

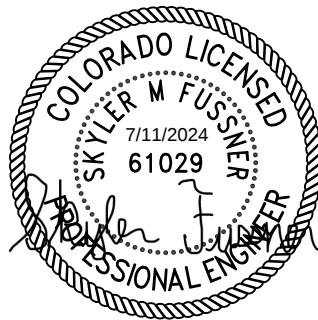
Structural Calculations

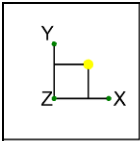
Woodrow Residence Truss Design

Anthem Job # 23-072

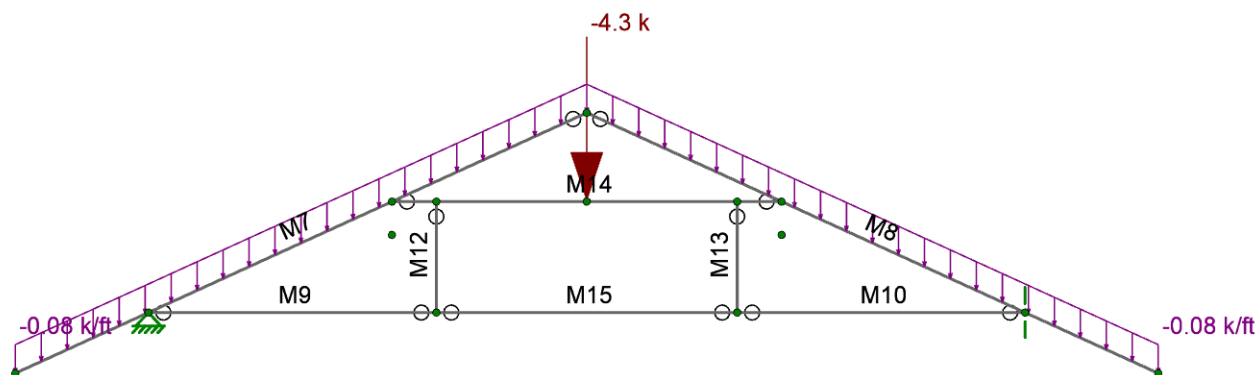
31555 Green Ridge Dr

July 10, 2024



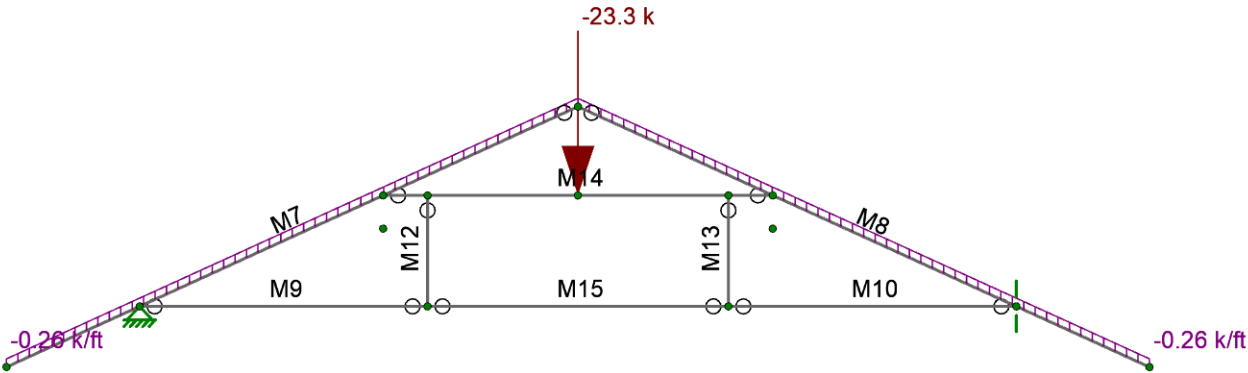
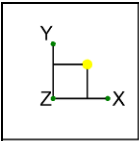


23-072 Green Ridge Truss



Loads: BLC 1, Dead

 A NEMETSCHKE COMPANY	Anthem Structural Engin...	Green Ridge Drive	SK-1
	JCC		Jul 09, 2024 at 04:20 PM
	23-072		23-072 10x Roof Timbers_...



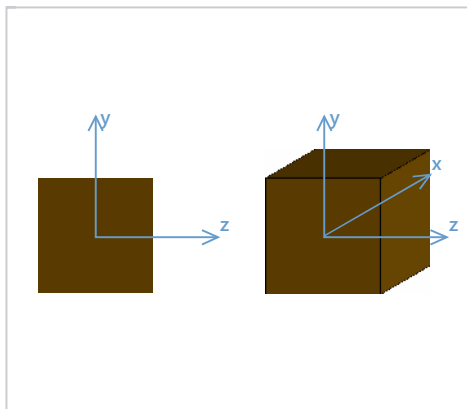
Loads: BLC 3, Snow

 A NEMETSCHKE COMPANY	Anthem Structural Engin...	Green Ridge Drive	SK-2
	JCC		Jul 09, 2024 at 04:22 PM
	23-072		23-072 10x Roof Timbers_...

Detail Report: M7

Load Combination: LC 14: DL+SL

Code check: 0.877 (axial/
bending)



Input Data

Shape:	10X10 (nominal)	I Node:	N33
Member Type:	Beam	J Node:	N19
Length (ft):	14.149	I Release:	Fixed
Material Type:	Wood	J Release:	BenPIN
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18 / SDPWS-15 ASD	T/C Only:	Both Way

Material Properties

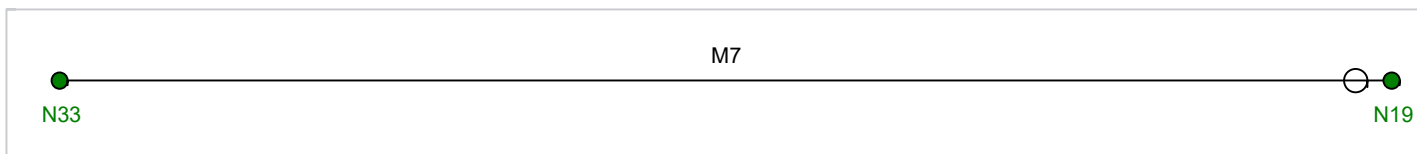
Material:	DF	Grade:	No.1	Nu:	0.3
Type:	Solid Sawn	Cm:	No	Alpha (1e⁵F⁻¹):	0.3
Database:	Visually Graded	Ci:	No	Density (k/ft³):	0.035
Species:	Douglas Fir-Larch	Emod:	1		

