Structural Calculations

for

Site: Fred JMG Realty
1900 Southeast Hillmoor Drive
Port St. Lucie, FL 329966

Project: 20.0' x 24.0'
Shed
Inv. No. 1665567

Store: 520 - Orlando
8524 East Colonial Drive
Orlando, FL 32817

Engineer: Timothy Cahalan, P.E.
Tuff Shed Inc.
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Date: July 21, 2021

This item has been electronically signed and sealed by Timothy D. Cahalan P.E. on the date shown using a digital signature.

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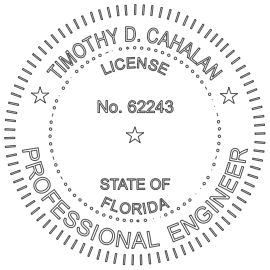

7/21/2021

TUFF SHED

DESIGN CRITERIA

Building Code:	2020 FBC (7th Ed.)
Seismic Design Category:	A
Basic Wind Speed:	160 mph
Wind Exposure:	C

Building Specifications

Width:	20.0 ft.
Length:	24.0 ft.
Side Wall Height:	8.09 ft.
Stud Size:	2x4
Stud Spacing:	16 in. o.c.
Wall Sheathing:	3/8" Smartside
Roof Sheathing:	7/16" OSB
Wall Wood Species & Grade:	SPF #1/#2
Wall "A" Overhang:	.0 in.
Wall "B" Overhang:	12.0 in.
Wall "C" Overhang:	.0 in.
Wall "D" Overhang:	12.0 in.
Foundation:	Treated Wood Shed Base
Anchor:	
Anchor Bolt Diameter:	.0 in.

Trusses

Span:	20.0 ft.
Left Overhang:	12.0 in.
Right Overhang:	12.0 in.
Pitch:	4./12
Lumber:	SPF #1/#2
Roofing:	Composition Shingles
Top Chord Live/Snow Load:	20 psf
Top Chord Dead Load:	10 psf
Bottom Chord Live Load:	0 psf
Bottom Chord Dead Load:	10 psf
Risk Category:	I - Low Hazard

Header: Wall A, Hdr 1

Top Chord Live/Snow Load: 20 psf
Top Chord Dead Load: 10 psf
Bottom Chord Live Load: 0 psf
Bottom Chord Dead Load: 10 psf

Tributary Width= 1.50 ft.
Height of wall above Header= 3.0 ft.
Moment= 9,754 in.-lbs.
Reaction= 383 lbs.

Header Size:	2x6				Header Size:	1¾x3½ LVL	
Number of Headers:	2				Number of Headers:	2	
Header depth=	5.50 in.		**Lumber**		Header depth=	3.50 in.	**Lumber**
Total header width=	3.0 in.		*SPF #1/#2*		Total header width=	3.50 in.	*LVL 2600Fb*
Header span=	8.50 ft.	F_b=	875 psi		Header span=	8.50 ft.	F_b= 2600 psi
		F_t=	450 psi				F_t= 1555 psi
Bending		F_v=	135 psi		*Bending*		F_v= 285 psi
S_x=	15.13 cu.in.	F_{cP}=	425 psi		S_x=	7.15 cu.in.	F_{cP}= 750 psi
F'_b=	1398 psi	F_c=	1150 psi	OR	F'_b=	3224 psi	F_c= 2510 psi
f_b=	645 psi	E=	1,400,000 psi		f_b=	1365 psi	E= 1,900,000 psi
		E_{min}=	510,000 psi				E_{min}= 965,710 psi
Good/No Good?	**O.K.**	*Lumber Factors*			*Good/No Good?*	**O.K.**	*Lumber Factors*
		C_D=	1.25	Duration			C_D= 1.25 Duration
Shear		C_M=	1.00	Wet Service	*Shear*		C_M= 1.00 Wet Service
F'_v=	169 psi	C_t=	1.00	Temperature	F'_v=	356 psi	C_t= 1.00 Temperature
f_v=	35 psi	C_L=	0.98	Beam Stability	f_v=	47 psi	C_L= 0.99 Beam Stability
Good/No Good?	**O.K.**	C_F=	1.30	Size	*Good/No Good?*	**O.K.**	C_F= 1.00 Size
		C_{fu}=	1.00	Flat Use			C_{fu}= 1.00 Flat Use
Deflection		C_i=	1.00	Incising	*Deflection*		C_i= 1.00 Incising
E'=	1,400,000 psi	C_r=	1.00	Repetitive Member	E'=	1,900,000 psi	C_r= 1.00 Repetitive Member
I=	41.594	C_f=	1.00	Form	I=	12.505	C_f= 1.00 Form
Deflection Ratio=	L/180	TL (L/x)	L/240	LL(L/x)	Deflection Ratio=	L/180	TL(L/x) L/240 LL(L/x)
Allowable Deflection=	.57 in.		.43 in.		Allowable Deflection=	.57 in.	.57 in.
Δ=	.18 in.		.12 in.		Δ=	.44 in.	.30 in.
Good/No Good?	**O.K.**		**O.K.**		*Good/No Good?*	**O.K.**	**O.K.**

