = 1.0$$

$$I_s = 1.0$$

$$P_g = 10.0 \text{ PSF}$$

$$P_f = 7.0 \text{ PSF}$$

MINIMUM SNOW LOAD FOR LOW- SLOPE ROOFS (ASCE7-10: 7.3.4)

$$P_m = 20 * I_s \quad \text{for Ground Snow} > 20$$

$$P_m = I_s P_g \quad \text{for Ground Snow} < 20$$

$$I_s = 1.0$$

$$P_g = 10.0 \text{ PSF}$$

$$P_m = 10.0 \text{ PSF}$$

SNOW DENSITY

$$\gamma = .013P_g + 14 \quad \text{but no more than 30 pcf} \quad (\text{ASCE 7-10 : 7.7-1})$$

$$P_g = 10.0 \text{ PSF}$$

$$\gamma = 14.13 \text{ PCF}$$

BASE SNOW HEIGHT

$$h_b = P_f / \gamma$$

$$P_f = 10.0 \text{ PSF}$$

$$\gamma = 14.13 \text{ PCF}$$

$$h_b = 0.71 \text{ FT}$$

SNOW DRIFT A

FULL DRIFT

$$h_d = .43 \sqrt[3]{l_u} \sqrt[4]{P_g + 10} - 1.5$$

(ASCE 7-10 : FIG. 7-9)

$$l_u = 37.00 \text{ FT}$$

if less than 20 FT use 20 FT

$$P_g = 10.0 \text{ PSF}$$

$$h_d = 1.53 \text{ FT}$$

MULTIPLY BY 0.75 FOR PARAPET

$$0.75h_d = 1.15 \text{ FT}$$

LESS THAN PARAPET HEIGHT: 5.40 FT

THEREFORE FULL DRIFT POSSIBLE TRUE

MAXIMUM INTENSITY OF DRIFT SURCHARGE LOAD

$$P_d = h_d \gamma$$

$$h_d = 1.15 \text{ FT}$$

$$\gamma = 14.13 \text{ PCF}$$

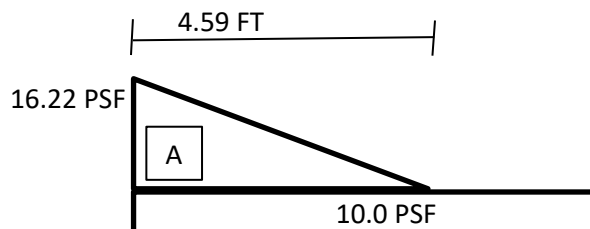
$$P_d = 16.22 \text{ PSF}$$

DRIFT LENGTH

$$w = 4h_d$$

$$h_d = 1.15 \text{ FT}$$

$$w = 4.59 \text{ FT}$$



SNOW DRIFT B

FULL DRIFT

$$h_d = .43 \sqrt[3]{l_u} \sqrt[4]{P_g + 10} - 1.5$$

(ASCE 7-10 : FIG. 7-9)

$$l_u = 20.00 \text{ FT}$$

20 if less than 20 FT use 20 FT

$$P_g = 10.0 \text{ PSF}$$

$$h_d = 0.97 \text{ FT}$$

$$0.75h_d = 0.73 \text{ FT}$$

MULTIPLY BY 0.75 FOR PARAPET

LESS THAN PARAPET HEIGHT: 5.40 FT

THEREFORE FULL DRIFT POSSIBLE TRUE

MAXIMUM INTENSITY OF DRIFT SURCHARGE LOAD

$$P_d = h_d \gamma$$

$$h_d = 0.73 \text{ FT}$$

$$\gamma = 14.13 \text{ PCF}$$

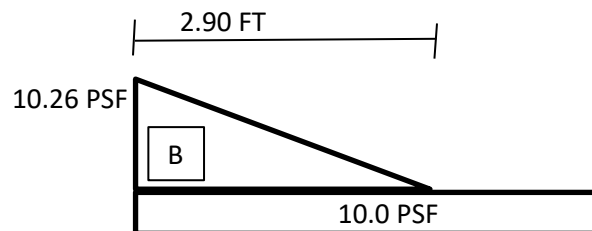
$$P_d = 10.26 \text{ PSF}$$

DRIFT LENGTH

$$w = 4h_d$$

$$h_d = 0.73 \text{ FT}$$

$$w = 2.90 \text{ FT}$$



- HEADER (A)

ROOF DEAD LOAD: 20 PSF TRIBUTARY WIDTH (ROOF) = 8' - 6"
ROOF LIVE LOAD: 20 PSF TRIBUTARY WIDTH (WALL) = 9' - 1"
WALL LOAD: 15 PSF

SPAN = 6' - 6"

USE (3) 2x10 W/ 1/2" PLYWOOD SPACERS*

- HEADER (B)

ROOF DEAD LOAD: 20 PSF TRIBUTARY WIDTH (ROOF) = 1' - 0"
ROOF LIVE LOAD: 20 PSF TRIBUTARY WIDTH (WALL) = 9' - 1"
WALL LOAD: 15 PSF

SPAN = 6' - 0"

USE (3) 2x8 W/ 1/2" PLYWOOD SPACERS*

- HEADER (C)

ROOF DEAD LOAD: 20 PSF TRIBUTARY WIDTH (ROOF) = 1' - 0"
ROOF LIVE LOAD: 20 PSF TRIBUTARY WIDTH (WALL) = 9' - 1"
WALL LOAD: 15 PSF

SPAN = 3' - 4"

USE (3) 2x6 W/ 1/2" PLYWOOD SPACERS*

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

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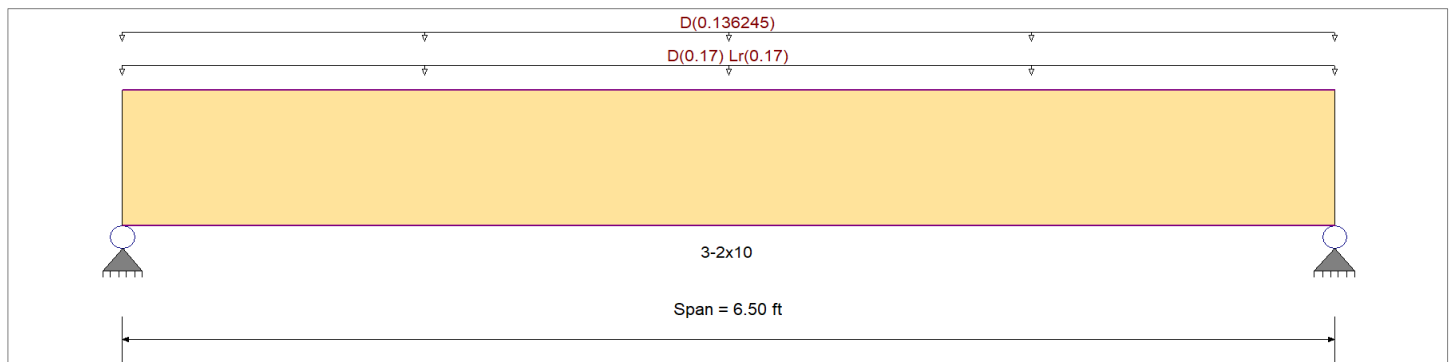
DESCRIPTION: HEADER A

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
 Load Combination Set : ASCE 7-10

Material Properties

| | | | | |
|--|-----------|-------------|---------------------------|------------|
| Analysis Method : Load Resistance Factor D | Fb + | 800.0 psi | E : Modulus of Elasticity | |
| Load Combination : ASCE 7-10 | Fb - | 800.0 psi | Ebend- xx | 1,400.0ksi |
| | Fc - Prll | 1,300.0 psi | Eminbend - xx | 510.0ksi |
| Wood Species : Southern Pine | Fc - Perp | 565.0 psi | | |
| Wood Grade : No.2: 2"-4" Thick: 10" Wide | Fv | 175.0 psi | | |
| | Ft | 475.0 psi | Density | 34.330pcf |
| Beam Bracing : Beam is Fully Braced against lateral-torsional buckling | | | | |



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
 Uniform Load : D = 0.020, Lr = 0.020 ksf, Tributary Width = 8.50 ft, (ROOF LOAD)
 Uniform Load : D = 0.0150 ksf, Tributary Width = 9.083 ft, (WALL LOAD)

DESIGN SUMMARY

Design OK

| | | | | | |
|-------------------------------------|---|------------------------------------|-----------------------------------|---|------------------|
| Maximum Bending Stress Ratio | = | 0.465 1 | Maximum Shear Stress Ratio | = | 0.193 : 1 |
| Section used for this span | | 3-2x10 | Section used for this span | | 3-2x10 |
| fb: Actual | = | 643.31 psi | fv: Actual | = | 58.47 psi |
| Fb: Allowable | = | 1,382.40 psi | Fv: Allowable | = | 302.40 psi |
| Load Combination | = | +1.20D+1.60Lr | Load Combination | = | +1.20D+1.60Lr |
| Location of maximum on span | = | 3.250ft | Location of maximum on span | = | 5.741 ft |
| Span # where maximum occurs | = | Span # 1 | Span # where maximum occurs | = | Span # 1 |
| Maximum Deflection | | | | | |
| Max Downward Transient Deflection | | 0.017 in Ratio = 4719 >=360 | Span: 1 : Lr Only | | |
| Max Upward Transient Deflection | | 0 in Ratio = 0 <360 | n/a | | |
| Max Downward Total Deflection | | 0.047 in Ratio = 1650 >=180 | Span: 1 : +D+Lr | | |
| Max Upward Total Deflection | | 0 in Ratio = 0 <180 | n/a | | |

Maximum Forces & Stresses for Load Combinations

| Load Combination | Segment Length | Span # | Max Stress Ratios | | | | | | | | | Moment Values | | | Shear Values | | | | | |
|------------------|------------------|--------|-------------------|-------|------|------------------|----------------|----------------|----------------|----------------|----------------|---------------|--------|---------|--------------|------|------|------|-------|--------|
| | | | M | V | λ | C _{F/V} | C _i | C _r | C _m | C _t | C _L | Mu | fb | Fb | Vu | fv | Fv | | | |
| +1.40D | Length = 6.50 ft | 1 | 0.422 | 0.175 | 0.60 | 1.000 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 2.34 | 437.14 | 1036.80 | 0.00 | 0.00 | 0.00 | 1.10 | 39.73 | 226.80 |
| +1.20D+0.50Lr | Length = 6.50 ft | 1 | 0.332 | 0.138 | 0.80 | 1.000 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 2.45 | 458.64 | 1382.40 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| +1.20D | Length = 6.50 ft | 1 | 0.271 | 0.113 | 0.80 | 1.000 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 2.00 | 374.69 | 1382.40 | 0.00 | 0.00 | 0.00 | 0.95 | 34.06 | 302.40 |
| +1.20D+1.60Lr | Length = 6.50 ft | 1 | 0.465 | 0.193 | 0.80 | 1.000 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 3.44 | 643.31 | 1382.40 | 0.00 | 0.00 | 0.00 | 1.62 | 58.47 | 302.40 |
| +0.90D | Length = 6.50 ft | 1 | 0.163 | 0.068 | 1.00 | 1.000 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.50 | 281.02 | 1728.00 | 0.00 | 0.00 | 0.00 | 0.71 | 25.54 | 378.00 |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

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DESCRIPTION: HEADER A

Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|------------------|------|---------------|------------------|------------------|---------------|------------------|
| +D+Lr | 1 | 0.0473 | 3.274 | | 0.0000 | 0.000 |

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

| Load Combination | Support 1 | Support 2 |
|------------------|-----------|-----------|
| Overall MAXimum | 1.580 | 1.580 |
| Overall MINimum | 0.553 | 0.553 |
| D Only | 1.028 | 1.028 |
| +D+Lr | 1.580 | 1.580 |
| +D+0.750Lr | 1.442 | 1.442 |
| +0.60D | 0.617 | 0.617 |
| Lr Only | 0.553 | 0.553 |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

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DESCRIPTION: HEADER B

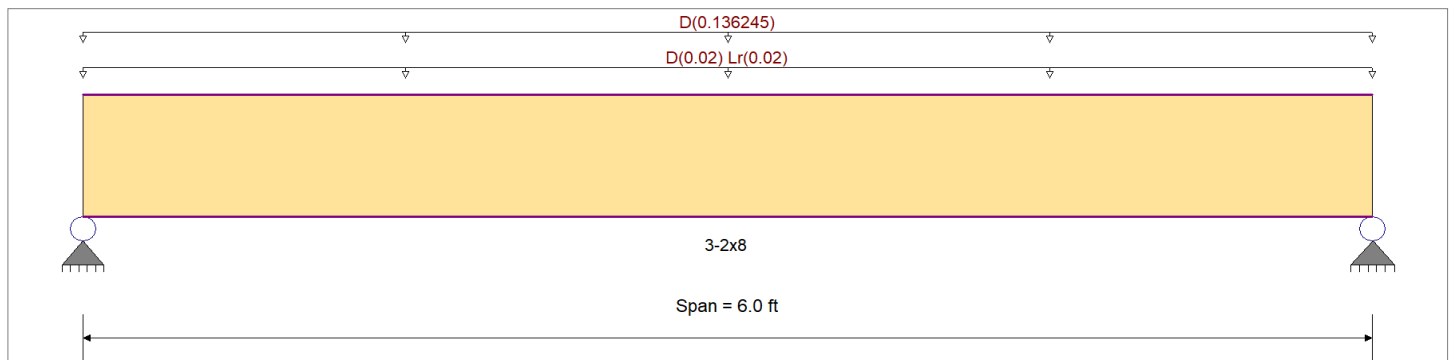
CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10

Load Combination Set : ASCE 7-10

Material Properties

| | | | | |
|--|-----------|-------------|----------------------------------|------------|
| Analysis Method : Allowable Stress Design | Fb + | 925.0 psi | <i>E : Modulus of Elasticity</i> | |
| Load Combination : ASCE 7-10 | Fb - | 925.0 psi | Ebend- xx | 1,400.0ksi |
| | Fc - Prll | 1,350.0 psi | Eminbend - xx | 510.0ksi |
| Wood Species : Southern Pine | Fc - Perp | 565.0 psi | | |
| Wood Grade : No.2: 2"-4" Thick: 8" Wide | Fv | 175.0 psi | | |
| | Ft | 550.0 psi | Density | 34.330pcf |
| Beam Bracing : Beam is Fully Braced against lateral-torsional buckling | | | | |