Shape Properties

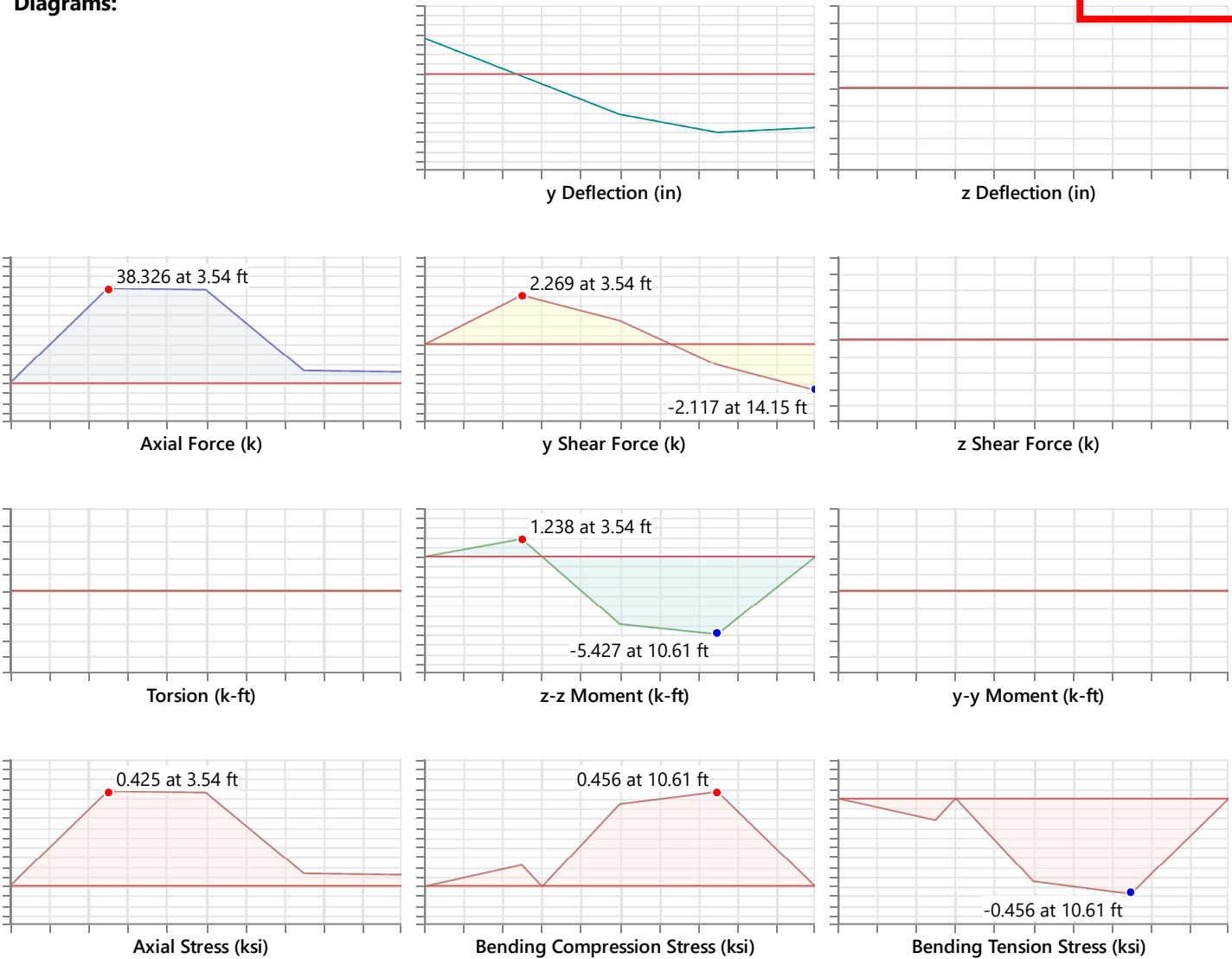
Fb (ksi):	1.2	E (ksi):	1600	b (actual) (in):	9.5
Ft (ksi):	0.825	Emod:	1	d (actual) (in):	9.5
Fv (ksi):	0.17	COVE (Table F1):	0.25		
Fc (ksi):	1	Emin (ksi):	584.494		

Design Properties

le2 (ft):	14.149	y sway:	No	Cfu:	1
le1 (ft):	14.149	z sway:	No	CP:	0.811
le-bend top:	Lbyy	Cb:	1	Max Defl Ratio:	L/873
le-bend bot (ft):	14.149	Rb:	4.228	Max Defl Location:	14.149
Ky-y:	1	CL:	1	Span:	2
Kz-z:	1	Cr:	1		



Diagrams:



WARNING: Detail Report Based On Less Than 10 Sections!

AWC NDS-18 / SDPWS-15 ASD Code Check

Limit State	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	-	-	-	-
Applied Loading - Shear + Torsion	-	-	-	-
Axial Compression Analysis	0.415 ksi	0.811 ksi	-	-
Axial Tension Analysis	0 ksi	0.825 ksi	-	-
Flexural Analysis, Fb1'	0.534 ksi	1.2 ksi	-	-
Flexural Analysis, Fb2'	0 ksi	1.2 ksi	-	-
Bending & Axial Compression Analysis	-	-	0.877	PASS



Company : Anthem Structural Engineers
Designer : JCC
Job Number : 23-072
Model Name : Green Ridge Drive

7/9/2024
4:10:45 PM
Checked by:

**Reviewed
for Code
Compliance**

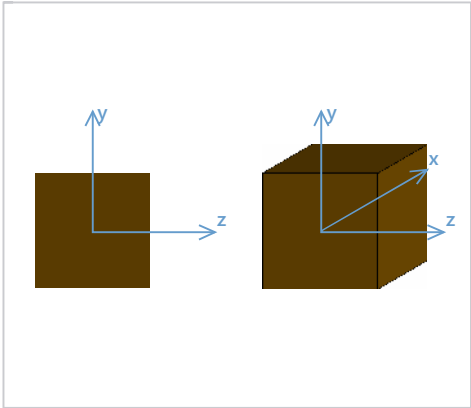
07/12/2024
PASS

Bending & Axial Tension Analysis	-	-	0.445	PASS
Shear Analysis	0.039 ksi	0.17 ksi	0.227	PASS

Detail Report: M9

Load Combination: LC 14: DL+SL

Code check: 0.465 (axial/
bending)



Input Data

Shape:	10X10 (nominal)	I Node:	N17
Member Type:	Beam	J Node:	N24
Length (ft):	6.486	I Release:	BenPIN
Material Type:	Wood	J Release:	BenPIN
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18 / SDPWS-15 ASD	T/C Only:	Both Way

Material Properties

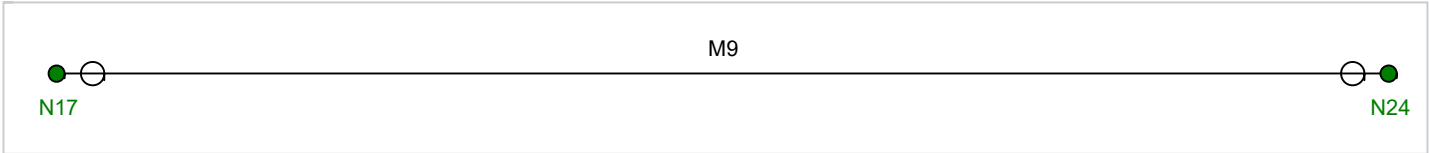
Material:	DF	Grade:	No.1	Nu:	0.3
Type:	Solid Sawn	Cm:	No	Alpha (1e ⁵ °F ⁻¹):	0.3
Database:	Visually Graded	Ci:	No	Density (k/ft ³):	0.035
Species:	Douglas Fir-Larch	Emod:	1		