Header: Wall B, Hdr 1

Top Chord Live/Snow Load: 20 psf
Top Chord Dead Load: 10 psf
Bottom Chord Live Load: 0 psf
Bottom Chord Dead Load: 10 psf

Tributary Width= 11.0 ft.
Height of wall above Header= 1.50 ft.
Moment= 7,209 in.-lbs.
Reaction= 739 lbs.

Header Size:	2x4				Header Size:	1¾x3½ LVL	
Number of Headers:	2				Number of Headers:	2	
Header depth=	3.50 in.		**Lumber**		Header depth=	3.50 in.	**Lumber**
Total header width=	3.0 in.		*SPF #1/#2*		Total header width=	3.50 in.	*LVL 2600Fb*
Header span=	3.25 ft.	F_b=	875 psi		Header span=	3.25 ft.	F_b= 2600 psi
		F_t=	450 psi				F_t= 1555 psi
Bending		F_v=	135 psi		*Bending*		F_v= 285 psi
S_x=	6.13 cu.in.	F_{cP}=	425 psi		S_x=	7.15 cu.in.	F_{cP}= 750 psi
F'_b=	1634 psi	F_c=	1150 psi	OR	F'_b=	3240 psi	F_c= 2510 psi
f_b=	1177 psi	E=	1,400,000 psi		f_b=	1009 psi	E= 1,900,000 psi
		E_{min}=	510,000 psi				E_{min}= 965,710 psi
Good/No Good?	**O.K.**	*Lumber Factors*			*Good/No Good?*	**O.K.**	*Lumber Factors*
		C_D=	1.25	Duration			C_D= 1.25 Duration
Shear		C_M=	1.00	Wet Service	*Shear*		C_M= 1.00 Wet Service
F'_v=	169 psi	C_t=	1.00	Temperature	F'_v=	356 psi	C_t= 1.00 Temperature
f_v=	106 psi	C_L=	1.00	Beam Stability	f_v=	91 psi	C_L= 1.00 Beam Stability
Good/No Good?	**O.K.**	C_F=	1.50	Size	*Good/No Good?*	**O.K.**	C_F= 1.00 Size
		C_{fu}=	1.00	Flat Use			C_{fu}= 1.00 Flat Use
Deflection		C_i=	1.00	Incising	*Deflection*		C_i= 1.00 Incising
E'=	1,400,000 psi	C_r=	1.00	Repetitive Member	E'=	1,900,000 psi	C_r= 1.00 Repetitive Member
I=	10.71875	C_f=	1.00	Form	I=	12.50520833	C_f= 1.00 Form
Deflection Ratio=	L/180	TL (L/x)	L/240	LL(L/x)	Deflection Ratio=	L/180	TL(L/x) L/240 LL(L/x)
Allowable Deflection=	.22 in.		.16 in.		Allowable Deflection=	.22 in.	.22 in.
Δ=	.08 in.		.04 in.		Δ=	.05 in.	.02 in.
Good/No Good?	**O.K.**		**O.K.**		*Good/No Good?*	**O.K.**	**O.K.**

