Structural Calculations

For

Hillcrest Elementary Kitchen Remodel

Project Number: 21908

June 2, 2021

Prepared by
ARW Engineers
1593 West Park Circle
Ogden Utah, 84404
STRUCTURAL CALCULATIONS

FOR

Project Name

Client: KNIT Designing Community

Project Number: 21908

DESIGN CRITERIA

GOVERNING CODE: IBC 2018

GENERAL: Risk Category = III

SEISMIC: Seismic Design Category = D

\[ I_E = 1.25 \]

\[ S_{DS} = 0.1116 \]

\[ S_{D1} = 0.614 \]

WIND: Basic Wind Speed = 109 mph

Exposure Classification = C

SOILS: Site Class: D

Design Allowable Soil Pressure = 1500 psf
3' 3" = 39" of trib wall wt above opening

\[ \text{wt of wall} = 150 \text{ psi (12")} \]

\[ \text{wt above wall} = 150(27') = 4050 \text{ psi} \]

Floor load = \[ \frac{50'}{2}(100\text{psf} + 20\text{psf} + 60 \text{psf}) \]
\[ = 4500 \text{psf} \]

8.550 psf

(2) 1 8\times 4\times 2\times 3/16 members OK

Comment: shows 1/6 load on single member.
DESCRIPTION: Header beam

CODE REFERENCES
Calculations per AISC 360-10, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set: ASCE 7-16

Material Properties
Analysis Method: Allowable Strength Design
Beam Bracing: Beam is Fully Braced against lateral-torsional buckling
Bending Axis: Major Axis Bending

Applied Loads
Beam self weight NOT internally calculated and added
Uniform Load: \( D = 4.30 \text{ k/ft}, \text{Tributary Width} = 1.0 \text{ ft} \)

DESIGN SUMMARY
Maximum Bending Stress Ratio = 0.643 : 1
Section used for this span L8x4x7/16
Ma : Applied 10.078 k-ft
Mn / Omega : Allowable 15.663 k-ft
Load Combination D Only
Location of maximum on span 2.165 ft
Span # where maximum occurs Span # 1
Maximum Downward Transient Deflection 0.000 in
Ratio = 0 < 360
Maximum Upward Transient Deflection 0.000 in
Ratio = 0 < 360
Maximum Downward Total Deflection 0.034 in
Ratio = 1500 > 180
Maximum Upward Total Deflection 0.000 in
Ratio = 0 < 180

Maximum Forces & Stresses for Load Combinations

Overall Maximum Deflections
Load Combination Span Max. "-" Defl Location in Span Load Combination Max. "+" Defl Location in Span
D Only 1 0.0344 2.177 0.0000 0.0000

Vertical Reactions
Support notation: Far left is #1 Values in KIPS

Support 1 Support 2
Overall MAXimum 9.310 9.310
Overall MINimum 5.586 5.586
D Only 9.310 9.310
+0.60D 5.586 5.586