Shape Properties

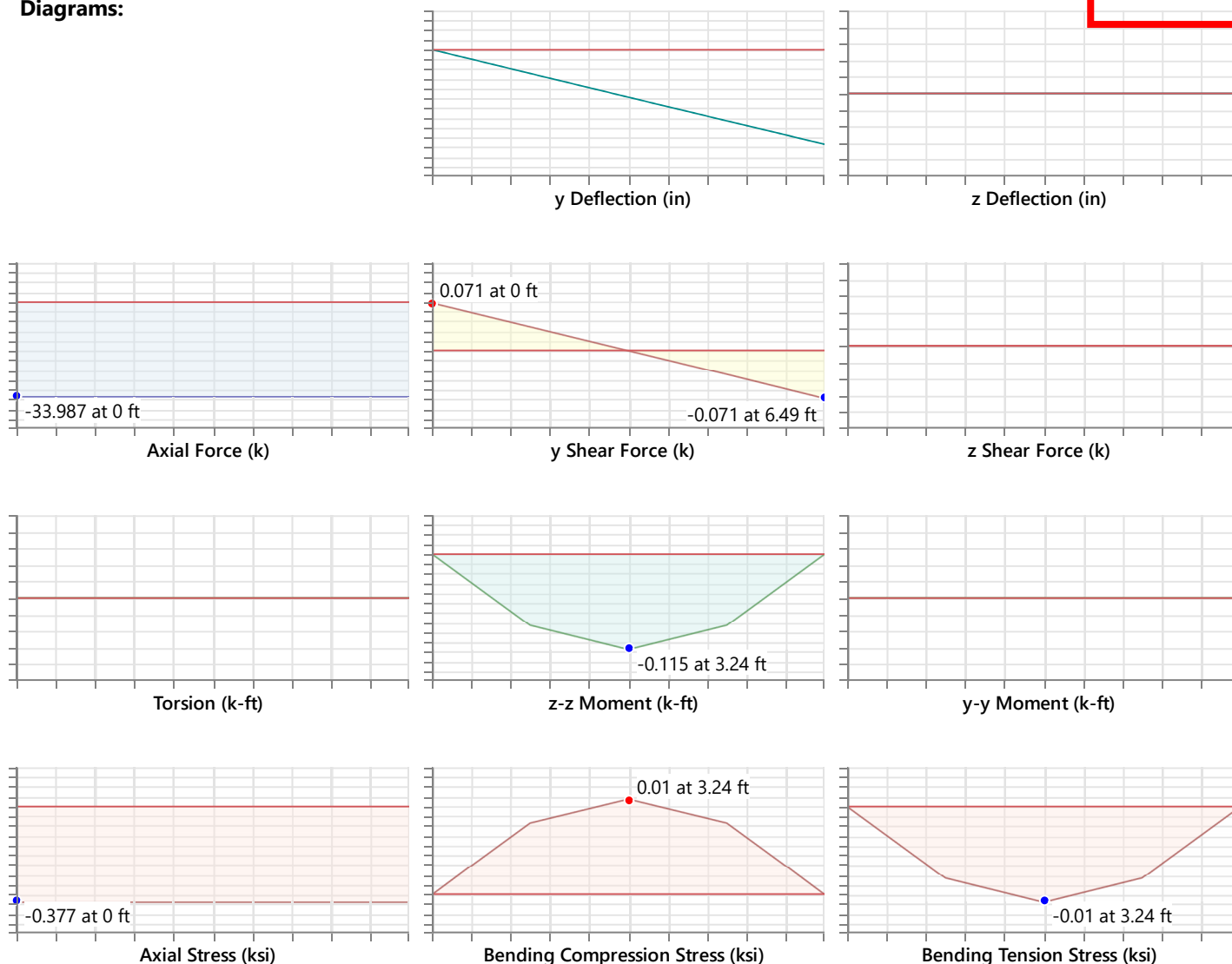
Fb (ksi):	1.2	E (ksi):	1600	b (actual) (in):	9.5
Ft (ksi):	0.825	Emod:	1	d (actual) (in):	9.5
Fv (ksi):	0.17	COVE (Table F1):	0.25		
Fc (ksi):	1	Emin (ksi):	584.494		

Design Properties

le2 (ft):	6.486	y sway:	No	Cfu:	1
le1 (ft):	6.486	z sway:	No	CP:	0.97
le-bend top:	Lbyy	Cb:	1	Max Defl Ratio:	L/10000
le-bend bot (ft):	6.486	Rb:	2.862	Max Defl Location:	0
Ky-y:	1	CL:	1	Span:	N/A
Kz-z:	1	Cr:	1		



Diagrams:



WARNING: Detail Report Based On Less Than 10 Sections!

AWC NDS-18 / SDPWS-15 ASD Code Check

Limit State	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	-	-	-	-
Applied Loading - Shear + Torsion	-	-	-	-
Axial Compression Analysis	0 ksi	0.97 ksi	-	-
Axial Tension Analysis	-0.377 ksi	0.825 ksi	-	-
Flexural Analysis, Fb1'	0.01 ksi	1.2 ksi	-	-
Flexural Analysis, Fb2'	0 ksi	1.2 ksi	-	-
Bending & Axial Compression Analysis	-	-	0.008	PASS



Company : Anthem Structural Engineers
Designer : JCC
Job Number : 23-072
Model Name : Green Ridge Drive

7/9/2024
4:10:47 PM
Checked by:

**Reviewed
for Code
Compliance**

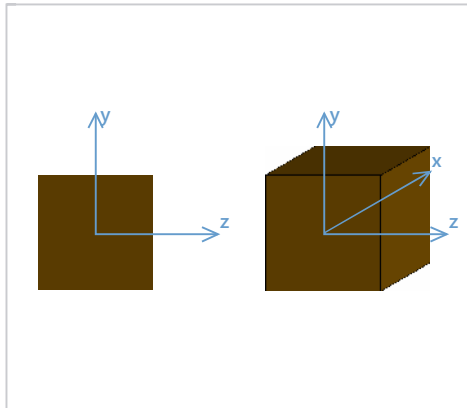
07/12/2024
PASS

Bending & Axial Tension Analysis	-	-	0.465	PASS
Shear Analysis	0.001 ksi	0.17 ksi	0.007	PASS

Detail Report: M8

Load Combination: LC 14: DL+SL

Code check: 0.877 (axial/
bending)



Input Data

Shape:	10X10 (nominal)	I Node:	N34
Member Type:	Beam	J Node:	N19
Length (ft):	14.149	I Release:	Fixed
Material Type:	Wood	J Release:	BenPIN
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18 / SDPWS-15 ASD	T/C Only:	Both Way