Header: Wall B, Hdr 2

Top Chord Live/Snow Load: 20 psf
Top Chord Dead Load: 10 psf
Bottom Chord Live Load: 0 psf
Bottom Chord Dead Load: 10 psf

Tributary Width= 11.0 ft.
Height of wall above Header= 1.50 ft.
Moment= 12,328 in.-lbs.
Reaction= 967 lbs.

Header Size:	2x6				Header Size:	1¾x3½ LVL	
Number of Headers:	2				Number of Headers:	2	
Header depth=	5.50 in.				Header depth=	3.50 in.	
Total header width=	3.0 in.		**Lumber**		Total header width=	3.50 in.	**Lumber**
Header span=	4.25 ft.		*SPF #1/#2*		Header span=	4.25 ft.	*LVL 2600Fb*
		F_b=	875 psi				F_b= 2600 psi
		F_t=	450 psi				F_t= 1555 psi
Bending		F_v=	135 psi		*Bending*		F_v= 285 psi
S_x=	15.13 cu.in.	F_{cP}=	425 psi		S_x=	7.15 cu.in.	F_{cP}= 750 psi
F'_b=	1410 psi	F_c=	1150 psi	OR	F'_b=	3237 psi	F_c= 2510 psi
f_b=	815 psi	E=	1,400,000 psi		f_b=	1725 psi	E= 1,900,000 psi
		E_{min}=	510,000 psi				E_{min}= 965,710 psi
Good/No Good?	**O.K.**		*Lumber Factors*		*Good/No Good?*	**O.K.**	*Lumber Factors*
		C_D=	1.25	Duration			C_D= 1.25 Duration
Shear		C_M=	1.00	Wet Service	*Shear*		C_M= 1.00 Wet Service
F'_v=	169 psi	C_t=	1.00	Temperature	F'_v=	356 psi	C_t= 1.00 Temperature
f_v=	88 psi	C_L=	0.99	Beam Stability	f_v=	118 psi	C_L= 1.00 Beam Stability
Good/No Good?	**O.K.**	C_F=	1.30	Size	*Good/No Good?*	**O.K.**	C_F= 1.00 Size
		C_{fu}=	1.00	Flat Use			C_{fu}= 1.00 Flat Use
Deflection		C_i=	1.00	Incising	*Deflection*		C_i= 1.00 Incising
E'=	1,400,000 psi	C_r=	1.00	Repetitive Member	E'=	1,900,000 psi	C_r= 1.00 Repetitive Member
I=	41.59375	C_f=	1.00	Form	I=	12.50520833	C_f= 1.00 Form
Deflection Ratio=	L/180	TL (L/x)	L/240	LL(L/x)	Deflection Ratio=	L/180	TL(L/x) L/240 LL(L/x)
Allowable Deflection=	.28 in.		.21 in.		Allowable Deflection=	.28 in.	.28 in.
Δ=	.06 in.		.03 in.		Δ=	.14 in.	.07 in.
Good/No Good?	**O.K.**		**O.K.**		*Good/No Good?*	**O.K.**	**O.K.**