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading

Uniform Load : D = 0.020, Lr = 0.020, Tributary Width = 1.0 ft, (ROOF LOAD)

Uniform Load : D = 0.0150 ksf, Tributary Width = 9.083 ft, (WALL LOAD)

DESIGN SUMMARY

Design OK

| | | | | | |
|-------------------------------------|---|------------------------------|-----------------------------------|---|------------------|
| Maximum Bending Stress Ratio | = | 0.270 : 1 | Maximum Shear Stress Ratio | = | 0.115 : 1 |
| Section used for this span | | 3-2x8 | Section used for this span | | 3-2x8 |
| fb: Actual | = | 224.68psi | fv: Actual | = | 18.17 psi |
| Fb: Allowable | = | 832.50psi | Fv: Allowable | = | 157.50 psi |
| Load Combination | | D Only | Load Combination | | D Only |
| Location of maximum on span | = | 3.000ft | Location of maximum on span | = | 0.000 ft |
| Span # where maximum occurs | = | Span # 1 | Span # where maximum occurs | = | Span # 1 |
| Maximum Deflection | | | | | |
| Max Downward Transient Deflection | | 0.003 in Ratio = 24556 >=360 | Span: 1 : Lr Only | | |
| Max Upward Transient Deflection | | 0 in Ratio = 0 <360 | n/a | | |
| Max Downward Total Deflection | | 0.027 in Ratio = 2668 >=180 | Span: 1 : +D+Lr | | |
| Max Upward Total Deflection | | 0 in Ratio = 0 <180 | n/a | | |

Maximum Forces & Stresses for Load Combinations

| Load Combination | Segment Length | Span # | Max Stress Ratios | | | | | | | | Moment Values | | | Shear Values | | | | | | | | |
|------------------|-----------------|--------|-------------------|-------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|------|------|--------------|--------|---------|------|-------|--------|------|-------|--------|
| | | | M | V | C _d | C _{F/V} | C _i | C _r | C _m | C _t | C _L | M | fb | F'b | V | fv | F'v | | | | | |
| D Only | Length = 6.0 ft | 1 | 0.270 | 0.115 | 0.90 | 1.000 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.74 | 224.68 | 832.50 | 0.00 | 0.00 | 0.00 | 0.40 | 18.17 | 157.50 |
| +D+Lr | Length = 6.0 ft | 1 | 0.218 | 0.093 | 1.25 | 1.000 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.83 | 252.07 | 1156.25 | 0.00 | 0.00 | 0.00 | 0.44 | 20.38 | 218.75 |
| +D+0.750Lr | Length = 6.0 ft | 1 | 0.212 | 0.091 | 1.25 | 1.000 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.81 | 245.23 | 1156.25 | 0.00 | 0.00 | 0.00 | 0.43 | 19.83 | 218.75 |
| +0.60D | Length = 6.0 ft | 1 | 0.091 | 0.039 | 1.60 | 1.000 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.44 | 134.81 | 1480.00 | 0.24 | 10.90 | 280.00 | 0.24 | 10.90 | 280.00 |

Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|------------------|------|---------------|------------------|------------------|---------------|------------------|
| +D+Lr | 1 | 0.0270 | 3.022 | | 0.0000 | 0.000 |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

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DESCRIPTION: HEADER B**Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

| Load Combination | Support 1 | Support 2 |
|------------------|-----------|-----------|
| Overall MAXimum | 0.552 | 0.552 |
| Overall MINimum | 0.060 | 0.060 |
| D Only | 0.492 | 0.492 |
| +D+Lr | 0.552 | 0.552 |
| +D+0.750Lr | 0.537 | 0.537 |
| +0.60D | 0.295 | 0.295 |
| Lr Only | 0.060 | 0.060 |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

(c) ENERCALC INC 1983-2022

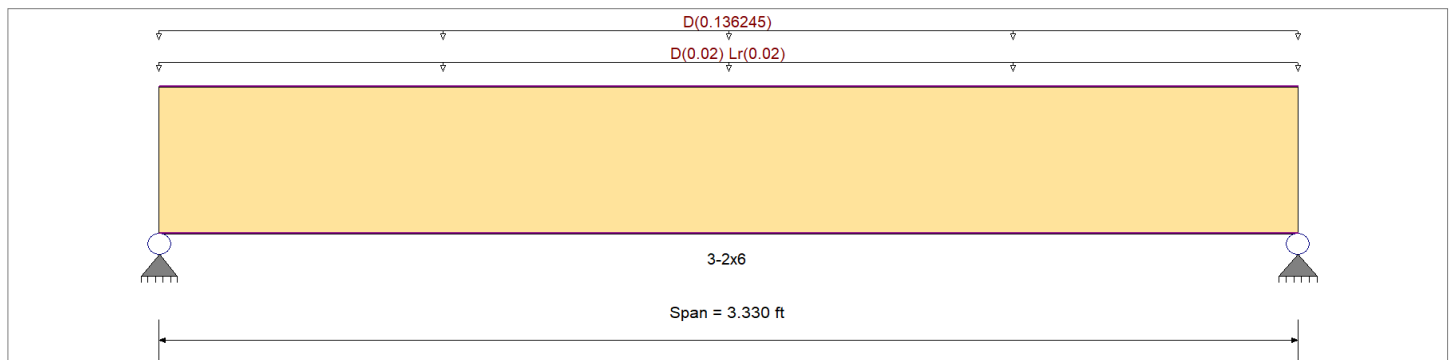
DESCRIPTION: HEADER C

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
 Load Combination Set : ASCE 7-10

Material Properties

| | | | |
|--|-----------|-------------|----------------------------------|
| Analysis Method : Allowable Stress Design | Fb + | 1,000.0 psi | <i>E : Modulus of Elasticity</i> |
| Load Combination : ASCE 7-10 | Fb - | 1,000.0 psi | Ebend- xx 1,400.0ksi |
| | Fc - Prll | 1,400.0 psi | Eminbend - xx 510.0ksi |
| Wood Species : Southern Pine | Fc - Perp | 565.0 psi | |
| Wood Grade : No.2: 2"-4" Thick: 5"-6" Wide | Fv | 175.0 psi | |
| | Ft | 600.0 psi | Density 34.330pcf |
| Beam Bracing : Beam is Fully Braced against lateral-torsional buckling | | | |



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
 Uniform Load : D = 0.020, Lr = 0.020, Tributary Width = 1.0 ft, (ROOF LOAD)
 Uniform Load : D = 0.0150 ksf, Tributary Width = 9.083 ft, (WALL LOAD)

DESIGN SUMMARY

Design OK

| | | | | | | | |
|-------------------------------------|---|--------------|---------|-----------------------------------|-----------------|--------------|-----|
| Maximum Bending Stress Ratio | = | 0.132 | 1 | Maximum Shear Stress Ratio | = | 0.076 | : 1 |
| Section used for this span | | 3-2x6 | | Section used for this span | | 3-2x6 | |
| fb: Actual | = | 118.88 psi | | fv: Actual | = | 11.94 psi | |
| Fb: Allowable | = | 900.00 psi | | Fv: Allowable | = | 157.50 psi | |
| Load Combination | | D Only | | Load Combination | | D Only | |
| Location of maximum on span | = | 1.665 ft | | Location of maximum on span | = | 0.000 ft | |
| Span # where maximum occurs | = | Span # 1 | | Span # where maximum occurs | = | Span # 1 | |
| Maximum Deflection | | | | | | | |
| Max Downward Transient Deflection | | 0 in | Ratio = | 0 < 360 | n/a | | |
| Max Upward Transient Deflection | | 0 in | Ratio = | 0 < 360 | n/a | | |
| Max Downward Total Deflection | | 0.006 in | Ratio = | 6886 >= 180 | Span: 1 : +D+Lr | | |
| Max Upward Total Deflection | | 0 in | Ratio = | 0 < 180 | n/a | | |

Maximum Forces & Stresses for Load Combinations

| Load Combination | Segment Length | Span # | Max Stress Ratios | | | | | | | | Moment Values | | | Shear Values | | | | | | |
|------------------|-------------------|--------|-------------------|-------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|------|--------|--------------|------|------|------|------|-------|--------|
| | | | M | V | C _d | C _{F/V} | C _i | C _r | C _m | C _t | C _L | M | fb | F'b | V | fv | F'v | | | |
| D Only | Length = 3.330 ft | 1 | 0.132 | 0.076 | 0.90 | 1.000 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.22 | 118.88 | 900.00 | 0.00 | 0.00 | 0.00 | 0.20 | 11.94 | 157.50 |
| +D+Lr | Length = 3.330 ft | 1 | 0.107 | 0.061 | 1.25 | 1.000 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.25 | 133.54 | 1250.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 218.75 |
| +D+0.750Lr | Length = 3.330 ft | 1 | 0.104 | 0.060 | 1.25 | 1.000 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.25 | 129.87 | 1250.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 218.75 |
| +0.60D | Length = 3.330 ft | 1 | 0.045 | 0.026 | 1.60 | 1.000 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.13 | 71.33 | 1600.00 | 0.00 | 0.00 | 0.00 | 0.12 | 7.17 | 280.00 |

Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|------------------|------|---------------|------------------|------------------|---------------|------------------|
| +D+Lr | 1 | 0.0058 | 1.677 | | 0.0000 | 0.000 |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

(c) ENERCALC INC 1983-2022

DESCRIPTION: HEADER C**Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

| Load Combination | Support 1 | Support 2 |
|------------------|-----------|-----------|
| Overall MAXimum | 0.303 | 0.303 |
| Overall MINimum | 0.033 | 0.033 |
| D Only | 0.270 | 0.270 |
| +D+Lr | 0.303 | 0.303 |
| +D+0.750Lr | 0.295 | 0.295 |
| +0.60D | 0.162 | 0.162 |
| Lr Only | 0.033 | 0.033 |

- ROOF JOIST: TYPICAL

| | | | |
|-----------------|----|-----|----------------------------------|
| ROOF DEAD LOAD: | 20 | PSF | TRIBUTARY WIDTH (ROOF) = 1' - 4" |
| ROOF LIVE LOAD: | 20 | PSF | |
| | | | SPAN = 17' - 0" |
| | | | USE: 2X12* |

- ROOF JOIST: AHU

| | | | |
|-----------------|------|-----|----------------------------------|
| ROOF DEAD LOAD: | 20 | PSF | TRIBUTARY WIDTH (ROOF) = 1' - 4" |
| ROOF LIVE LOAD: | 20 | PSF | |
| MECH LOAD: | 62.5 | LBS | @ 7' - 9" |
| MECH LOAD: | 62.5 | LBS | @ 11' - 9" |
| | | | SPAN = 17' - 0" |
| | | | USE: 2X12* |

- ROOF JOIST: MECH @ HEADERED JOIST

| | | | |
|-----------------|------|-----|----------------------------------|
| ROOF DEAD LOAD: | 20 | PSF | TRIBUTARY WIDTH (ROOF) = 1' - 4" |
| ROOF LIVE LOAD: | 20 | PSF | |
| MECH LOAD: | 83.3 | LBS | @ 11' - 3" |
| | | | SPAN = 17' - 0" |
| | | | USE: 2X12* |

- ROOF JOIST: WATER HEATER

| | | | |
|--------------------|-----|-----|----------------------------------|
| ROOF DEAD LOAD: | 20 | PSF | TRIBUTARY WIDTH (ROOF) = 1' - 4" |
| ROOF LIVE LOAD: | 20 | PSF | |
| WATER HEATER LOAD: | 300 | LBS | @ 16' - 0" |
| | | | SPAN = 17' - 0" |
| | | | USE: 2X12* |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

(c) ENERCALC INC 1983-2022

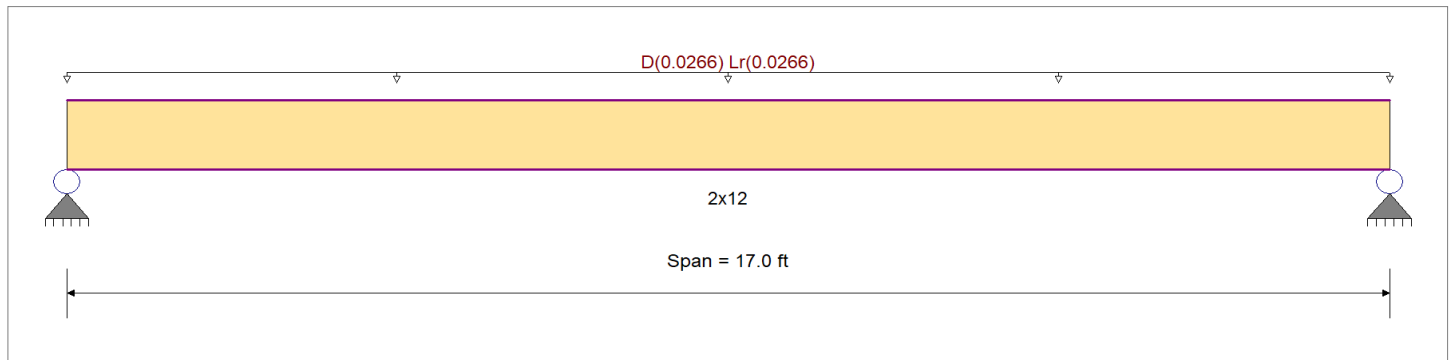
DESCRIPTION: ROOF JOIST: TYPICAL

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-10

Material Properties

| | | | |
|--|-----------|-------------|-----------------------------------|
| Analysis Method : Allowable Stress Design | Fb + | 750.0 psi | E : Modulus of Elasticity |
| Load Combination : ASCE 7-10 | Fb - | 750.0 psi | Ebend- xx |
| | Fc - Prll | 1,250.0 psi | Eminbend - xx |
| Wood Species : Southern Pine | Fc - Perp | 565.0 psi | |
| Wood Grade : No.2: 2"-4" Thick: 12" Wide | Fv | 175.0 psi | Density |
| | Ft | 450.0 psi | Repetitive Member Stress Increase |
| Beam Bracing : Beam is Fully Braced against lateral-torsional buckling | | | |