Material Properties

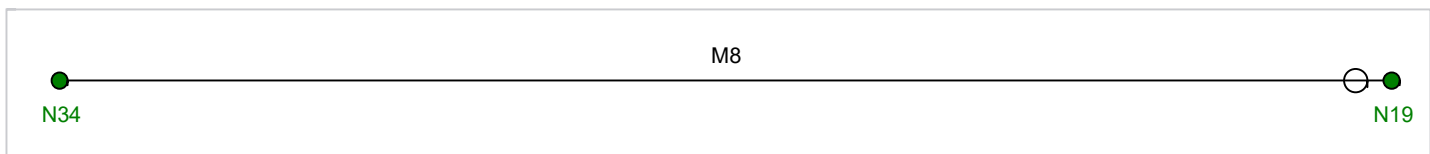
Material:	DF	Grade:	No.1	Nu:	0.3
Type:	Solid Sawn	Cm:	No	Alpha (1e⁵F⁻¹):	0.3
Database:	Visually Graded	Ci:	No	Density (k/ft³):	0.035
Species:	Douglas Fir-Larch	Emod:	1		

Shape Properties

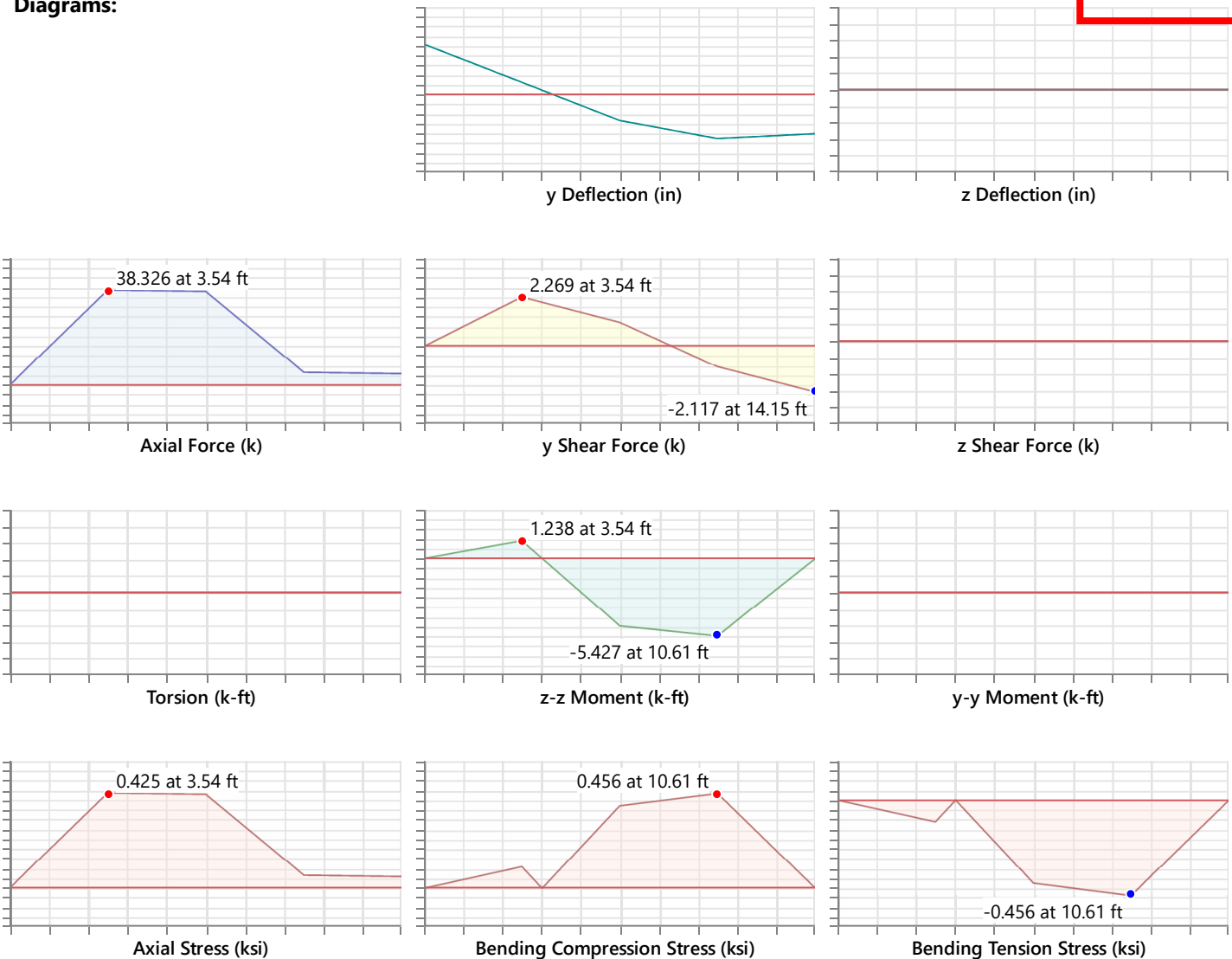
Fb (ksi):	1.2	E (ksi):	1600	b (actual) (in):	9.5
Ft (ksi):	0.825	Emod:	1	d (actual) (in):	9.5
Fv (ksi):	0.17	COVE (Table F1):	0.25		
Fc (ksi):	1	Emin (ksi):	584.494		

Design Properties

le2 (ft):	14.149	y sway:	No	Cfu:	1
le1 (ft):	14.149	z sway:	No	CP:	0.811
le-bend top:	Lbyy	Cb:	1	Max Defl Ratio:	L/873
le-bend bot (ft):	14.149	Rb:	4.228	Max Defl Location:	14.149
Ky-y:	1	CL:	1	Span:	2
Kz-z:	1	Cr:	1		



Diagrams:



WARNING: Detail Report Based On Less Than 10 Sections!

AWC NDS-18 / SDPWS-15 ASD Code Check

Limit State	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	-	-	-	-
Applied Loading - Shear + Torsion	-	-	-	-
Axial Compression Analysis	0.415 ksi	0.811 ksi	-	-
Axial Tension Analysis	0 ksi	0.825 ksi	-	-
Flexural Analysis, Fb1'	0.534 ksi	1.2 ksi	-	-
Flexural Analysis, Fb2'	0 ksi	1.2 ksi	-	-
Bending & Axial Compression Analysis	-	-	0.877	PASS



Company : Anthem Structural Engineers
Designer : JCC
Job Number : 23-072
Model Name : Green Ridge Drive

7/9/2024
4:10:48 PM
Checked by:

**Reviewed
for Code
Compliance**

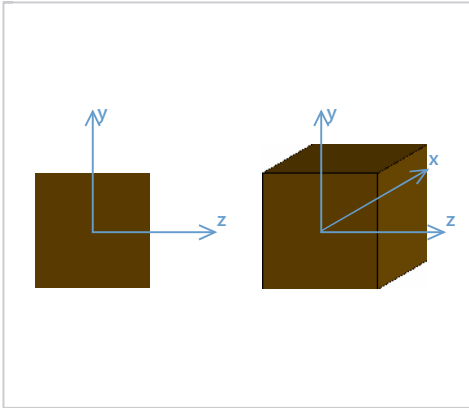
07/12/2024
PASS

Bending & Axial Tension Analysis	-	-	0.445	PASS
Shear Analysis	0.039 ksi	0.17 ksi	0.227	PASS