Trimmer for: **Header: Wall A, Hdr 1**

		SPF #1/#2	
		F_b= 875 psi	
Load=	383 lbs.	F_t= 450 psi	
width=	3.50 in.	F_v= 135 psi	
thickness=	1.50 in.	F_{cP}= 425 psi	
No. of members=	1	F_c= 1150 psi	
Unbraced Length(x)(width)=	89.13 in.	E_{min}= 510,000 psi	
Unbraced Length(y)(thickness)=	6.0 in.		
Effective Length factor, $K_{e(x)}$=	1	*Lumber Factors*	
Effective Length factor, $K_{e(y)}$=	1	C_D= 1.25	Duration
		C_M= 1.00	Wet Service
c=	0.8	C_t= 1.00	Temperature
A=	5.25 sq.in.	C_L= 1.00	Beam Stability
$(l/d)_x$=	25.46	C_F= 1.15	Size
$(l/d)_y$=	4.00	C_{fu}= 1.00	Flat Use
E'_{min}=	510,000 psi	C_i= 1.00	Incising
		C_r= 1.00	Repetitive Member
		C_f= 1.00	Form
		C_T= 1.00	Buckling Stiffness

Weak Axis Calculations(y)		*Strong Axis Calculations (x)*	
F_{cE}=	26201.25	F_{cE}=	646.52
F^*_c=	1653.13	F^*_c=	1653.13
F_{cE}/F^*_c=	15.85	F_{cE}/F^*_c=	0.39
$1+F_{cE}/F^*_c/2c$=	10.53	$1+F_{cE}/F^*_c/2c$=	0.87
C_P=	0.99	C_P=	0.35
F'_c=	1631.46	F'_c=	582.99
$P_{allowable}$=	8,565 lbs.	$P_{allowable}$=	3,061 lbs.
Good/No Good?	**O.K.**	*Good/No Good?*	**O.K.**

Trimmer for: **Header: Wall B, Hdr 1**

		SPF #1/#2	
		F_b= 875 psi	
Load=	739 lbs.	F_t= 450 psi	
width=	3.50 in.	F_v= 135 psi	
thickness=	1.50 in.	F_{cP}= 425 psi	
No. of members=	1	F_c= 1150 psi	
Unbraced Length(x)(width)=	89.13 in.	E_{min}= 510,000 psi	
Unbraced Length(y)(thickness)=	6.0 in.		
Effective Length factor, $K_{e(x)}$=	1	*Lumber Factors*	
Effective Length factor, $K_{e(y)}$=	1	C_D= 1.25	Duration
		C_M= 1.00	Wet Service
c=	0.8	C_t= 1.00	Temperature
A=	5.25 sq.in.	C_L= 1.00	Beam Stability
$(l/d)_x$=	25.46	C_F= 1.15	Size
$(l/d)_y$=	4.00	C_{fu}= 1.00	Flat Use
E'_{min}=	510,000 psi	C_i= 1.00	Incising
		C_r= 1.00	Repetitive Member
		C_f= 1.00	Form
		C_T= 1.00	Buckling Stiffness

Weak Axis Calculations(y)		*Strong Axis Calculations (x)*	
F_{cE}=	26201.25	F_{cE}=	646.52
F^*_c=	1653.13	F^*_c=	1653.13
F_{cE}/F^*_c=	15.85	F_{cE}/F^*_c=	0.39
$1+F_{cE}/F^*_c/2c$=	10.53	$1+F_{cE}/F^*_c/2c$=	0.87
C_P=	0.99	C_P=	0.35
F'_c=	1631.46	F'_c=	582.99
$P_{allowable}$=	8,565 lbs.	$P_{allowable}$=	3,061 lbs.
Good/No Good?	**O.K.**	*Good/No Good?*	**O.K.**