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.020, Lr = 0.020 ksf, Tributary Width = 1.330 ft, (ROOF LOAD)

DESIGN SUMMARY

Design OK

| | | | | | |
|-------------------------------------|----------|--------------------|-----------------------------------|---|------------------|
| Maximum Bending Stress Ratio | = | 0.727 : 1 | Maximum Shear Stress Ratio | = | 0.176 : 1 |
| Section used for this span | | 2x12 | Section used for this span | | 2x12 |
| fb: Actual | = | 784.00 psi | fv: Actual | = | 38.50 psi |
| Fb: Allowable | = | 1,078.13 psi | Fv: Allowable | = | 218.75 psi |
| Load Combination | | +D+Lr | Load Combination | | +D+Lr |
| Location of maximum on span | = | 8.500ft | Location of maximum on span | = | 0.000ft |
| Span # where maximum occurs | = | Span # 1 | Span # where maximum occurs | = | Span # 1 |
| Maximum Deflection | | | | | |
| Max Downward Transient Deflection | 0.202 in | Ratio = 1010 >=360 | Span: 1 : Lr Only | | |
| Max Upward Transient Deflection | 0 in | Ratio = 0 <360 | n/a | | |
| Max Downward Total Deflection | 0.434 in | Ratio = 469 >=180 | Span: 1 : +D+Lr | | |
| Max Upward Total Deflection | 0 in | Ratio = 0 <180 | n/a | | |

Maximum Forces & Stresses for Load Combinations

| Load Combination | Segment Length | Span # | Max Stress Ratios | | | | | | | | | Moment Values | | | Shear Values | | | | |
|------------------|------------------|--------|-------------------|-------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|---------------|--------|---------|--------------|------|------|------|--------|
| | | | M | V | C _d | C _{F/V} | C _i | C _r | C _m | C _t | C _L | M | fb | F'b | V | fv | F'v | | |
| D Only | Length = 17.0 ft | 1 | 0.540 | 0.131 | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 1.00 | 1.11 | 419.56 | 776.25 | 0.00 | 0.00 | 0.00 | 0.00 | 157.50 |
| +D+Lr | Length = 17.0 ft | 1 | 0.727 | 0.176 | 1.25 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 1.00 | 2.07 | 784.00 | 1078.13 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| +D+0.750Lr | Length = 17.0 ft | 1 | 0.643 | 0.156 | 1.25 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 1.00 | 1.83 | 692.89 | 1078.13 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| +0.60D | Length = 17.0 ft | 1 | 0.182 | 0.044 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 1.00 | 0.66 | 251.74 | 1380.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|------------------|------|---------------|------------------|------------------|---------------|------------------|
| +D+Lr | 1 | 0.4341 | 8.562 | | 0.0000 | 0.000 |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

(c) ENERCALC INC 1983-2022

DESCRIPTION: ROOF JOIST: TYPICAL

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

| Load Combination | Support 1 | Support 2 |
|------------------|-----------|-----------|
| Overall MAXimum | 0.486 | 0.486 |
| Overall MINimum | 0.226 | 0.226 |
| D Only | 0.260 | 0.260 |
| +D+Lr | 0.486 | 0.486 |
| +D+0.750Lr | 0.430 | 0.430 |
| +0.60D | 0.156 | 0.156 |
| Lr Only | 0.226 | 0.226 |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

(c) ENERCALC INC 1983-2022

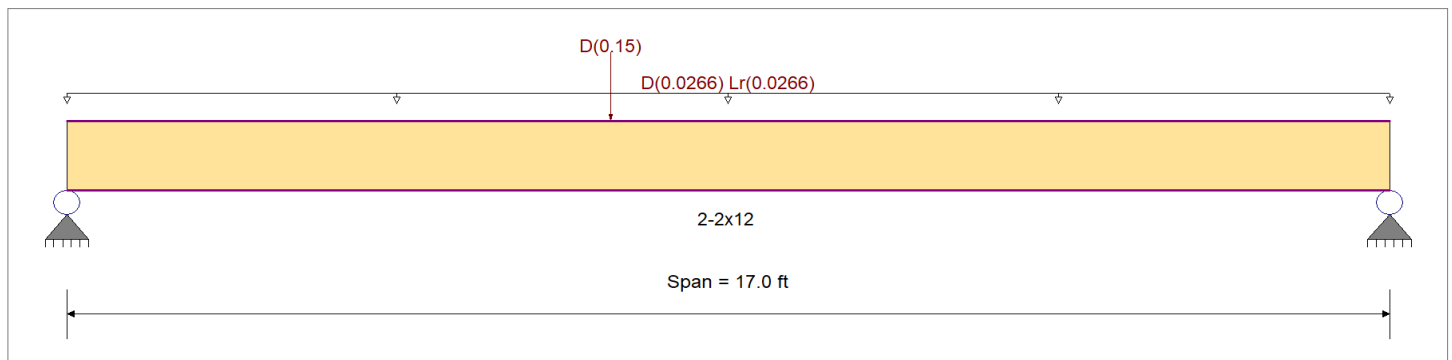
DESCRIPTION: ROOF JOIST: AHU

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-10

Material Properties

| | | | |
|--|-----------|-------------|-----------------------------------|
| Analysis Method : Allowable Stress Design | Fb + | 750.0 psi | E : Modulus of Elasticity |
| Load Combination : ASCE 7-10 | Fb - | 750.0 psi | Ebend- xx |
| | Fc - Prll | 1,250.0 psi | Eminbend - xx |
| Wood Species : Southern Pine | Fc - Perp | 565.0 psi | |
| Wood Grade : No.2: 2"-4" Thick: 12" Wide | Fv | 175.0 psi | Density |
| | Ft | 450.0 psi | Repetitive Member Stress Increase |
| Beam Bracing : Beam is Fully Braced against lateral-torsional buckling | | | |



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.020, Lr = 0.020 ksf, Tributary Width = 1.330 ft, (ROOF LOAD)
Point Load : D = 0.150 k @ 7.0 ft, (MECH LOAD)

DESIGN SUMMARY

Design OK

| | | | | | |
|-------------------------------------|----------|------------------|-----------------------------------|-------|-------------------|
| Maximum Bending Stress Ratio | = | 0.487 : 1 | Maximum Shear Stress Ratio | = | 0.112 : 1 |
| Section used for this span | | 2-2x12 | Section used for this span | | 2-2x12 |
| fb: Actual | = | 525.02 psi | fv: Actual | = | 24.53 psi |
| Fb: Allowable | = | 1,078.13 psi | Fv: Allowable | = | 218.75 psi |
| Load Combination | | +D+Lr | Load Combination | | +D+Lr |
| Location of maximum on span | = | 7.507 ft | Location of maximum on span | = | 0.000 ft |
| Span # where maximum occurs | = | Span # 1 | Span # where maximum occurs | = | Span # 1 |
| Maximum Deflection | | | | | |
| Max Downward Transient Deflection | 0.101 in | Ratio = | 2021 | >=360 | Span: 1 : Lr Only |
| Max Upward Transient Deflection | 0 in | Ratio = | 0 | <360 | n/a |
| Max Downward Total Deflection | 0.284 in | Ratio = | 719 | >=180 | Span: 1 : +D+Lr |
| Max Upward Total Deflection | 0 in | Ratio = | 0 | <180 | n/a |

Maximum Forces & Stresses for Load Combinations

| Load Combination | Segment Length | Span # | Max Stress Ratios | | | | | | | | Moment Values | | | Shear Values | | | | | | |
|------------------|------------------|--------|-------------------|-------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|------|--------|--------------|------|------|------|------|-------|--------|
| | | | M | V | C _d | C _{F/V} | C _i | C _r | C _m | C _t | C _L | M | fb | F'b | V | fv | F'v | | | |
| D Only | Length = 17.0 ft | 1 | 0.447 | 0.099 | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 1.00 | 1.83 | 347.05 | 776.25 | 0.00 | 0.00 | 0.00 | 0.35 | 15.58 | 157.50 |
| +D+Lr | Length = 17.0 ft | 1 | 0.487 | 0.112 | 1.25 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 1.00 | 2.77 | 525.02 | 1078.13 | 0.00 | 0.00 | 0.00 | 0.55 | 24.53 | 218.75 |
| +D+0.750Lr | Length = 17.0 ft | 1 | 0.445 | 0.102 | 1.25 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 1.00 | 2.53 | 480.18 | 1078.13 | 0.00 | 0.00 | 0.00 | 0.50 | 22.29 | 218.75 |
| +0.60D | Length = 17.0 ft | 1 | 0.151 | 0.033 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 1.00 | 1.10 | 208.23 | 1380.00 | 0.00 | 0.00 | 0.00 | 0.21 | 9.35 | 280.00 |

Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|------------------|------|---------------|------------------|------------------|---------------|------------------|
| +D+Lr | 1 | 0.2835 | 8.438 | | 0.0000 | 0.000 |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

(c) ENERCALC INC 1983-2022

DESCRIPTION: ROOF JOIST: AHU**Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

| Load Combination | Support 1 | Support 2 |
|------------------|-----------|-----------|
| Overall MAXimum | 0.609 | 0.582 |
| Overall MINimum | 0.226 | 0.226 |
| D Only | 0.383 | 0.356 |
| +D+Lr | 0.609 | 0.582 |
| +D+0.750Lr | 0.552 | 0.526 |
| +0.60D | 0.230 | 0.214 |
| Lr Only | 0.226 | 0.226 |

Wood Beam

Project File: 22434 scooters framing.ecb

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

(c) ENERCALC INC 1983-2022

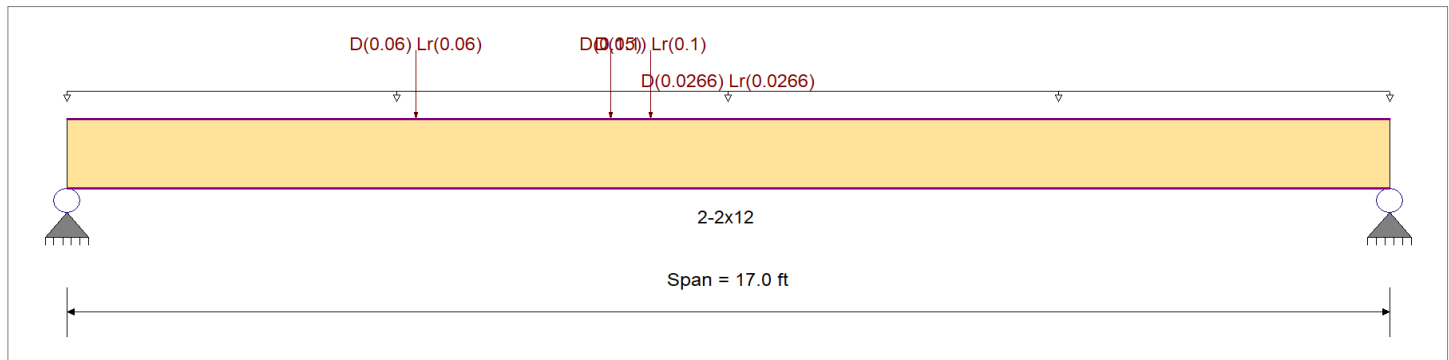
DESCRIPTION: ROOF JOIST: CU

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-10

Material Properties

| | | | |
|--|-----------|-------------|-----------------------------------|
| Analysis Method : Allowable Stress Design | Fb + | 750.0 psi | E : Modulus of Elasticity |
| Load Combination : ASCE 7-10 | Fb - | 750.0 psi | Ebend- xx |
| | Fc - Prll | 1,250.0 psi | Eminbend - xx |
| Wood Species : Southern Pine | Fc - Perp | 565.0 psi | |
| Wood Grade : No.2: 2"-4" Thick: 12" Wide | Fv | 175.0 psi | Density |
| | Ft | 450.0 psi | Repetitive Member Stress Increase |
| Beam Bracing : Beam is Fully Braced against lateral-torsional buckling | | | |



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.020, Lr = 0.020 ksf, Tributary Width = 1.330 ft, (ROOF LOAD)
Point Load : D = 0.150 k @ 7.0 ft, (MECH LOAD)
Point Load : D = 0.060, Lr = 0.060 k @ 4.50 ft, (HEADER LOAD 1)
Point Load : D = 0.10, Lr = 0.10 k @ 7.50 ft, (HEADER LOAD 2)

DESIGN SUMMARY

Design OK

| | | | |
|-----------------------------------|------------------|-------------------------------|-------------------|
| Maximum Bending Stress Ratio = | 0.687 : 1 | Maximum Shear Stress Ratio = | 0.153 : 1 |
| Section used for this span | 2-2x12 | Section used for this span | 2-2x12 |
| fb: Actual = | 741.03 psi | fv: Actual = | 33.41 psi |
| Fb: Allowable = | 1,078.13 psi | Fv: Allowable = | 218.75 psi |
| Load Combination | +D+Lr | Load Combination | +D+Lr |
| Location of maximum on span = | 7.507 ft | Location of maximum on span = | 0.000 ft |
| Span # where maximum occurs = | Span # 1 | Span # where maximum occurs = | Span # 1 |
| Maximum Deflection | | | |
| Max Downward Transient Deflection | 0.151 in | Ratio = | 1347 >=360 |
| Max Upward Transient Deflection | 0 in | Ratio = | 0 <360 |
| Max Downward Total Deflection | 0.385 in | Ratio = | 530 >=180 |
| Max Upward Total Deflection | 0 in | Ratio = | 0 <180 |