Detail Report: M10

Load Combination: LC 14: DL+SL

Code check: 0.465 (axial/
bending)



Input Data

Shape:	10X10 (nominal)	I Node:	N25
Member Type:	Beam	J Node:	N18
Length (ft):	6.486	I Release:	BenPIN
Material Type:	Wood	J Release:	BenPIN
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18 / SDPWS-15 ASD	T/C Only:	Both Way

Material Properties

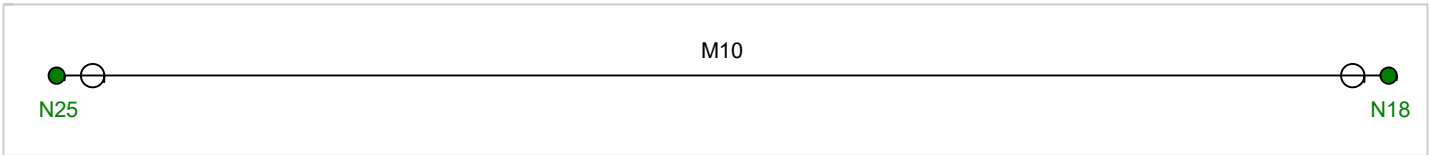
Material:	DF	Grade:	No.1	Nu:	0.3
Type:	Solid Sawn	Cm:	No	Alpha (1e ⁵ °F ⁻¹):	0.3
Database:	Visually Graded	Ci:	No	Density (k/ft ³):	0.035
Species:	Douglas Fir-Larch	Emod:	1		

Shape Properties

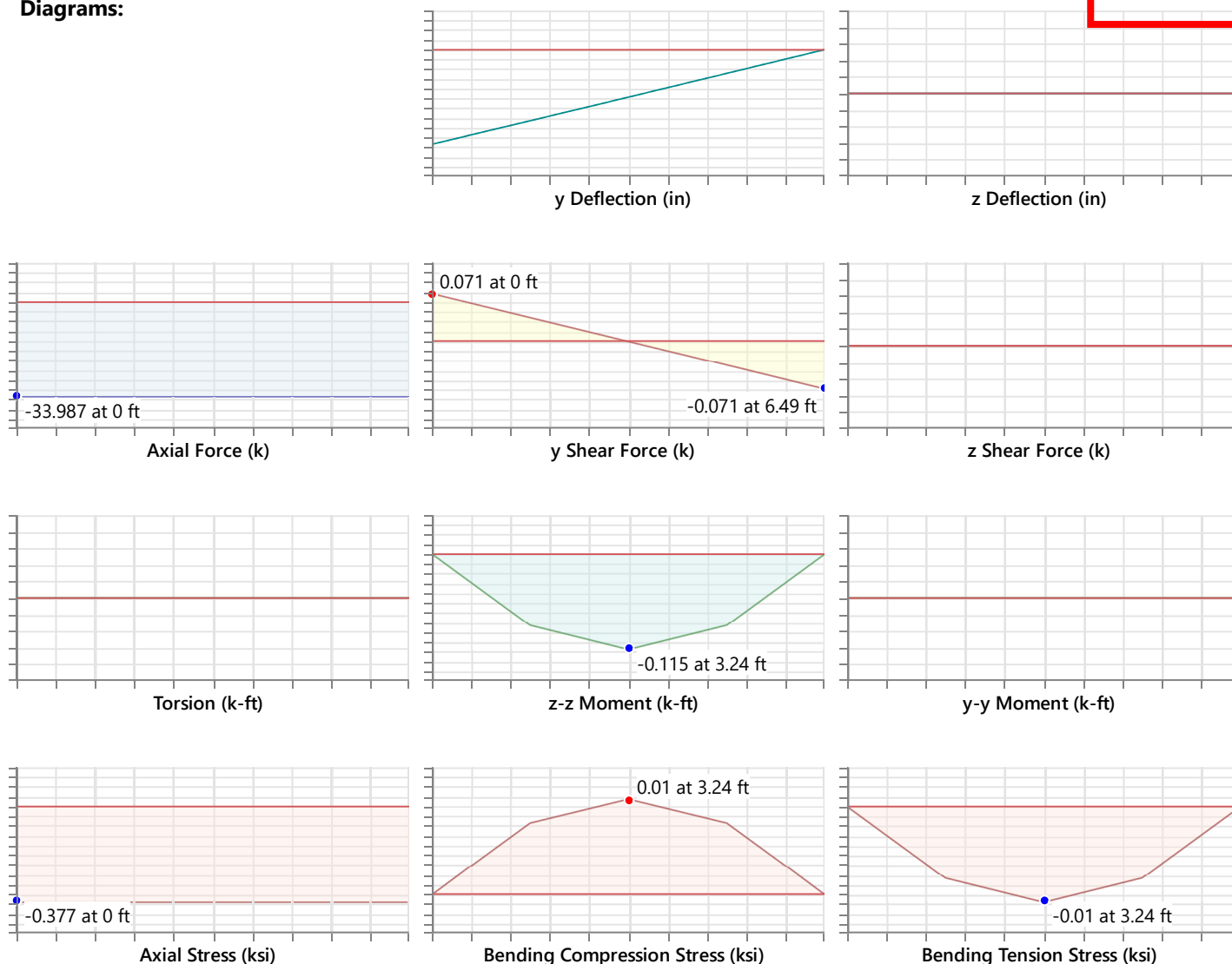
Fb (ksi):	1.2	E (ksi):	1600	b (actual) (in):	9.5
Ft (ksi):	0.825	Emod:	1	d (actual) (in):	9.5
Fv (ksi):	0.17	COVE (Table F1):	0.25		
Fc (ksi):	1	Emin (ksi):	584.494		

Design Properties

le2 (ft):	6.486	y sway:	No	Cfu:	1
le1 (ft):	6.486	z sway:	No	CP:	0.97
le-bend top:	Lbyy	Cb:	1	Max Defl Ratio:	L/10000
le-bend bot (ft):	6.486	Rb:	2.862	Max Defl Location:	0
Ky-y:	1	CL:	1	Span:	N/A
Kz-z:	1	Cr:	1		



Diagrams:



WARNING: Detail Report Based On Less Than 10 Sections!