Trimmer for: **Header: Wall B, Hdr 2**

		SPF #1/#2	
		F_b= 875 psi	
Load=	967 lbs.	F_t= 450 psi	
width=	3.50 in.	F_v= 135 psi	
thickness=	1.50 in.	F_{cP}= 425 psi	
No. of members=	1	F_c= 1150 psi	
Unbraced Length(x)(width)=	89.13 in.	E_{min}= 510,000 psi	
Unbraced Length(y)(thickness)=	6.0 in.		
Effective Length factor, $K_{e(x)}$=	1	*Lumber Factors*	
Effective Length factor, $K_{e(y)}$=	1	C_D= 1.25	Duration
		C_M= 1.00	Wet Service
c=	0.8	C_t= 1.00	Temperature
A=	5.25 sq.in.	C_L= 1.00	Beam Stability
$(l/d)_x$=	25.46	C_F= 1.15	Size
$(l/d)_y$=	4.00	C_{fu}= 1.00	Flat Use
E'_{min}=	510,000 psi	C_i= 1.00	Incising
		C_r= 1.00	Repetitive Member
		C_f= 1.00	Form
		C_T= 1.00	Buckling Stiffness

Weak Axis Calculations(y)		*Strong Axis Calculations (x)*	
F_{cE}=	26201.25	F_{cE}=	646.52
F^*_c=	1653.13	F^*_c=	1653.13
F_{cE}/F^*_c=	15.85	F_{cE}/F^*_c=	0.39
$1+F_{cE}/F^*_c/2c$=	10.53	$1+F_{cE}/F^*_c/2c$=	0.87
C_P=	0.99	C_P=	0.35
F'_c=	1631.46	F'_c=	582.99
$P_{allowable}$=	8,565 lbs.	$P_{allowable}$=	3,061 lbs.
Good/No Good?	**O.K.**	*Good/No Good?*	**O.K.**

Wind Calculations (C&C)

Alternate all-heights method

Wind Speed, v_{ASD}:	124 mph	
Wind Exposure:	C	
Risk Category:	I - Low Hazard	
Roof Angle=	18.43	
Gable Wall Span=	20.0 ft.	
Longitude Wall Span=	24.0 ft.	
Enclosure Classification:	Enclosed	Section 26.10
K_{zt}=	1	Section 26.8.2
K_z=	0.85	Table 27.3-1
K_d=	0.85	Table 26.6-1
Mean Roof Height=	11.42 ft.	

LOW RISE BUILDINGS (ASCE 7-16 Chapt. 30)

GC_{pi}= 0.18

q_h= 28.41 psf

	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	
GC_p=	-0.9	-1.7	-2.6	-1.1	-1.4	(ASCE 7-16 Figures 30.3-1,30.3-2B,30.3-2a,30.3-2C)
GC_p=	0.5	0.5	0.5	1.0	1.0	(ASCE 7-16 Figures 30.3-1,30.3-2B,30.3-2a,30.3-2C)
p=	-30.68 psf	-53.41 psf	-78.98 psf	-36.36 psf	-44.89 psf	
p=	19.32 psf	19.32 psf	19.32 psf	33.52 psf	33.52 psf	
p=	-30.68 psf	-53.41 psf	-78.98 psf	-36.36 psf	-44.89 psf	
p=	19.32 psf	19.32 psf	19.32 psf	33.52 psf	33.52 psf	
p_{max}=	**19 psf**	**19 psf**	**19 psf**	**34 psf**	**34 psf**	
p_{min}=	**-31 psf**	**-53 psf**	**-79 psf**	**-36 psf**	**-45 psf**	

Wind Calculations (MWFRS)

ASCE 7-16 Chapt. 28 Part 1

Wind Speed, v_{ASD}: 124 mph
Wind Speed, v_{ULT}: 160 mph
Wind Exposure: C
Risk Category: I - Low Hazard
Roof Angle= 18.43
Gable Wall Span= 20.0 ft.
Longitude Wall Span= 24.0 ft.
Mean Roof Height= 11.42 ft.
Enclosure Classification: Enclosed — Section 26.10
K_{zt}= 1 — Section 26.8.2
K_z= 0.85 — Table 27.3-1
K_d= 0.85 — Table 26.6-1