Maximum Forces & Stresses for Load Combinations

| Load Combination | Segment Length | Span # | Max Stress Ratios | | | | | | | | Moment Values | | | Shear Values | | | | | |
|------------------|------------------|--------|-------------------|-------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|------|--------|--------------|------|-------|--------|------|------|
| | | | M | V | C _d | C _{F/V} | C _i | C _r | C _m | C _t | C _L | M | fb | F'b | V | fv | F'v | | |
| D Only | Length = 17.0 ft | 1 | 0.584 | 0.127 | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 1.00 | 2.39 | 453.29 | 776.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| +D+Lr | Length = 17.0 ft | 1 | 0.687 | 0.153 | 1.25 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 1.00 | 3.91 | 741.03 | 1078.13 | 0.75 | 33.41 | 218.75 | 0.00 | 0.00 |
| +D+0.750Lr | Length = 17.0 ft | 1 | 0.621 | 0.137 | 1.25 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 1.00 | 3.53 | 669.09 | 1078.13 | 0.68 | 30.07 | 218.75 | 0.00 | 0.00 |
| +0.60D | Length = 17.0 ft | 1 | 0.197 | 0.043 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 1.00 | 1.43 | 271.97 | 1380.00 | 0.27 | 12.01 | 280.00 | 0.00 | 0.00 |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

(c) ENERCALC INC 1983-2022

DESCRIPTION: ROOF JOIST: CU

Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|------------------|------|---------------|------------------|------------------|---------------|------------------|
| +D+Lr | 1 | 0.3846 | 8.314 | | 0.0000 | 0.000 |

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

| Load Combination | Support 1 | Support 2 |
|------------------|-----------|-----------|
| Overall MAXimum | 0.809 | 0.702 |
| Overall MINimum | 0.326 | 0.286 |
| D Only | 0.483 | 0.416 |
| +D+Lr | 0.809 | 0.702 |
| +D+0.750Lr | 0.727 | 0.631 |
| +0.60D | 0.290 | 0.250 |
| Lr Only | 0.326 | 0.286 |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

(c) ENERCALC INC 1983-2022

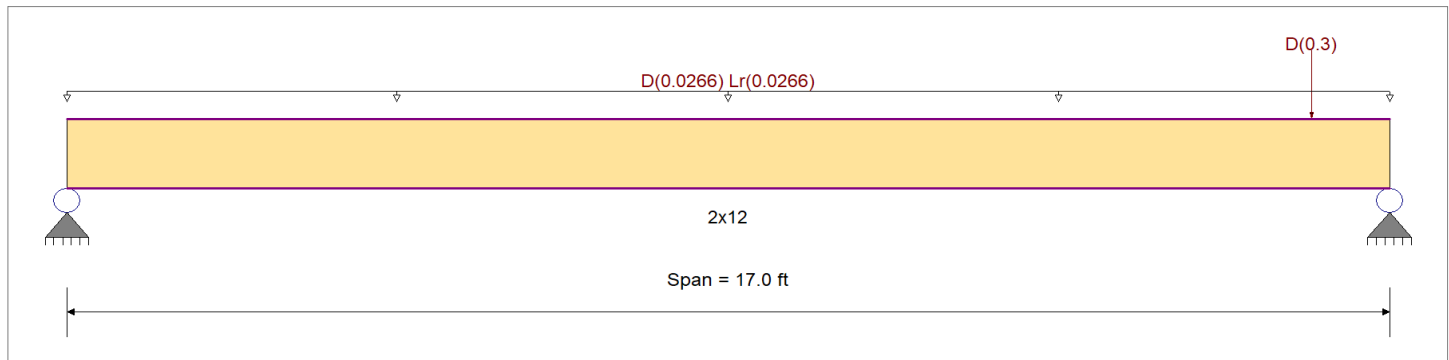
DESCRIPTION: ROOF JOIST: WATER HEATER

CODE REFERENCES

Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-10

Material Properties

| | | | |
|--|-----------|-------------|-----------------------------------|
| Analysis Method : Allowable Stress Design | Fb + | 750.0 psi | E : Modulus of Elasticity |
| Load Combination : ASCE 7-10 | Fb - | 750.0 psi | Ebend- xx |
| | Fc - Prll | 1,250.0 psi | Eminbend - xx |
| Wood Species : Southern Pine | Fc - Perp | 565.0 psi | |
| Wood Grade : No.2: 2"-4" Thick: 12" Wide | Fv | 175.0 psi | Density |
| | Ft | 450.0 psi | Repetitive Member Stress Increase |
| Beam Bracing : Beam is Fully Braced against lateral-torsional buckling | | | |



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.020, Lr = 0.020 ksf, Tributary Width = 1.330 ft, (ROOF LOAD)
Point Load : D = 0.30 k @ 16.0 ft, (WATER HEATER LOAD)

DESIGN SUMMARY

Design OK

| | | | | | |
|-------------------------------------|----------|------------------|-----------------------------------|-------------------|------------------|
| Maximum Bending Stress Ratio | = | 0.781 : 1 | Maximum Shear Stress Ratio | = | 0.291 : 1 |
| Section used for this span | | 2x12 | Section used for this span | | 2x12 |
| fb: Actual | = | 841.92 psi | fv: Actual | = | 63.60 psi |
| Fb: Allowable | = | 1,078.13 psi | Fv: Allowable | = | 218.75 psi |
| Load Combination | | +D+Lr | Load Combination | | +D+Lr |
| Location of maximum on span | = | 8.810 ft | Location of maximum on span | = | 16.069 ft |
| Span # where maximum occurs | = | Span # 1 | Span # where maximum occurs | = | Span # 1 |
| Maximum Deflection | | | | | |
| Max Downward Transient Deflection | 0.202 in | Ratio = 1010 | >=360 | Span: 1 : Lr Only | |
| Max Upward Transient Deflection | 0 in | Ratio = 0 | <360 | n/a | |
| Max Downward Total Deflection | 0.472 in | Ratio = 432 | >=180 | Span: 1 : +D+Lr | |
| Max Upward Total Deflection | 0 in | Ratio = 0 | <180 | n/a | |

Maximum Forces & Stresses for Load Combinations

| Load Combination | Segment Length | Span # | Max Stress Ratios | | | | | | | | Moment Values | | | Shear Values | | | | | | |
|------------------|------------------|--------|-------------------|-------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|------|--------|--------------|------|------|------|------|-------|--------|
| | | | M | V | C _d | C _{F/V} | C _i | C _r | C _m | C _t | C _L | M | fb | F'b | V | fv | F'v | | | |
| D Only | Length = 17.0 ft | 1 | 0.616 | 0.290 | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 1.00 | 1.26 | 478.37 | 776.25 | 0.00 | 0.00 | 0.00 | 0.51 | 45.70 | 157.50 |
| +D+Lr | Length = 17.0 ft | 1 | 0.781 | 0.291 | 1.25 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 1.00 | 2.22 | 841.92 | 1078.13 | 0.00 | 0.00 | 0.00 | 0.72 | 63.60 | 218.75 |
| +D+0.750Lr | Length = 17.0 ft | 1 | 0.697 | 0.270 | 1.25 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 1.00 | 1.98 | 750.94 | 1078.13 | 0.00 | 0.00 | 0.00 | 0.67 | 59.13 | 218.75 |
| +0.60D | Length = 17.0 ft | 1 | 0.208 | 0.098 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 1.00 | 0.76 | 287.02 | 1380.00 | 0.00 | 0.00 | 0.00 | 0.31 | 27.42 | 280.00 |

Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|------------------|------|---------------|------------------|------------------|---------------|------------------|
| +D+Lr | 1 | 0.4718 | 8.624 | | 0.0000 | 0.000 |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

(c) ENERCALC INC 1983-2022

DESCRIPTION: ROOF JOIST: WATER HEATER**Vertical Reactions**

Support notation : Far left is #1

Values in KIPS

| Load Combination | Support 1 | Support 2 |
|------------------|-----------|-----------|
| Overall MAXimum | 0.504 | 0.769 |
| Overall MINimum | 0.226 | 0.226 |
| D Only | 0.278 | 0.543 |
| +D+Lr | 0.504 | 0.769 |
| +D+0.750Lr | 0.448 | 0.712 |
| +0.60D | 0.167 | 0.326 |
| Lr Only | 0.226 | 0.226 |

PROJECT: SCOOTERS COFFEE JOB NO.: 22434
SUBJECT: GRADE BEAM DESIGN DATE: 8/31/2022
BY: CMB

- GRADE BEAM (WORST CASE)

ROOF DEAD LOAD: 20 PSF TRIBUTARY WIDTH (ROOF) = 8' - 6"
ROOF LIVE LOAD: 20 PSF TRIBUTARY WIDTH (WALL) = 18' - 0"
WALL LOAD: 20 PSF
GRADE BEAM WIDTH: 1' - 6"
TOTAL LOAD = (20 + 20) PSF (8.5') + (20) PSF (18.0') = 700 PLF
ALLOWABLE = 1' - 4" (2,500) = 3,333 PLF > 680 PLF **OK**

USE 1'-4" x 2'-0" GRADE BEAM W/ (2) #5 TOP, BOT. & INT. W/ #3 STIRRUPS AT 18" O.C.

- WOOD STUDS: LOAD CASE A

HEIGHT: 19' – 0" TRIBUTARY WIDTH (SPACING) = 16" O.C.
LATERAL WIND LOAD:
PARAPET: 43.8 PSF (LOAD CASE A C&C PARAPET: ULT) 13.6 FT TO 19 FT
MAIN BLDG: 22.7 PSF (WALL ZONE 5 C&C: ULT.) 0 FT TO 13.6 FT

USE 2X6 STUDS @ 16" O.C.*

- WOOD STUDS: LOAD CASE B

HEIGHT: 19' – 0" TRIBUTARY WIDTH (SPACING) = 16" O.C.
LATERAL WIND LOAD:
PARAPET: 47.8 PSF (LOAD CASE B C&C PARAPET: ULT) 13.5 FT TO 19 FT
MAIN BLDG: 29.7 PSF (WALL ZONE 5 C&C: ULT.) 0 FT TO 13.5 FT

USE 2X6 STUDS @ 16" O.C.*

- WOOD STUDS: LOAD CASE A

HEIGHT: 18' – 3" TRIBUTARY WIDTH (SPACING) = 16" O.C.
LATERAL WIND LOAD:
PARAPET: 43.8 PSF (LOAD CASE A C&C PARAPET: ULT) 12.9 FT TO 18.3 FT
MAIN BLDG: 22.7 PSF (WALL ZONE 5 C&C: ULT.) 0 FT TO 12.9 FT

USE 2X6 STUDS @ 16" O.C.*

- WOOD STUDS: LOAD CASE B

HEIGHT: 18' – 3" TRIBUTARY WIDTH (SPACING) = 16" O.C.
LATERAL WIND LOAD:
PARAPET: 47.8 PSF (LOAD CASE B C&C PARAPET: ULT) 12.9 FT TO 18.3 FT
MAIN BLDG: 29.7 PSF (WALL ZONE 5 C&C: ULT.) 0 FT TO 12.9 FT

USE 2X6 STUDS @ 16" O.C.*

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

(c) ENERCALC INC 1983-2022

DESCRIPTION: Load Case A: Wood Stud: 19'-0"

CODE REFERENCES

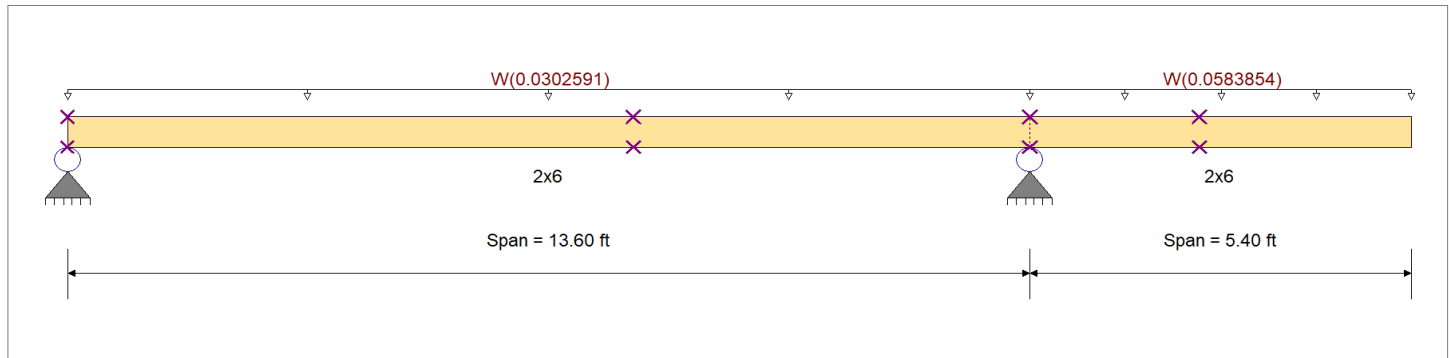
Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-10

Material Properties

| | | | |
|--|-----------|-------------|-----------------------------------|
| Analysis Method : Allowable Stress Design | Fb + | 1,000.0 psi | <i>E : Modulus of Elasticity</i> |
| Load Combination : ASCE 7-10 | Fb - | 1,000.0 psi | Ebend- xx 1,400.0ksi |
| | Fc - Prll | 1,400.0 psi | Eminbend - xx 510.0ksi |
| Wood Species : Southern Pine | Fc - Perp | 565.0 psi | |
| Wood Grade : No.2: 2"-4" Thick: 5"-6" Wide | Fv | 175.0 psi | |
| | Ft | 600.0 psi | Density 34.330pcf |
| Beam Bracing : Beam bracing is defined as a set spacing over all spans | | | Repetitive Member Stress Increase |

Unbraced Lengths

First Brace starts at 8.0 ft from Left-Most support
Regular spacing of lateral supports on length of beam = 8.0 ft



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Load for Span Number 1
Uniform Load : W = 0.02270 ksf, Tributary Width = 1.333 ft
Load for Span Number 2
Uniform Load : W = 0.04380 ksf, Tributary Width = 1.333 ft