AWC NDS-18 / SDPWS-15 ASD Code Check

Limit State	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	-	-	-	-
Applied Loading - Shear + Torsion	-	-	-	-
Axial Compression Analysis	0 ksi	0.97 ksi	-	-
Axial Tension Analysis	-0.377 ksi	0.825 ksi	-	-
Flexural Analysis, Fb1'	0.01 ksi	1.2 ksi	-	-
Flexural Analysis, Fb2'	0 ksi	1.2 ksi	-	-
Bending & Axial Compression Analysis	-	-	0.008	PASS



Company : Anthem Structural Engineers
Designer : JCC
Job Number : 23-072
Model Name : Green Ridge Drive

7/9/2024
4:10:49 PM
Checked by:

**Reviewed
for Code
Compliance**

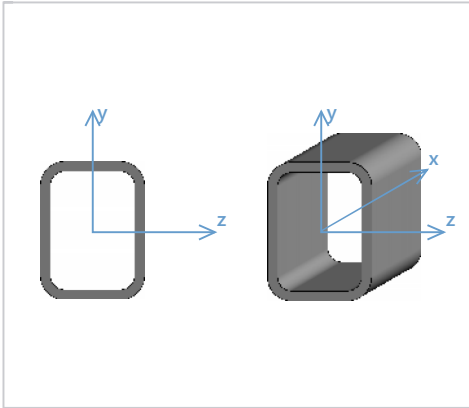
07/12/2024
PASS

Bending & Axial Tension Analysis	-	-	0.465	PASS
Shear Analysis	0.001 ksi	0.17 ksi	0.007	PASS

Detail Report: M14

Load Combination: LC 14: DL+SL

Code check: 0.482 (axial/
bending)



Input Data

Shape:	HSS8X6X10	I Node:	N22
Member Type:	Beam	J Node:	N23
Length (ft):	8.778	I Release:	BenPIN
Material Type:	Hot Rolled Steel	J Release:	BenPIN
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AISC 15th (360-16): LRFD	T/C Only:	Both Way

Material Properties

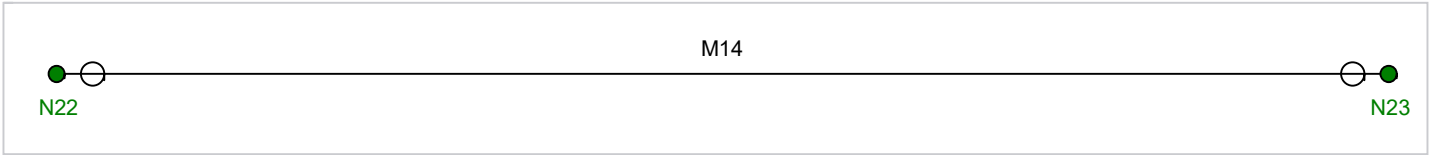
Material:	A992	Therm. Coeff. (/1E5 F):	0.65	Fu (ksi):	65
E (ksi):	29000	Density (k/ft ³):	0.49	Rt:	1.1
G (ksi):	11154	Fy (ksi):	50		
Nu:	0.3	Ry:	1.1		

Shape Properties

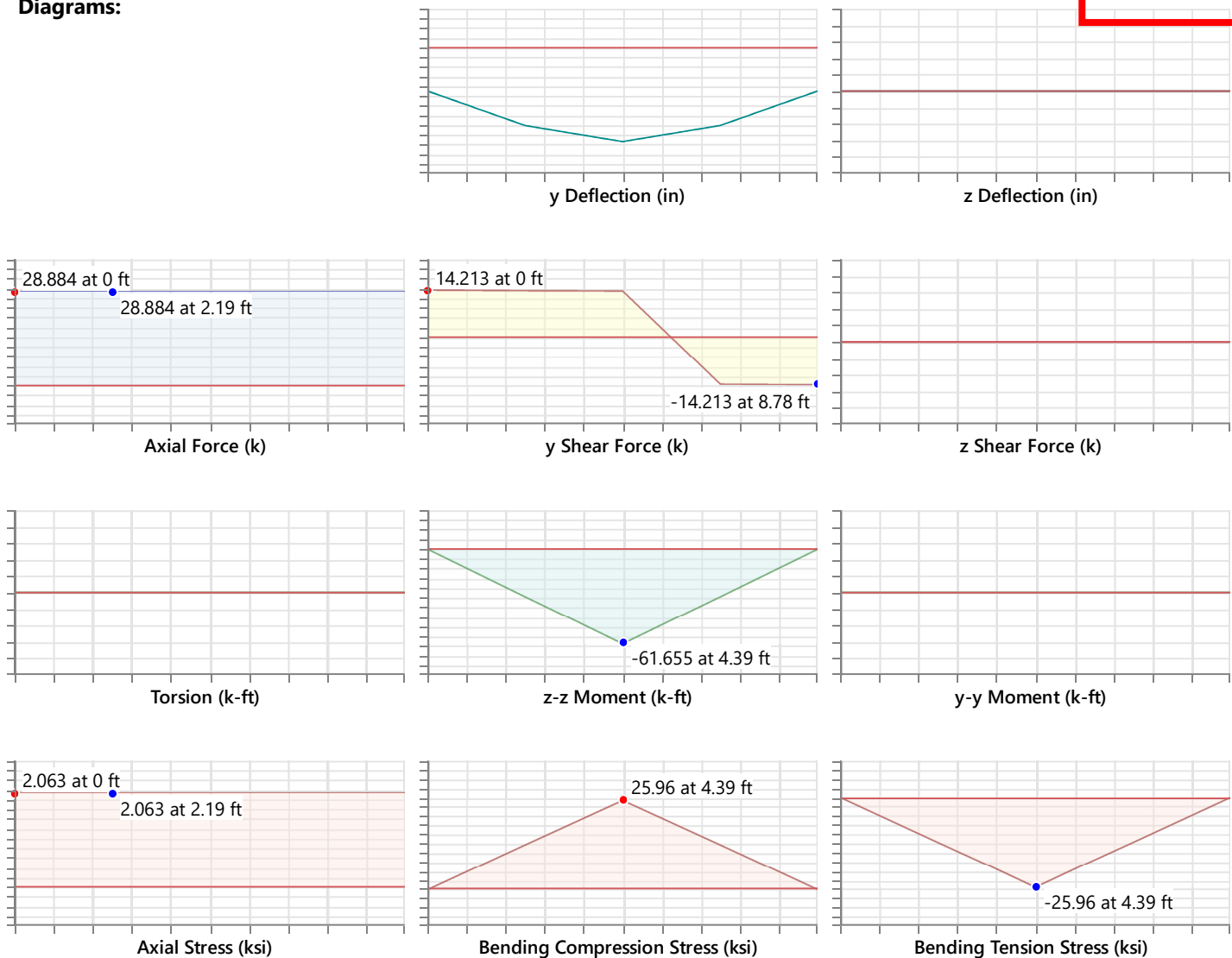
d (in):	8	I _{yy} (in ⁴):	72.3	J (in ⁴):	150
bf (in):	6	I _{zz} (in ⁴):	114		
t (in):	0.581	Area (in ²):	14		

Design Properties

Lb y-y (ft):	8.778	Ky-y:	1	Seismic DR:	None
Lb z-z (ft):	8.778	Kz-z:	1	Max Defl Ratio:	L/269
Lcomp top:	Lbyy	y sway:	No	Max Defl Location:	8.778
Lcomp bot (ft):	8.778	z sway:	No	Span:	3
Ltorque (ft):	8.778	Function:	Lateral	τb:	1



Diagrams:



WARNING: Detail Report Based On Less Than 10 Sections!