GC_{pi}= ±0.18 — Table 26.11-1
q_h= 47.35 psf — Eq. 28.3-1

		1	2	3	4	5	6	1E	2E	3E	4E	5E	6E
GC_{pi}	Load Case A	0.52	-0.69	-0.47	-0.42	N/A	N/A	0.78	-1.07	-0.67	-0.62	N/A	N/A
	Load Case B	-0.45	-0.69	-0.37	-0.45	0.40	-0.29	-0.48	-1.07	-0.53	-0.48	0.61	-0.43
p	Load Case A (-GC_{pi})	15.93 psf	-41.19 psf	-30.71 psf	-28.19 psf	N/A	N/A	28.42 psf	-59.19 psf	-40.40 psf	-37.79 psf	N/A	N/A
	Load Case A (+GC_{pi})	32.97 psf	-24.15 psf	-13.66 psf	-11.14 psf	N/A	N/A	45.46 psf	-42.14 psf	-23.36 psf	-20.74 psf	N/A	N/A
	Load Case B (-GC_{pi})	-29.83 psf	-41.19 psf	-26.04 psf	-29.83 psf	10.42 psf	-22.25 psf	-31.25 psf	-59.19 psf	-33.62 psf	-31.25 psf	20.36 psf	-28.88 psf
	Load Case B (+GC_{pi})	-12.78 psf	-24.15 psf	-9.0 psf	-12.78 psf	27.46 psf	-5.21 psf	-14.20 psf	-42.14 psf	-16.57 psf	-14.20 psf	37.41 psf	-11.84 psf

max. p_L= 45.46 psf — Side Wall, maximum wind pressure
max. p_T= 37.41 psf — Gable End Wall, maximum wind pressure

max. p_{roof}= -59.19 psf

V_L= 4,273 lbs. — Max. Longitudinal Shear
V_T= 6,232 lbs. — Max. Transversial Shear
Max. uplift pressure= -31,251 lbs. — Max. uplift pressure on the building due to wind on roof

Diaphragm Calculations

Length (for shear)
Wall A: 12.0 ft.
Wall B: 17.0 ft.
Wall C: 20.0 ft.
Wall D: 24.0 ft.

	Sheathing*	Nail Size	Edge Nailing	Boundary Nailing		v_{allow}	HF/SPF Factor
Roof	7/16" OSB	8d	6 in. o.c.	12 in. o.c.	v= 180.0 plf	165.6 plf	0.92
Wall	3/8" Smartside	8d	6 in. o.c.	12 in. o.c.	v= 200.0 plf	164.0 plf	0.82
Wall	3/8" Smartside	8d	4 in. o.c.	12 in. o.c.	v= 300.0 plf	246.0 plf	0.82
Wall	3/8" Smartside	8d	3 in. o.c.	12 in. o.c.	v= 390.0 plf	319.8 plf	0.82

*Must be Rated sheathing

Wind		v_{allow}		$2b_s/h$	edge nailing
Wall A:	311.6 plf	319.8 plf	C_0= 1.00	1.00	3" o.c.
Wall B:	150.8 plf	164.0 plf	C_0= 1.00	1.00	6" o.c.
Wall C:	187.0 plf	246.0 plf	C_0= 1.00	1.00	4" o.c.
Wall D:	106.8 plf	164.0 plf	C_0= 1.00	1.00	6" o.c.
Roof=	106.8 plf	165.6 plf			

Overturning Calculations

Wall A

Min. No. anchor bolts= 0
Width= 12.0 ft.
Height= 8.09 ft.
P_{wind}= 6,232 lbs.

Wall Weight= 594.48 lbs.

$Uplift_{wind}$= 2,223.53 lbs. Provide MR-88 Earth Anchor

Allowable Service, wind: N/A

Wall B

Min. No. anchor bolts= 0
Width= 17.0 ft.
Height= 8.09 ft.
P_{wind}= 4,273 lbs.

Wall Weight= 957.18 lbs.

$Uplift_{wind}$= 741.49 lbs.

Allowable Service, wind: N/A

Wall C

Min. No. anchor bolts= 0
Width= 20.0 ft.
Height= 8.09 ft.
P_{wind}= 6,232 lbs.