DESIGN SUMMARY

Design OK

| | | | | | |
|-------------------------------------|-----------|------------------|-----------------------------------|------------------|------------------|
| Maximum Bending Stress Ratio | = | 0.521 : 1 | Maximum Shear Stress Ratio | = | 0.123 : 1 |
| Section used for this span | | 2x6 | Section used for this span | | 2x6 |
| fb: Actual | = | 810.45 psi | fv: Actual | = | 34.39 psi |
| Fb: Allowable | = | 1,555.12 psi | Fv: Allowable | = | 280.00 psi |
| Load Combination | | +0.60W | Load Combination | | +0.60W |
| Location of maximum on span | = | 13.600ft | Location of maximum on span | = | 13.600 ft |
| Span # where maximum occurs | = | Span # 1 | Span # where maximum occurs | = | Span # 1 |
| Maximum Deflection | | | | | |
| Max Downward Transient Deflection | 0.587 in | Ratio = 220 | >=120 | Span: 2 : W Only | |
| Max Upward Transient Deflection | -0.015 in | Ratio = 10650 | >=120 | Span: 1 : W Only | |
| Max Downward Total Deflection | 0.352 in | Ratio = 366 | >=120 | Span: 2 : +0.60W | |
| Max Upward Total Deflection | -0.009 in | Ratio = 17751 | >=120 | Span: 1 : +0.60W | |

Maximum Forces & Stresses for Load Combinations

| Load Combination | Segment Length | Span # | Max Stress Ratios | | | | | | | | | Moment Values | | | Shear Values | | |
|------------------|-------------------|--------|-------------------|-------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|---------------|--------|---------|--------------|-------|--------|
| | | | M | V | C _d | C _{F/V} | C _i | C _r | C _m | C _t | C _L | M | fb | F'b | V | fv | F'v |
| | Length = 7.978 ft | 1 | | | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.91 | | | 0.00 | 0.00 | 0.00 | 0.00 |
| | Length = 5.622 ft | 1 | | | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.95 | | | 942.32 | 0.00 | 0.00 | 157.50 |
| | Length = 2.383 ft | 2 | | | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.98 | | | 986.07 | 0.00 | 0.00 | 157.50 |
| | Length = 3.017 ft | 2 | | | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.98 | | | 1013.11 | 0.00 | 0.00 | 157.50 |
| +0.60W | | | | | | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.98 | | | 0.00 | 0.00 | 0.00 | 0.00 |
| | Length = 7.978 ft | 1 | 0.253 | 0.056 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.69 | 0.20 | 322.46 | 1276.67 | 0.09 | 15.62 | 280.00 |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

(c) ENERCALC INC 1983-2022

DESCRIPTION: Load Case A: Wood Stud: 19'-0"

Maximum Forces & Stresses for Load Combinations

| Load Combination | Segment Length | Span # | Max Stress Ratios | | | | | | | | | Moment Values | | | Shear Values | | |
|------------------|-------------------|--------|-------------------|-------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|---------------|--------|---------|--------------|----------------|----------------|
| | | | M | V | C _d | C _{F/V} | C _i | C _r | C _m | C _t | C _L | M | fb | F'b | V | f _v | F _v |
| | Length = 5.622 ft | 1 | 0.521 | 0.123 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.85 | 0.51 | 810.45 | 1555.12 | 0.19 | 34.39 | 280.00 |
| | Length = 2.383 ft | 2 | 0.456 | 0.123 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.97 | 0.51 | 810.45 | 1776.22 | 0.19 | 34.39 | 280.00 |
| | Length = 3.017 ft | 2 | 0.145 | 0.123 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.95 | 0.16 | 252.94 | 1745.48 | 0.11 | 34.39 | 280.00 |
| +0.450W | | | | | | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.95 | | | 0.00 | 0.00 | 0.00 | 0.00 |
| | Length = 7.978 ft | 1 | 0.189 | 0.042 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.69 | 0.15 | 241.84 | 1276.67 | 0.06 | 11.71 | 280.00 |
| | Length = 5.622 ft | 1 | 0.391 | 0.092 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.85 | 0.38 | 607.84 | 1555.12 | 0.14 | 25.80 | 280.00 |
| | Length = 2.383 ft | 2 | 0.342 | 0.092 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.97 | 0.38 | 607.84 | 1776.22 | 0.14 | 25.80 | 280.00 |
| | Length = 3.017 ft | 2 | 0.109 | 0.092 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.95 | 0.12 | 189.71 | 1745.48 | 0.08 | 25.80 | 280.00 |

Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|------------------|------|---------------|------------------|------------------|---------------|------------------|
| W Only | 1 | 0.2417 | 5.318 | W Only | -0.0153 | 12.688 |
| W Only | 2 | 0.5873 | 5.400 | | 0.0000 | 12.688 |

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

| Load Combination | Support 1 | Support 2 | Support 3 |
|------------------|-----------|-----------|-----------|
| Overall MAXimum | 0.143 | 0.584 | |
| Overall MINimum | 0.143 | 0.584 | |
| +0.60W | 0.086 | 0.350 | |
| +0.450W | 0.064 | 0.263 | |
| W Only | 0.143 | 0.584 | |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

(c) ENERCALC INC 1983-2022

DESCRIPTION: Load Case B: Wood Stud: 19'-0"

CODE REFERENCES

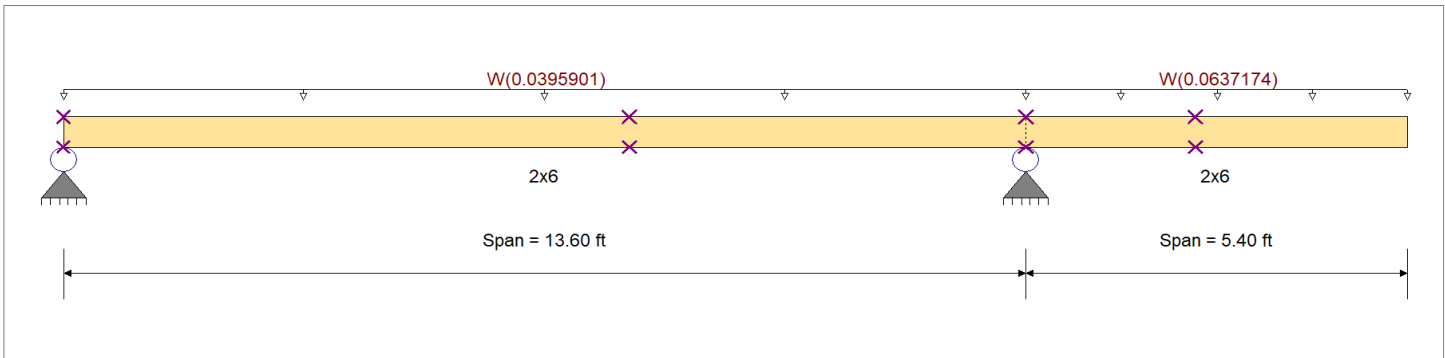
Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-10

Material Properties

| | | | |
|--|-----------|-------------|-----------------------------------|
| Analysis Method : Allowable Stress Design | Fb + | 1,000.0 psi | <i>E : Modulus of Elasticity</i> |
| Load Combination : ASCE 7-10 | Fb - | 1,000.0 psi | Ebend- xx 1,400.0ksi |
| | Fc - Prll | 1,400.0 psi | Eminbend - xx 510.0ksi |
| Wood Species : Southern Pine | Fc - Perp | 565.0 psi | |
| Wood Grade : No.2: 2"-4" Thick: 5"-6" Wide | Fv | 175.0 psi | |
| | Ft | 600.0 psi | |
| Beam Bracing : Beam bracing is defined as a set spacing over all spans | | | Density 34.330pcf |
| | | | Repetitive Member Stress Increase |

Unbraced Lengths

First Brace starts at 8.0 ft from Left-Most support
Regular spacing of lateral supports on length of beam = 8.0 ft



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added

Load for Span Number 1

Uniform Load : W = 0.02970 ksf, Tributary Width = 1.333 ft

Load for Span Number 2

Uniform Load : W = 0.04780 ksf, Tributary Width = 1.333 ft

DESIGN SUMMARY

Design OK

| | | | | | | | |
|-------------------------------------|---|--------------|-------------------|-----------------------------------|---|--------------|-----|
| Maximum Bending Stress Ratio | = | 0.569 | 1 | Maximum Shear Stress Ratio | = | 0.124 | : 1 |
| Section used for this span | | 2x6 | | Section used for this span | | 2x6 | |
| fb: Actual | = | 884.47 psi | | fv: Actual | = | 34.85 psi | |
| Fb: Allowable | = | 1,555.12 psi | | Fv: Allowable | = | 280.00 psi | |
| Load Combination | | +0.60W | | Load Combination | | +0.60W | |
| Location of maximum on span | = | 13.600ft | | Location of maximum on span | = | 13.144 ft | |
| Span # where maximum occurs | = | Span # 1 | | Span # where maximum occurs | = | Span # 1 | |
| Maximum Deflection | | | | | | | |
| Max Downward Transient Deflection | | 0.420 in | Ratio = 308 >=120 | Span: 2 : W Only | | | |
| Max Upward Transient Deflection | | 0 in | Ratio = 0 <120 | n/a | | | |
| Max Downward Total Deflection | | 0.252 in | Ratio = 512 >=120 | Span: 2 : +0.60W | | | |
| Max Upward Total Deflection | | 0 in | Ratio = 0 <120 | n/a | | | |

Maximum Forces & Stresses for Load Combinations

| Load Combination | Segment Length | Span # | Max Stress Ratios | | | | | | | | | Moment Values | | | Shear Values | | |
|------------------|-------------------|--------|-------------------|-------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|---------------|--------|---------|--------------|----------------|--------|
| | | | M | V | C _d | C _{F/V} | C _i | C _r | C _m | C _t | C _L | M | fb | F'b | V | f _v | F'v |
| | Length = 7.978 ft | 1 | | | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.91 | | | 0.00 | 0.00 | 0.00 | 0.00 |
| | Length = 5.622 ft | 1 | | | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.95 | | | 942.32 | 0.00 | 0.00 | 157.50 |
| | Length = 2.383 ft | 2 | | | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.98 | | | 986.07 | 0.00 | 0.00 | 157.50 |
| | Length = 3.017 ft | 2 | | | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.98 | | | 1013.11 | 0.00 | 0.00 | 157.50 |
| +0.60W | | | | | | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.98 | | | 0.00 | 0.00 | 0.00 | 0.00 |
| | Length = 7.978 ft | 1 | 0.380 | 0.071 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.69 | 0.31 | 485.31 | 1276.67 | 0.11 | 19.95 | 280.00 |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

(c) ENERCALC INC 1983-2022

DESCRIPTION: Load Case B: Wood Stud: 19'-0"

Maximum Forces & Stresses for Load Combinations

| Load Combination | Segment Length | Span # | Max Stress Ratios | | | | | | | | | Moment Values | | | Shear Values | | |
|------------------|-------------------|--------|-------------------|-------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|---------------|--------|---------|--------------|----------------|--------|
| | | | M | V | C _d | C _{F/V} | C _i | C _r | C _m | C _t | C _L | M | fb | F'b | V | f _v | F'v |
| | Length = 5.622 ft | 1 | 0.569 | 0.124 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.85 | 0.56 | 884.47 | 1555.12 | 0.19 | 34.85 | 280.00 |
| | Length = 2.383 ft | 2 | 0.498 | 0.124 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.97 | 0.56 | 884.47 | 1776.22 | 0.19 | 34.85 | 280.00 |
| | Length = 3.017 ft | 2 | 0.158 | 0.124 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.95 | 0.17 | 276.04 | 1745.48 | 0.12 | 34.85 | 280.00 |
| +0.450W | | | | | | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.95 | | | 0.00 | 0.00 | 0.00 | 0.00 |
| | Length = 7.978 ft | 1 | 0.285 | 0.053 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.69 | 0.23 | 363.99 | 1276.67 | 0.08 | 14.96 | 280.00 |
| | Length = 5.622 ft | 1 | 0.427 | 0.093 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.85 | 0.42 | 663.35 | 1555.12 | 0.14 | 26.14 | 280.00 |
| | Length = 2.383 ft | 2 | 0.373 | 0.093 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.97 | 0.42 | 663.35 | 1776.22 | 0.14 | 26.14 | 280.00 |
| | Length = 3.017 ft | 2 | 0.119 | 0.093 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.95 | 0.13 | 207.03 | 1745.48 | 0.09 | 26.14 | 280.00 |

Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|------------------|------|---------------|------------------|------------------|---------------|------------------|
| W Only | 1 | 0.4313 | 5.774 | | 0.0000 | 0.000 |
| W Only | 2 | 0.4203 | 5.400 | | 0.0000 | 0.000 |

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

| Load Combination | Support 1 | Support 2 | Support 3 |
|------------------|-----------|-----------|-----------|
| Overall MAXimum | 0.201 | 0.682 | |
| Overall MINimum | 0.201 | 0.682 | |
| +0.60W | 0.121 | 0.409 | |
| +0.450W | 0.090 | 0.307 | |
| W Only | 0.201 | 0.682 | |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

(c) ENERCALC INC 1983-2022

DESCRIPTION: Load Case A: Wood Stud: 18'-3"

CODE REFERENCES

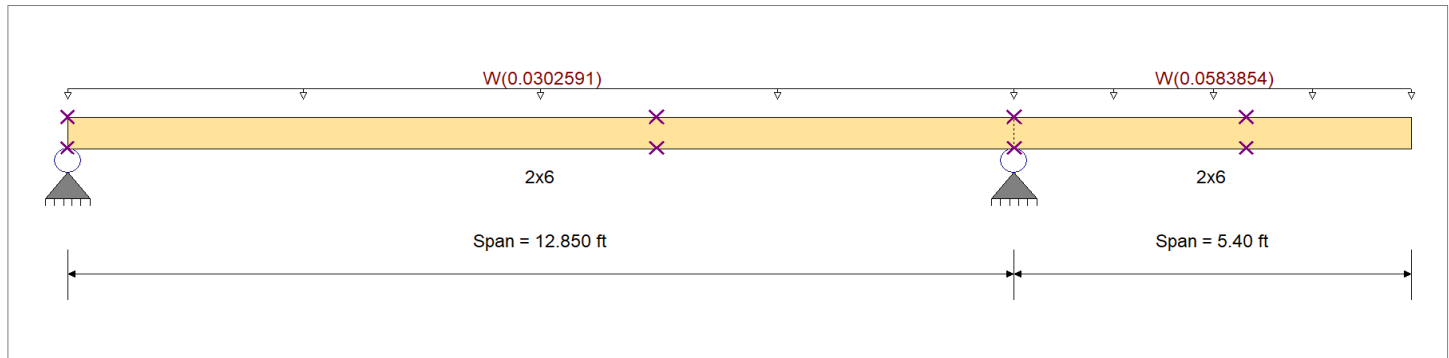
Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-10