AISC 15th (360-16): LRFD Code Check

Limit State	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	-	-	-	-
Applied Loading - Shear + Torsion	-	-	-	-
Axial Tension Analysis	0 k	630 k	-	-
Axial Compression Analysis	28.883 k	538.417 k	-	-
Flexural Analysis (Strong Axis)	61.655 k-ft	135.375 k-ft	-	-
Flexural Analysis (Weak Axis)	0 k-ft	110.625 k-ft	-	-
Shear Analysis (Major Axis y)	14.213 k	196.307 k	0.072	PASS



Company : Anthem Structural Engineers
Designer : JCC
Job Number : 23-072
Model Name : Green Ridge Drive

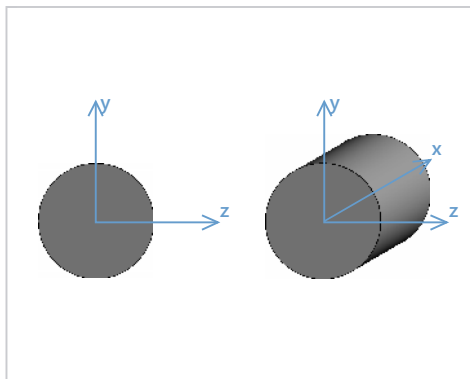
7/9/2024
4:10:50 PM
Checked by:

**Reviewed
for Code
Compliance**

07/12/2024
PASS

Shear Analysis (Minor Axis z)	0 k	133.559 k	0	PASS
Bending & Axial Interaction Check (UC Bending Max)	-	-	0.482	PASS
Torsional Analysis	0 k-ft	103.408 k-ft	0	PASS

Detail Report: M15

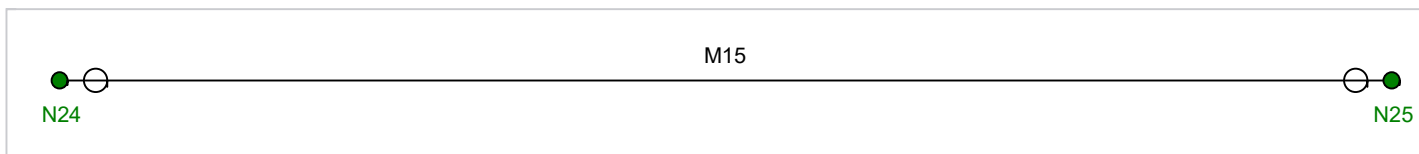


Input Data

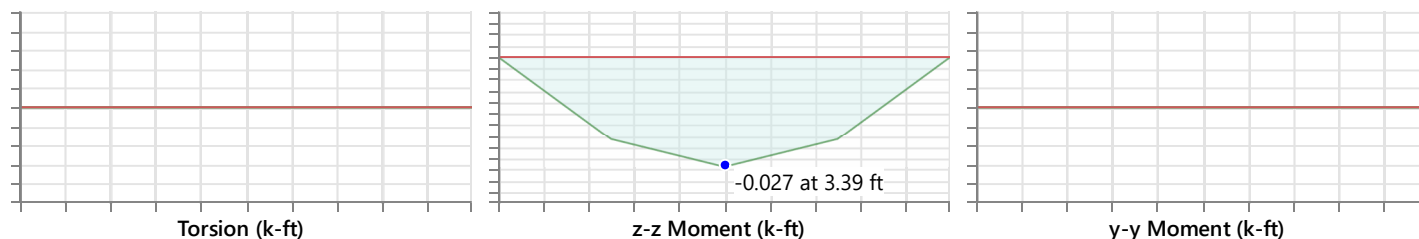
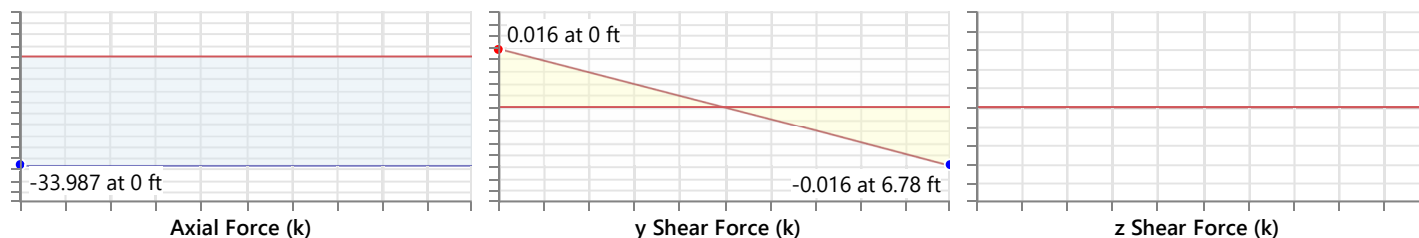
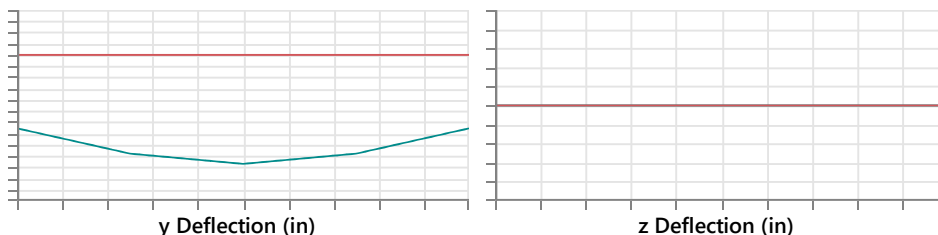
Shape:	BAR1	I Node:	N24
Member Type:	Beam	J Node:	N25
Length (ft):	6.778	I Release:	BenPIN
Material Type:	General	J Release:	BenPIN
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	None	T/C Only:	Tension Only

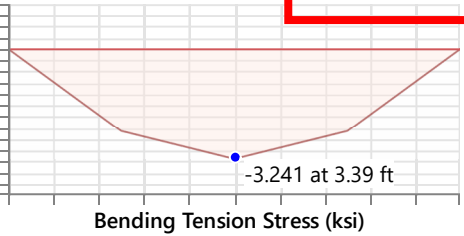
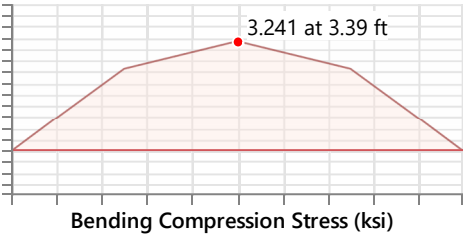
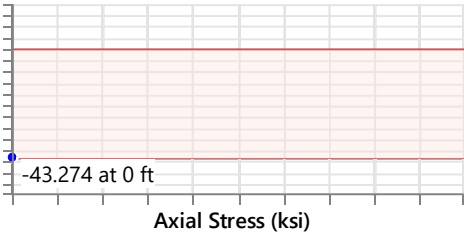
Material Properties

Material:	gen_Steel	G (ksi):	11154	Therm. Coeff. (/1E5 F):	0.65
E (ksi):	29000	Nu:	0.3	Density (k/ft³):	0.847



Diagrams:



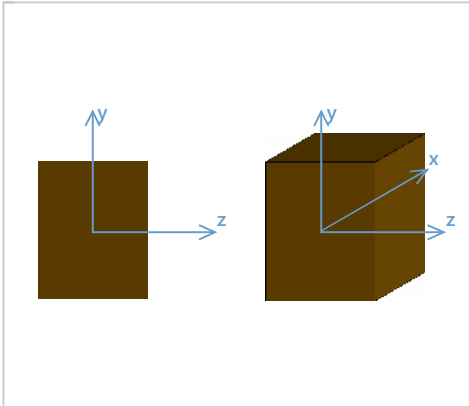


WARNING: Detail Report Based On Less Than 10 Sections!