Wall Weight= 982.80 lbs.

$Uplift_{wind}$= 1,021.06 lbs. Provide MR-88 Earth Anchor

Allowable Service, wind: N/A

Wall D

Min. No. anchor bolts= 0
Width= 24.0 ft.
Height= 8.09 ft.
P_{wind}= 4,273 lbs.

Wall Weight= 1,296.96 lbs.

$Uplift_{wind}$= 215.74 lbs.

Allowable Service, wind: N/A

Building Uplift

Wind uplift= -31,250.84 lbs.
Min. building weight= 8,183.76 lbs.
Additional min. dead load= .0 lbs. additional dead load due to steel floor, wood base, or other permanent loads,if any, (not including foundation)
Net uplift= -23,067.08 lbs.
Total no. of anchor bolts (min.)= 0 (Does not include additional holddowns for overturning of the walls.)
Anchor bolt uplift= .0 lbs.

Additional anchors required Provide 9-MR-88 Earth Anchors

Bearing Wall Calculations

Axial Load

Stud Spacing= 16 in. o.c.
Max. Load on wall= 520.9 plf

depth= 3.50 in.
width= 1.50 in.
No. of members= 1
Length (depth)= 92.58 in. unbraced length (depth)(x)(in.)
Length (width)= 12.0 in. unbraced length (width)(y)(in.)
$K_{e(x)}$= 1 effective length factor (x)
$K_{e(y)}$= 1 effective length factor (y)
K_{cE}= 0.3
c= 0.8

Load= 695 lbs. Load per stud

A= 5.25 sq.in.
$(l/d)_x$= 26.45
$(l/d)_y$= 8.00
E'_{min}= 510,000 psi

Lumber
SPF #1/#2

F_b= 875 psi
F_t= 450 psi
F_v= 135 psi
F_{cP}= 425 psi
F_c= 1150 psi
E_{min}= 510,000 psi
E= 1,400,000 psi

Lumber Factors

C_D=	1.25	Duration for gravity load
C_M=	1.00	Wet Service
C_t=	1.00	Temperature
C_L=	1.00	Beam Stability
C_F=	1.15	Size for F_c
C_{fu}=	1.00	Flat Use
C_i=	1.00	Incising
C_r=	1.15	Repetitive Member
C_f=	1.00	Form
C_T=	1.00	Buckling Stiffness (NDS 4.4.2)
C_F=	1.50	Size for F_b
C_D=	1.60	Duration for lateral load
C_r=	1.50	Repetitive Member (wind)

Weak Axis Calculations(y)

F_{cE}= 6550.31
F^*_c= 1653.13
F_{cE}/F^*_c= 3.96
$1+F_{cE}/F^*_c/2c$= 3.10
C_P= 0.94
F'_c= 1556.15
$P_{allowable}$= 8,170 lbs.

Good/No Good? **O.K.**

Strong Axis Calculations (x)

F_{cE}= 599.16
F^*_c= 1653.13
F_{cE}/F^*_c= 0.36
$1+F_{cE}/F^*_c/2c$= 0.85
C_P= 0.33
F'_c= 545.44
$P_{allowable}$= 2,864 lbs.

Good/No Good? **O.K.**

Wind Load

Wind load per stud= 60.6 plf
Moment= 5,412 in.-lbs.
Reaction= 234 lbs.

Header depth= 3.50 in.
Total header width= 1.50 in.
Header span= 8.0 ft.

Bending

S_x= 3.06 cu.in.
F'_b= 3150 psi
f_b= 1767 psi

Good/No Good? **O.K.**

Shear

F'_v= 216 psi
f_v= 67 psi
Good/No Good? **O.K.**

Combined Bending and Axial Loading

F'_c= 698.17 combine allowable compressive stress
f_c= 66 psi combine compressive stress
Combined stress index= 0.64
Good/No Good? **O.K.**