Material Properties

| | | | |
|--|-----------|-------------|-----------------------------------|
| Analysis Method : Allowable Stress Design | Fb + | 1,000.0 psi | E : Modulus of Elasticity |
| Load Combination : ASCE 7-10 | Fb - | 1,000.0 psi | Ebend- xx |
| | Fc - Prll | 1,400.0 psi | Eminbend - xx |
| Wood Species : Southern Pine | Fc - Perp | 565.0 psi | |
| Wood Grade : No.2: 2"-4" Thick: 5"-6" Wide | Fv | 175.0 psi | Density |
| | Ft | 600.0 psi | Repetitive Member Stress Increase |
| Beam Bracing : Beam bracing is defined as a set spacing over all spans | | | |

Unbraced Lengths

First Brace starts at 8.0 ft from Left-Most support
Regular spacing of lateral supports on length of beam = 8.0 ft



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Load for Span Number 1
Uniform Load : W = 0.02270 ksf, Tributary Width = 1.333 ft
Load for Span Number 2
Uniform Load : W = 0.04380 ksf, Tributary Width = 1.333 ft

DESIGN SUMMARY

Design OK

| | | | | | | | |
|-------------------------------------|---|--------------|--------------------|-----------------------------------|---|--------------|-----|
| Maximum Bending Stress Ratio | = | 0.499 | 1 | Maximum Shear Stress Ratio | = | 0.113 | : 1 |
| Section used for this span | | 2x6 | | Section used for this span | | 2x6 | |
| fb: Actual | = | 810.45 psi | | fv: Actual | = | 31.51 psi | |
| Fb: Allowable | = | 1,624.27 psi | | Fv: Allowable | = | 280.00 psi | |
| Load Combination | | +0.60W | | Load Combination | | +0.60W | |
| Location of maximum on span | = | 12.850ft | | Location of maximum on span | = | 12.850 ft | |
| Span # where maximum occurs | = | Span # 1 | | Span # where maximum occurs | = | Span # 1 | |
| Maximum Deflection | | | | | | | |
| Max Downward Transient Deflection | | 0.678 in | Ratio = 190 >=120 | Span: 2 : W Only | | | |
| Max Upward Transient Deflection | | -0.036 in | Ratio = 4270 >=120 | Span: 1 : W Only | | | |
| Max Downward Total Deflection | | 0.407 in | Ratio = 318 >=120 | Span: 2 : +0.60W | | | |
| Max Upward Total Deflection | | -0.022 in | Ratio = 7116 >=120 | Span: 1 : +0.60W | | | |

Maximum Forces & Stresses for Load Combinations

| Load Combination | Segment Length | Span # | Max Stress Ratios | | | | | | | | | Moment Values | | | Shear Values | | |
|------------------|-------------------|--------|-------------------|-------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|---------------|--------|---------|--------------|-------|--------|
| | | | M | V | C _d | C _{F/V} | C _i | C _r | C _m | C _t | C _L | M | fb | F'b | V | fv | F'v |
| | Length = 7.968 ft | 1 | | | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.91 | | | 0.00 | 0.00 | 0.00 | 0.00 |
| | Length = 4.882 ft | 1 | | | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.96 | | | 942.54 | 0.00 | 0.00 | 157.50 |
| | Length = 3.137 ft | 2 | | | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.98 | | | 995.09 | 0.00 | 0.00 | 157.50 |
| | Length = 2.263 ft | 2 | | | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.99 | | | 1011.90 | 0.00 | 0.00 | 157.50 |
| +0.60W | | | | | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.99 | | | 1019.95 | 0.00 | 0.00 | 157.50 |
| | | | | | | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.99 | | | 0.00 | 0.00 | 0.00 | 0.00 |
| | Length = 7.968 ft | 1 | 0.202 | 0.045 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.69 | 0.16 | 258.43 | 1277.78 | 0.07 | 12.56 | 280.00 |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

(c) ENERCALC INC 1983-2022

DESCRIPTION: Load Case A: Wood Stud: 18'-3"

Maximum Forces & Stresses for Load Combinations

| Load Combination | Segment Length | Span # | Max Stress Ratios | | | | | | | | Moment Values | | | Shear Values | | |
|-------------------|----------------|--------|-------------------|------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|--------|---------|--------------|-------|----------------|
| | | | M | V | C _d | C _{F/V} | C _i | C _r | C _m | C _t | C _L | M | fb | F'b | V | f _v |
| Length = 4.882 ft | 1 | 0.499 | 0.113 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.88 | 0.51 | 810.45 | 1624.27 | 0.17 | 31.51 | 280.00 |
| Length = 3.137 ft | 2 | 0.466 | 0.113 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.94 | 0.51 | 810.45 | 1738.54 | 0.17 | 31.51 | 280.00 |
| Length = 2.263 ft | 2 | 0.080 | 0.113 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.97 | 0.09 | 142.28 | 1781.15 | 0.08 | 31.51 | 280.00 |
| +0.450W | | | | | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.97 | | | 0.00 | 0.00 | 0.00 | 0.00 |
| Length = 7.968 ft | 1 | 0.152 | 0.034 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.69 | 0.12 | 193.82 | 1277.78 | 0.05 | 9.42 | 280.00 |
| Length = 4.882 ft | 1 | 0.374 | 0.084 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.88 | 0.38 | 607.84 | 1624.27 | 0.13 | 23.63 | 280.00 |
| Length = 3.137 ft | 2 | 0.350 | 0.084 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.94 | 0.38 | 607.84 | 1738.54 | 0.13 | 23.63 | 280.00 |
| Length = 2.263 ft | 2 | 0.060 | 0.084 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.97 | 0.07 | 106.71 | 1781.15 | 0.06 | 23.63 | 280.00 |

Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|------------------|------|---------------|------------------|------------------|---------------|------------------|
| W Only | 1 | 0.1446 | 4.594 | W Only | -0.0361 | 11.414 |
| W Only | 2 | 0.6781 | 5.400 | | 0.0000 | 11.414 |

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

| Load Combination | Support 1 | Support 2 | Support 3 |
|------------------|-----------|-----------|-----------|
| Overall MAXimum | 0.128 | 0.576 | |
| Overall MINimum | 0.128 | 0.576 | |
| +0.60W | 0.077 | 0.346 | |
| +0.450W | 0.058 | 0.259 | |
| W Only | 0.128 | 0.576 | |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

(c) ENERCALC INC 1983-2022

DESCRIPTION: Load Case B: Wood Stud: 18'-3"

CODE REFERENCES

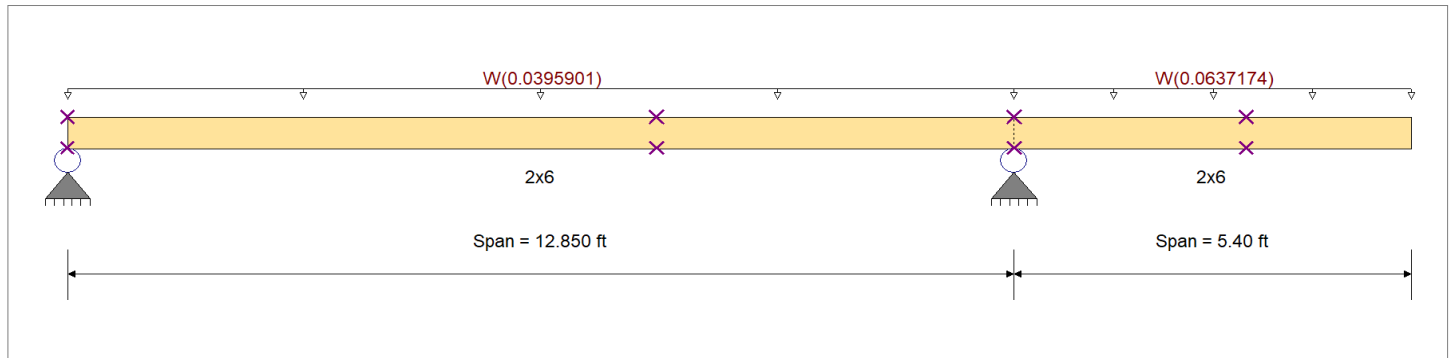
Calculations per NDS 2015, IBC 2015, CBC 2016, ASCE 7-10
Load Combination Set : ASCE 7-10

Material Properties

| | | | |
|--|-----------|-------------|-----------------------------------|
| Analysis Method : Allowable Stress Design | Fb + | 1,000.0 psi | <i>E : Modulus of Elasticity</i> |
| Load Combination : ASCE 7-10 | Fb - | 1,000.0 psi | Ebend- xx 1,400.0ksi |
| | Fc - Prll | 1,400.0 psi | Eminbend - xx 510.0ksi |
| Wood Species : Southern Pine | Fc - Perp | 565.0 psi | |
| Wood Grade : No.2: 2"-4" Thick: 5"-6" Wide | Fv | 175.0 psi | |
| | Ft | 600.0 psi | Density 34.330pcf |
| Beam Bracing : Beam bracing is defined as a set spacing over all spans | | | Repetitive Member Stress Increase |

Unbraced Lengths

First Brace starts at 8.0 ft from Left-Most support
Regular spacing of lateral supports on length of beam = 8.0 ft



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Load for Span Number 1
Uniform Load : W = 0.02970 ksf, Tributary Width = 1.333 ft
Load for Span Number 2
Uniform Load : W = 0.04780 ksf, Tributary Width = 1.333 ft

DESIGN SUMMARY

Design OK

| | | | | | | | |
|-------------------------------------|---|--------------|---------------------|-----------------------------------|---|--------------|-----|
| Maximum Bending Stress Ratio | = | 0.545 | 1 | Maximum Shear Stress Ratio | = | 0.123 | : 1 |
| Section used for this span | | 2x6 | | Section used for this span | | 2x6 | |
| fb: Actual | = | 884.47 psi | | fv: Actual | = | 34.39 psi | |
| Fb: Allowable | = | 1,624.27 psi | | Fv: Allowable | = | 280.00 psi | |
| Load Combination | | +0.60W | | Load Combination | | +0.60W | |
| Location of maximum on span | = | 12.850ft | | Location of maximum on span | = | 12.850 ft | |
| Span # where maximum occurs | = | Span # 1 | | Span # where maximum occurs | = | Span # 1 | |
| Maximum Deflection | | | | | | | |
| Max Downward Transient Deflection | | 0.554 in | Ratio = 232 >=120 | Span: 2 : W Only | | | |
| Max Upward Transient Deflection | | -0.005 in | Ratio = 34050 >=120 | Span: 1 : W Only | | | |
| Max Downward Total Deflection | | 0.332 in | Ratio = 388 >=120 | Span: 2 : +0.60W | | | |
| Max Upward Total Deflection | | -0.003 in | Ratio = 56750 >=120 | Span: 1 : +0.60W | | | |

Maximum Forces & Stresses for Load Combinations

| Load Combination | Segment Length | Span # | Max Stress Ratios | | | | | | | | | Moment Values | | | Shear Values | | |
|------------------|-------------------|--------|-------------------|-------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|---------------|--------|---------|--------------|-------|--------|
| | | | M | V | C _d | C _{F/V} | C _i | C _r | C _m | C _t | C _L | M | fb | F'b | V | fv | F'v |
| | Length = 7.968 ft | 1 | | | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.91 | | | 0.00 | 0.00 | 0.00 | 0.00 |
| | Length = 4.882 ft | 1 | | | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.96 | | | 942.54 | 0.00 | 0.00 | 157.50 |
| | Length = 3.137 ft | 2 | | | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.98 | | | 995.09 | 0.00 | 0.00 | 157.50 |
| | Length = 2.263 ft | 2 | | | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.99 | | | 1011.90 | 0.00 | 0.00 | 157.50 |
| +0.60W | | | | | 0.90 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.99 | | | 1019.95 | 0.00 | 0.00 | 157.50 |
| | | | | | | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.99 | | | 0.00 | 0.00 | 0.00 | 0.00 |
| | Length = 7.968 ft | 1 | 0.312 | 0.064 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.69 | 0.25 | 398.59 | 1277.78 | 0.10 | 18.00 | 280.00 |

Wood Beam

Project File: 22434 scooters framing.ec6

LIC# : KW-06017501, Build:20.22.8.17

RONALD A. ROBERTS ASSOCIATES

(c) ENERCALC INC 1983-2022

DESCRIPTION: Load Case B: Wood Stud: 18'-3"

Maximum Forces & Stresses for Load Combinations

| Load Combination | Segment Length | Span # | Max Stress Ratios | | | | | | | | Moment Values | | | Shear Values | | | |
|-------------------|----------------|--------|-------------------|-------|----------------|------------------|----------------|----------------|----------------|----------------|----------------|------|--------|--------------|------|----------------|----------------|
| | | | M | V | C _d | C _{F/V} | C _i | C _r | C _m | C _t | C _L | M | fb | F'b | V | f _v | F _v |
| Length = 4.882 ft | 1 | | 0.545 | 0.123 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.88 | 0.56 | 884.47 | 1624.27 | 0.19 | 34.39 | 280.00 |
| Length = 3.137 ft | 2 | | 0.509 | 0.123 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.94 | 0.56 | 884.47 | 1738.54 | 0.19 | 34.39 | 280.00 |
| Length = 2.263 ft | 2 | | 0.087 | 0.123 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.97 | 0.10 | 155.27 | 1781.15 | 0.09 | 34.39 | 280.00 |
| +0.450W | | | | | | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.97 | | | 0.00 | 0.00 | 0.00 | 0.00 |
| Length = 7.968 ft | 1 | | 0.234 | 0.048 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.69 | 0.19 | 298.95 | 1277.78 | 0.07 | 13.50 | 280.00 |
| Length = 4.882 ft | 1 | | 0.408 | 0.092 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.88 | 0.42 | 663.35 | 1624.27 | 0.14 | 25.79 | 280.00 |
| Length = 3.137 ft | 2 | | 0.382 | 0.092 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.94 | 0.42 | 663.35 | 1738.54 | 0.14 | 25.79 | 280.00 |
| Length = 2.263 ft | 2 | | 0.065 | 0.092 | 1.60 | 1.000 | 1.00 | 1.15 | 1.00 | 1.00 | 0.97 | 0.07 | 116.46 | 1781.15 | 0.06 | 25.79 | 280.00 |

Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|------------------|------|---------------|------------------|------------------|---------------|------------------|
| W Only | 1 | 0.2878 | 5.169 | W Only | -0.0045 | 12.347 |
| W Only | 2 | 0.5540 | 5.400 | | 0.0000 | 12.347 |

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

| Load Combination | Support 1 | Support 2 | Support 3 |
|------------------|-----------|-----------|-----------|
| Overall MAXimum | 0.182 | 0.671 | |
| Overall MINimum | 0.182 | 0.671 | |
| +0.60W | 0.109 | 0.402 | |
| +0.450W | 0.082 | 0.302 | |
| W Only | 0.182 | 0.671 | |

USE SDS25412 SCREWS

- MINIMUM EDGE DISTANCE: $C_{\Delta} = 0.5$ FOR 2D AND $C_{\Delta} = 1.0$ FOR 4D (TABLE 12.5.1A, NDS)

$$D = \text{SCREW DIAMETER} = 0.25''$$

$$0.25'' \times 2 = 0.5''$$

$$0.2'' \times 4 = 1.0''$$

IF INSTALLED IN THE MIDDLE OF THE 2X EDGE DISTANCE = 0.75 INCHES OR 3D. INTEREPLATING BETWEEN 2D AND 4D, $C_{\Delta} = 0.75$ INCHES

- SPACING REQUIREMENTS: 4D FOR $C_{\Delta} = 1.0$ (TABLE 12.5.1B, NDS) = $4 (0.25'') = 1''$
- LOADED EDGE 4D = 1.0 INCH (CHECK PER TABLE 12.5.1C)
- MINIMUM PENETRATION: $8D = 8 \times 0.25'' = 2$ INCHES
SDS25412 = $4 \frac{1}{2}'' - 1 \frac{1}{2}'' = 3'' > 2$ INCHES **OK**
- SHEAR CAPACITY OF SINGLE SDS25412 SCREW

$$Z' = Z(C_D)(C_m)(C_E)(C_g)(C_{\Delta})$$

$$Z = 350 \text{ LBS (PER ESR-2236)}$$

$$C_D = 1.0$$

$$C_m = 1.0$$

$$C_E = 1.0$$

$$C_g = 1.0$$

$$C_{\Delta} = 0.75$$

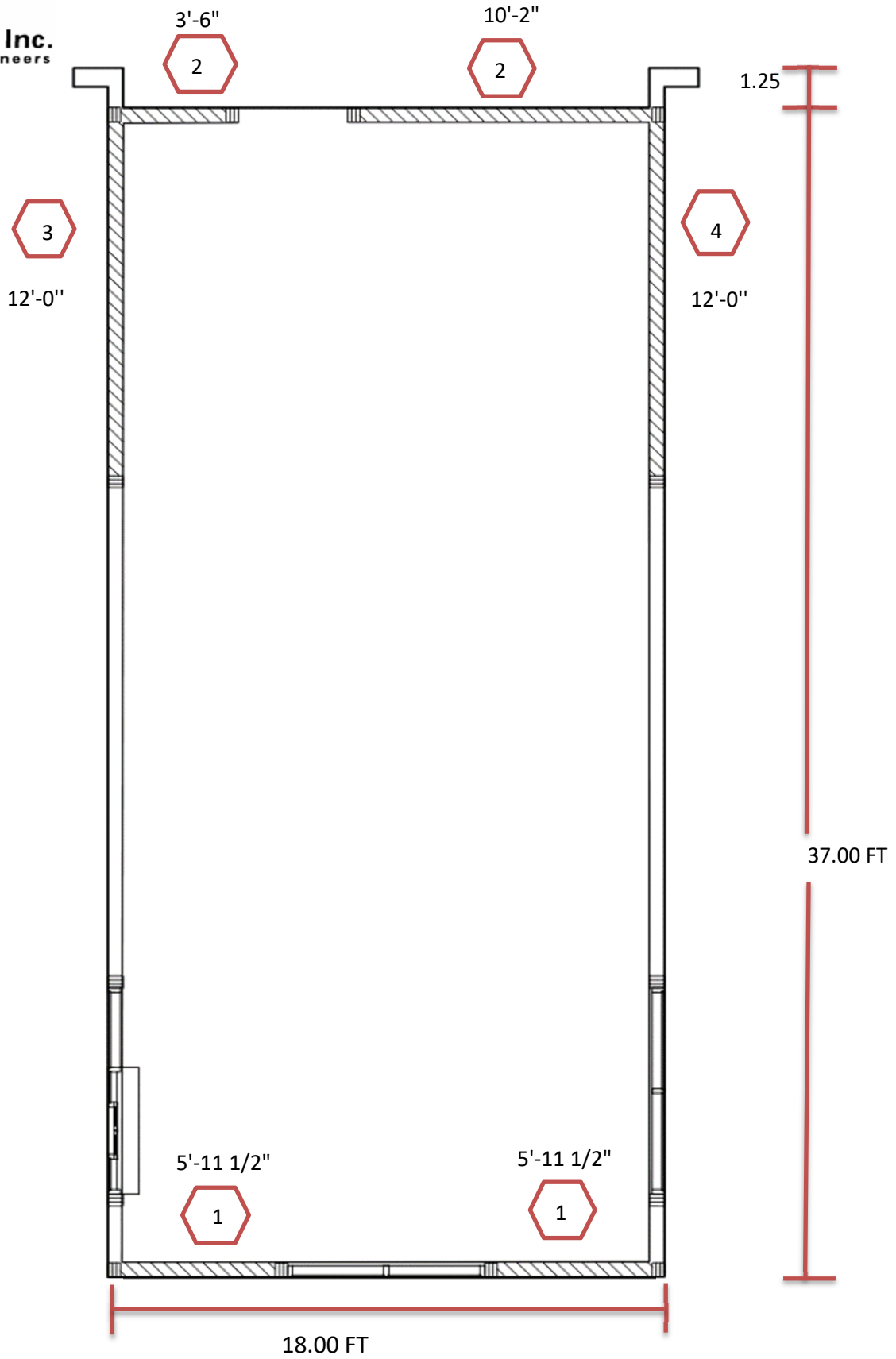
$$Z' = 350 \text{ LBS } (1.0)(1.0)(1.0)(1.0)(0.75) = 262 \text{ LBS}$$

- REQUIRED LOAD = 769 LBS (REFER TO WORST CASE JOIST CALCULATION)
- REQUIRED NUMBER OF SCREWS

$$(769 \text{ LBS}) / (262 \text{ LBS/SCREW}) = 2.94 \Rightarrow \text{USE 3 SCREWS MINIMUM}$$

(5 SCREWS USED IN TYPICAL DESIGN)

USE: (5) SDS25412 SCREWS/STUD



EDGE DISTANCE:

a = 10% LEAST HORIZONTAL DIMENSION OR .4 DECK HEIGHT BUT NOT LESS THAN 3 FT

| | | | |
|-----------------------------|--------|---|--------|
| | | a | |
| LEAST HORIZONTAL DIMENSION: | 18.00' | | 1.8 FT |
| DECK HEIGHT: | 13.00' | | 5.2 FT |

| | |
|------|--------|
| USE: | 5.2 FT |
|------|--------|

AVERAGE TOP OF PARAPET : 18.50 FT

Weights of
 Materials
 Per ASCE 7-10
 Table C3-1

EXTERIOR WALLS:

| | |
|------------------------------|-----------|
| 2X6 STUD | 2.20 PSF |
| INSULATION | 0.70 PSF |
| 5/8" GYP | 2.50 PSF |
| 1/2 PLYWOOD SHEATHING | 1.60 PSF |
| ADHERED STONE | 10.00 PSF |
| 2" EIFS | 1.50 PSF |

| | | | | |
|-------------|---|---------|---|-----------|
| LINEAR FEET | | HEIGHT | | |
| 112.50 FT | X | 18.5 FT | = | 2081.3 SF |
| | | | | 2081.3 SF |

TOTAL: 18.50 PSF X 2081.3 SF = 38503 LBS

INTERIOR WALLS:

| | |
|--------------------------|----------|
| 2X6 STUD WALLS | 2.20 PSF |
| 5/8" GYP BOARD X 2 SIDES | 5.50 PSF |

| | | |
|----------------|---|----------|
| ESTIMATED WALL | = | 50.0 FT |
| HEIGHT | = | 12.0 FT |
| | | 600.0 SF |

TOTAL: 7.70 PSF X 600.0 FT = 4,620 LBS

ROOF:

| | |
|------------------------|----------|
| SINGLE PLY MEMBRANE | 0.70 PSF |
| 3/4" PLYWOOD ROOF DECK | 2.40 PSF |
| MECHANICAL/LIGHTING | 4.00 PSF |
| MECHANICAL/LIGHTING | 4.00 PSF |
| RIGID INSULATION | 4.15 PSF |
| SPRINKLER | 2.00 PSF |
| GYPSUM CEILING | 2.75 PSF |

| | | | | |
|---------|---|---------|---|----------|
| WIDTH | | LENGTH | | |
| 18.0 FT | X | 37.0 FT | = | 666.0 SF |

TOTAL: 20.0 PSF X 666.0 SF = 13,320 LBS

MECHANICAL UNITS:

TOTAL OF ALL UNITS: 1,000 LBS

TOTAL WEIGHT: 57443 LBS

SIMPLIFIED DESIGN PROCEDURE CHECKLIST

(12.14.1.1)

- | | |
|--|-------------------------------------|
| 1) THE STRUCTURE SHALL QUALIFY FOR RISK CATEGORY I OR II IN ACCORDANCE WITH | <input checked="" type="checkbox"/> |
| 2) THE SITE CLASS, DEFINED IN CHAPTER 20, SHALL NOT BE CLASS E OR F. | <input checked="" type="checkbox"/> |
| 3) THE STRUCTURE SHALL NOT EXCEED THREE STORIES ABOVE GRADE PLANE. | <input checked="" type="checkbox"/> |
| 4) THE SEISMIC FORCE- RESISTING SYSTEM SHALL BE EITHER A BEARING WALL SYSTEM OR BUILDING FRAME SYSTEM, AS INDICATED IN TABLE 12.14-1. | <input checked="" type="checkbox"/> |
| 5) THE STRUCTURE SHALL HAVE AT LEAST TWO LINES OF LATERAL RESISTANCE IN EACH OF THE TWO MAJOR AXIS DIRECTIONS. | <input checked="" type="checkbox"/> |
| 6) AT LEAST ONE LINE OF RESISTANCE SHALL BE PROVIDED ON EACH SIDE OF THE CENTER OF MASS IN EACH DIRECTION. | <input checked="" type="checkbox"/> |
| 7) FOR STRUCTURES WITH FLEXIBLE DIAPHRAGMS, OVERHANGS BEYOND THE OUTSIDE LINE OF SHEAR WALLS OR BRACED SHALL SATISFY THE FOLLOWING: | <input checked="" type="checkbox"/> |
| $a \leq d/5$ | |
| a = the distance perpendicular to the forces being considered from the extreme edge of the diaphragm to the line of vertical resistance closest to that edge | |
| d = the depth of the diaphragm parallel to the forces being considered at the line of the vertical resistance closest to the edge. | |
| 8) FOR BUILDINGS WITH A DIAPHRAGM THAT IS NOT FLEXIBLE, THE DISTANCE BETWEEN THE CENTER OF RIGIDITY AND THE CENTER OF MASS PARALLEL TO EACH MAJOR AXIS SHALL NOT EXCEED 15 PERCENT OF THE GREATEST WIDTH OF THE DIAPHRAGM | n/a |
| 9) LINES OF RESISTANCE OF THE SEISMIC FORCE-RESISTING SYSTEM SHALL BE ORIENTED AT ANGLE OF NO MORE THAN 15 DEGREES FROM ALIGNMENT WITH THE MAJOR ORTHOGONAL HORIZONTAL AXES OF THE BUILDING. | <input checked="" type="checkbox"/> |
| 10) THE SIMPLIFIED DESIGN PROCEDURE SHALL BE USED FOR EACH MAJOR ORTHOGONAL HORIZONTAL AXIS DIRECTION OF THE BUILDING. | <input checked="" type="checkbox"/> |
| 11) SYSTEM IRREGULARITIES CAUSED BY IN-PLANE OR OUT-OF-PLANE OFFSETS OF LATERAL FORCE- RESISTING ELEMENTS SHALL NOT BE PERMITTED. | <input checked="" type="checkbox"/> |
| <i>EXCEPTION: OUT-OF-PLANE AND IN-PLANE OFFSETS OF SHEAR WALLS ARE PERMITTED IN TWO-STORY BUILDINGS OF LIGHT-FRAME CONSTRUCTION PROVIDED THAT THE FRAMING SUPPORTING THE UPPER WALL IS DESIGNED FOR SEISMIC FORCE EFFECTS FROM OVERTURNING OF THE WALL AMPLIFIED BY A FACTOR OF 2.5.</i> | |
| 12) THE LATERAL LOAD RESISTANCE OF ANY STORY SHALL NOT BE LESS THAN 80 PERCENT OF THE STORY ABOVE. | <input checked="" type="checkbox"/> |

DETERMINE SEISMIC BASE SHEAR:

$$V = \frac{FS_{ds}W}{R} \quad \text{Equation 12.14-11}$$

F = 1.00 Per ASCE 7-10, 12.14.8.1
 S_{ds} = 0.28
 R = 6.50
 W = 57,443 LBS FROM CALCULATION ABOVE
R=6.5 (Light framed wood walls sheathed in plywood)

TOTAL BASE SHEAR = 2,466 LBS

DETERMINE SHEAR TO WALLS

SHEARWALL 1

PERCENT TO WALL: 50.00% X 2,466 LBS = 1233 LBS

SHEARWALL 2

PERCENT TO WALL: 50.00% X 2,466 LBS = 1233 LBS

SHEARWALL 3

PERCENT TO WALL: 50.00% X 2,466 LBS = 1233 LBS

SHEARWALL 4

PERCENT TO WALL: 50.00% x 2,466 LBS = 1233 LBS

AVERAGE TOP OF SHEAR WALL : 13 FT
 TOP OF PARAPET (WORST CASE) 19 FT

MAIN BUILDING WIND PRESSURE : 21.0 PSF END ZONE (A)
 13.9 PSF INTERIOR ZONE (C)
 PARAPET WIND PRESSURE : 30.2 PSF (WINDWARD)
 20.1 PSF (LEEWARD)
 50.3 PSF TOTAL PARAPET

$$W = 21.0 \text{ PSF } (13\text{FT}/2) + 50.3 \text{ PSF } (19\text{FT} - 13\text{FT}) = 438.3 \text{ PLF} \quad (\text{ZONE A})$$

$$W = 13.9 \text{ PSF } (13\text{FT}/2) + 50.3 \text{ PSF } (19\text{FT} - 13\text{FT}) = 392.2 \text{ PLF} \quad (\text{ZONE C})$$

DETERMINE SHEAR TO SIDES

SHEARWALL 1

$$\text{SHEAR (V)} = 392.2 \text{ PLF } (37\text{FT} /2- 5.2\text{FT}) + 438.3 \text{ PLF } (5.2 \text{ FT}) = 7,495 \text{ LBS}$$

SHEARWALL 2

$$\text{SHEAR (V)} = 392.2 \text{ PLF } (37\text{FT} /2- 5.2\text{FT}) + 438.3 \text{ PLF } (5.2 \text{ FT}+1.25\text{FT}) = 8,043 \text{ LBS}$$

SHEARWALL 3

$$\text{SHEAR (V)} = 392.2 \text{ PLF } (18\text{FT} /2- 5.2\text{FT}) + 438.3 \text{ PLF } (5.2 \text{ FT}) = 3,769 \text{ LBS}$$

SHEARWALL 4

$$\text{SHEAR (V)} = 392.2 \text{ PLF } (18\text{FT} /2- 5.2\text{FT}) + 438.3 \text{ PLF } (5.2 \text{ FT}) = 3,769 \text{ LBS}$$

ULTIMATE VALUES SHOWN

AVERAGE TOP OF SHEAR WALL : 13 FT
 TOP OF PARAPET (WORST CASE) : 19 FT

MINIMUM

MAIN BUILDING WIND PRESSURE : 16.0 PSF END ZONE (A)
 16.0 PSF INTERIOR ZONE (C)
 PARAPET WIND PRESSURE : 30.2 PSF (WINDWARD)
 20.1 PSF (LEEWARD)
 50.3 PSF TOTAL PARAPET

$$W = 16 \text{ PSF } (13\text{FT}/2) + 50.3 \text{ PSF } (19\text{FT} - 13\text{FT}) = 405.8 \text{ PLF}$$

DETERMINE SHEAR TO SIDES

SHEARWALL 1

$$\text{SHEAR (V)} = 405.8 \text{ PLF } (37 \text{ FT } /2) = 7,507 \text{ LBS}$$

SHEARWALL 2

$$\text{SHEAR (V)} = 405.8 \text{ PLF } (37 \text{ FT } /2 + 1.25\text{FT}) = 8,015 \text{ LBS}$$

SHEARWALL 3

$$\text{SHEAR (V)} = 405.8 \text{ PLF } (18 \text{ FT } /2) = 3,652 \text{ LBS}$$

SHEARWALL 4

$$\text{SHEAR (V)} = 405.8 \text{ PLF } (18 \text{ FT } /2) = 3,652 \text{ LBS}$$

| SHEAR WALL | SHEAR LOADS | | | |
|------------|-------------|---------------|-----------------------|-----------|
| | SEISMIC | WIND PRESSURE | MINIMUM WIND PRESSURE | USE |
| WALL 1 | 1233 LBS | 7,495 LBS | 7,507 LBS | 7,507 LBS |
| WALL 2 | 1233 LBS | 8,043 LBS | 8,015 LBS | 8,043 LBS |
| WALL 3 | 1233 LBS | 3,769 LBS | 3,652 LBS | 3,769 LBS |
| WALL 4 | 1233 LBS | 3,769 LBS | 3,652 LBS | 3,769 LBS |

ULTIMATE VALUES SHOWN

WALL 1

| | (ULTIMATE) | (ASD) |
|-----------------------|------------------|----------|
| SHEAR (V) = | 7,507 LBS X .6 = | 4504 LBS |
| NAILING LENGTH (LN) = | 11.9 FT | |
| ANCHOR LENGTH (LA) = | 9.9 FT | |
| HEIGHT (H) = | 13.5 FT | |

NAILING REQUIREMENTS

$$V/LN = \frac{4504 \text{ PLF}}{11.9 \text{ FT}} = 378 \text{ LBS}$$

USE 10d NAILS @ 6" O.C. (CAPACITY = 435 PLF)

NDS15 : Table 4.3A USING 15/32 PANEL SHEATING

HOLDOWN REQUIREMENTS

$$(VH)/LA = \frac{60809 \text{ LBS- FT}}{9.9 \text{ FT}} = 6130 \text{ LBS}$$

USE HDU8-SDS2.5 (CAPACITY = 7,870 LBS)

2019 - 2020 SIMPSON CATALOG

ANCHOR REQUIREMENTS (AR)

$$AR = V/LA = \frac{7507 \text{ LBS}}{9.9 \text{ FT}} = 757 \text{ PLF}$$

PER NDS 2015 TABLE 12E: 5/8" BOLT WITH 1.5" THICK DOUGLAS
FIR-LARCH SIDE MEMBER ALLOWABLE SHEAR WITH WIND LOAD

5/8" DIA. ANCHOR ALLOW. LOAD: 1488 LBS/ANCHOR

$$\frac{(A.B.ALLOW * 12\text{INCHES}/\text{FT})}{AR} = \frac{1488 \text{ LBS} * 12 \text{ IN}/\text{FT}}{757 \text{ LBS}/\text{ANCHOR}} = 24 \text{ IN}$$

USE 5/8" DIAMETER ANCHORS AT 24" O.C.

ALLOWABLE VALUES SHOWN

WALL 2

| | (ULTIMATE) | (ASD) |
|-----------------------|------------------|-----------|
| SHEAR (V) = | 8,043 LBS X .6 = | 4,826 LBS |
| NAILING LENGTH (LN) = | 13.7 FT | |
| ANCHOR LENGTH (LA) = | 11.7 FT | |
| HEIGHT (H) = | 13.0 FT | |

NAILING REQUIREMENTS

$$V/LN = \frac{4826 \text{ PLF}}{13.7 \text{ FT}} = 353 \text{ LBS}$$

USE 10d NAILS @ 6" O.C. (CAPACITY = 435 PLF)

NDS15 : Table 4.3A USING 15/32 PANEL SHEATING

HOLDOWN REQUIREMENTS

$$(VH)/LA = \frac{62733 \text{ LBS- FT}}{11.7 \text{ FT}} = 5377 \text{ LBS}$$

USE HDU5-SDS2.5 (CAPACITY = 5,645 LBS)

2019 - 2020 SIMPSON CATALOG

ANCHOR REQUIREMENTS (AR)

$$AR = V/LA = \frac{8043 \text{ LBS}}{11.7 \text{ FT}} = 689 \text{ PLF}$$

PER NDS 2015 TABLE 12E: 5/8" BOLT WITH 1.5" THICK DOUGLAS
FIR-LARCH SIDE MEMBER ALLOWABLE SHEAR WITH WIND LOAD

5/8" DIA. ANCHOR ALLOW. LOAD: 1488 LBS/ANCHOR

$$\frac{(A.B.ALLOW * 12\text{INCHES/FT})}{AR} = \frac{1488 \text{ LBS} * 12 \text{ IN/FT}}{689 \text{ LBS/ANCHOR}} = 26 \text{ IN}$$

USE 5/8" DIAMETER ANCHORS AT 24" O.C.

ALLOWABLE VALUES SHOWN

WALL 3

| | (ULTIMATE) | (ASD) |
|-----------------------|------------------|-----------|
| SHEAR (V) = | 3,769 LBS X .6 = | 2,262 LBS |
| NAILING LENGTH (LN) = | 12.0 FT | |
| ANCHOR LENGTH (LA) = | 11.0 FT | |
| HEIGHT (H) = | 12.5 FT | |

NAILING REQUIREMENTS

$$V/LN = \frac{2262 \text{ PLF}}{12.0 \text{ FT}} = 188 \text{ LBS}$$

USE 10d NAILS @ 6" O.C. (CAPACITY = 435 PLF)

NDS15 : Table 4.3A USING 15/32 PANEL SHEATING

HOLDOWN REQUIREMENTS

$$(VH)/LA = \frac{28270 \text{ LBS- FT}}{11.0 \text{ FT}} = 2570 \text{ LBS}$$

USE HDU2-SDS2.5 (CAPACITY = 3,075 LBS)

2019 - 2020 SIMPSON CATALOG

ANCHOR REQUIREMENTS (AR)

$$AR = V/LA = \frac{3769 \text{ LBS}}{11.0 \text{ FT}} = 343 \text{ PLF}$$

PER NDS 2015 TABLE 12E: 5/8" BOLT WITH 1.5" THICK DOUGLAS
FIR-LARCH SIDE MEMBER ALLOWABLE SHEAR WITH WIND LOAD

5/8" DIA. ANCHOR ALLOW. LOAD: 1488 LBS/ANCHOR

$$\frac{(A.B.ALLOW * 12\text{INCHES/FT})}{AR} = \frac{1488 \text{ LBS} * 12 \text{ IN/FT}}{343 \text{ LBS/ANCHOR}} = 52 \text{ IN}$$

USE 5/8" DIAMETER ANCHORS AT 32" O.C.

ALLOWABLE VALUES SHOWN

WALL 4

| | (ULTIMATE) | (ASD) |
|-----------------------|------------------|-----------|
| SHEAR (V) = | 3,769 LBS X .6 = | 2,262 LBS |
| NAILING LENGTH (LN) = | 12.0 FT | |
| ANCHOR LENGTH (LA) = | 11.0 FT | |
| HEIGHT (H) = | 12.5 FT | |

NAILING REQUIREMENTS

$$V/LN = \frac{2262 \text{ PLF}}{12.0 \text{ FT}} = 188 \text{ LBS}$$

USE 10d NAILS @ 6" O.C. (CAPACITY = 435 PLF)

NDS15 : Table 4.3A USING 15/32 PANEL SHEATING

HOLDOWN REQUIREMENTS

$$(VH)/LA = \frac{28270 \text{ LBS- FT}}{11.0 \text{ FT}} = 2570 \text{ LBS}$$

USE HDU2-SDS2.5 (CAPACITY = 3,075 LBS)

2019 - 2020 SIMPSON CATALOG

ANCHOR REQUIREMENTS (AR)

$$AR = V/LA = \frac{3769 \text{ LBS}}{11.0 \text{ FT}} = 343 \text{ PLF}$$

PER NDS 2015 TABLE 12E: 5/8" BOLT WITH 1.5" THICK DOUGLAS
FIR-LARCH SIDE MEMBER ALLOWABLE SHEAR WITH WIND LOAD

5/8" DIA. ANCHOR ALLOW. LOAD: 1488 LBS/ANCHOR

$$\frac{(A.B.ALLOW * 12\text{INCHES/FT})}{AR} = \frac{1488 \text{ LBS} * 12 \text{ IN/FT}}{343 \text{ LBS/ANCHOR}} = 52 \text{ IN}$$

USE 5/8" DIAMETER ANCHORS AT 32" O.C.

ALLOWABLE VALUES SHOWN



DIAPHARGM

WALL 1 &2: 4,826 LBS/ 18 FT = 268.09 PLF
(WORST CASE)

CASE 1: ALLOWABLE : 400 PLF

WALL 3 & 4 2,262 LBS/ 37 FT = 61.12 PLF

CASE 3 ALLOWABLE : 300 PLF

USE 10d NAILS @ 6 O.C. AT DIAPHRAGM BOUNDARIES (UN-BLOCKED) U.N.O.

CHORD

Chord Along Wall 1 and 2

$$\left(\frac{3,769 \text{ LBS}}{8} + \frac{3,769 \text{ LBS}}{37 \text{ FT}} \right) \times 18 \text{ FT} = 458 \text{ LBS} \quad (.6) = 275.1 \text{ LBS}$$

USE 2X8 (MIN) LEDGER

$$\text{FT} = 575 \text{ TALLOW} = 575 * 10.875 = 6,253 \text{ LBS} > 458 \text{ LBS}$$

Chord Along Wall 3 and 4

$$\left(\frac{8,043 \text{ LBS}}{8} + \frac{7,495 \text{ LBS}}{18 \text{ FT}} \right) \times 37 \text{ FT} = 3,992 \text{ LBS} \quad (.6) = 2395 \text{ LBS}$$

USE 2X12 (MIN) LEDGER

$$\text{FT} = 575 \text{ TALLOW} = 575 * 16.875 = 9,703 \text{ LBS} > 2,395 \text{ LBS}$$

USE SIMPSON MSTI48 STRAP @ SPLICE

CAPACITY : 5,070 LBS

ULTIMATE VALUES SHOWN