Detail Report: M12

Load Combination: LC 14: DL+SL

Code check: 0.001 (axial/
bending)



Input Data

Shape:	8X10 (nominal)	I Node:	N24
Member Type:	Column	J Node:	N29
Length (ft):	2.5	I Release:	Fixed
Material Type:	Wood	J Release:	BenPIN
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18 / SDPWS-15 ASD	T/C Only:	Both Way

Material Properties

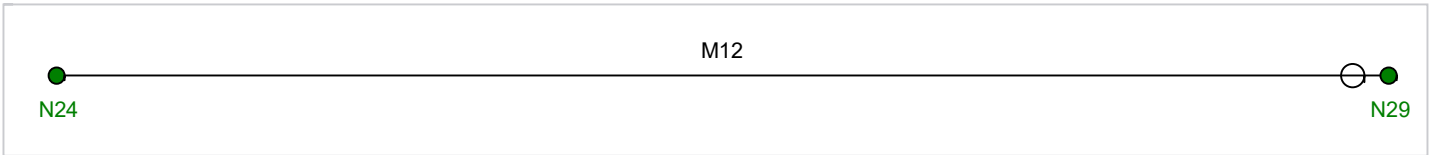
Material:	DF	Grade:	No.1	Nu:	0.3
Type:	Solid Sawn	Cm:	No	Alpha (1e ⁵ °F ⁻¹):	0.3
Database:	Visually Graded	Ci:	No	Density (k/ft ³):	0.035
Species:	Douglas Fir-Larch	Emod:	1		

Shape Properties

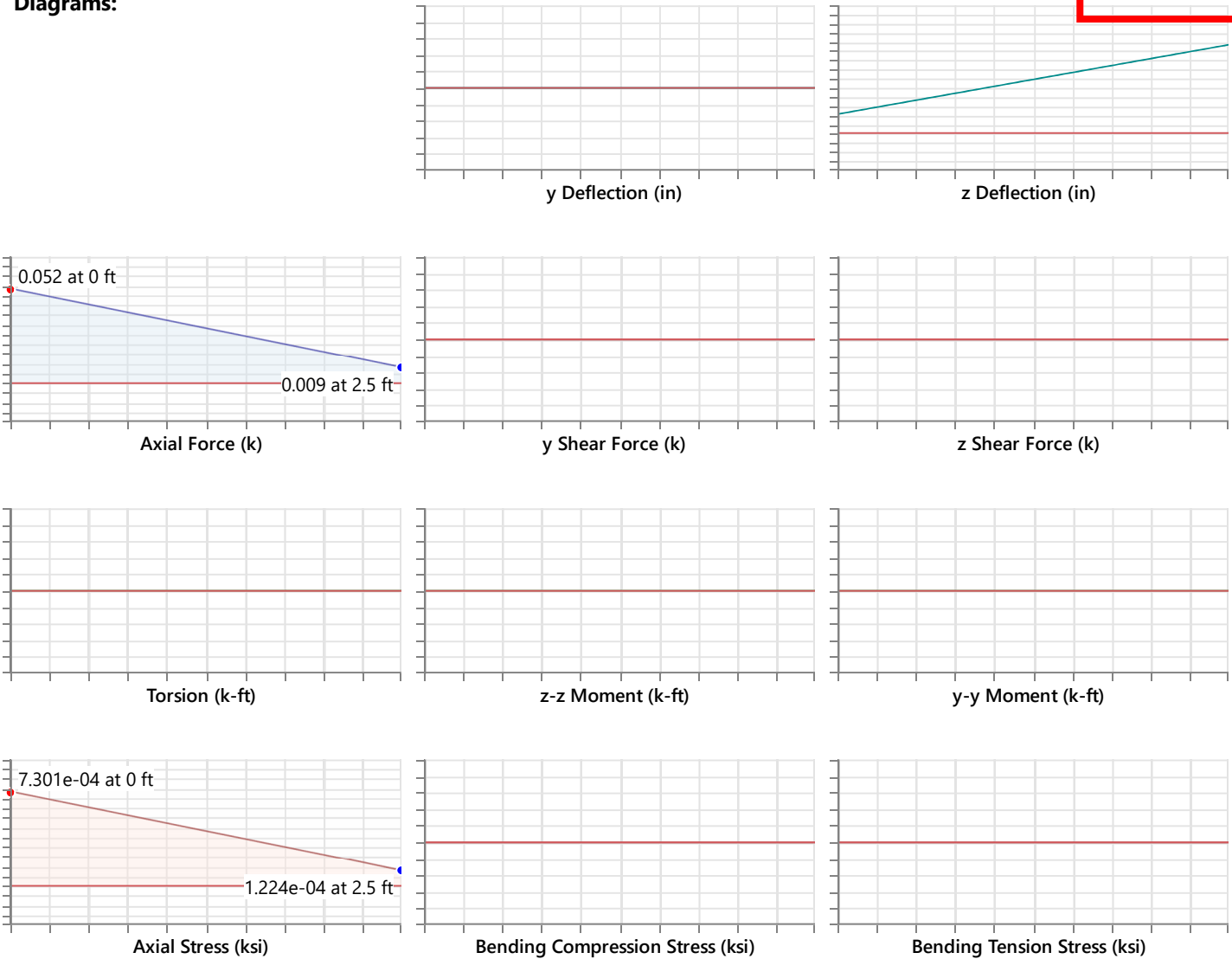
Fb (ksi):	1.2	E (ksi):	1600	b (actual) (in):	7.5
Ft (ksi):	0.825	Emod:	1	d (actual) (in):	9.5
Fv (ksi):	0.17	COVE (Table F1):	0.25		
Fc (ksi):	1	Emin (ksi):	584.494		

Design Properties

le2 (ft):	2.5	y sway:	No	Cfu:	1
le1 (ft):	2.5	z sway:	No	CP:	0.993
le-bend top:	Lbyy	Cb:	1	Max Defl Ratio:	L/10000
le-bend bot (ft):	2.5	Rb:	2.251	Max Defl Location:	0
Ky-y:	1	CL:	1	Span:	N/A
Kz-z:	1	Cr:	1		



Diagrams:



WARNING: Detail Report Based On Less Than 10 Sections!

AWC NDS-18 / SDPWS-15 ASD Code Check

Limit State	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	-	-	-	-
Applied Loading - Shear + Torsion	-	-	-	-
Axial Compression Analysis	0.0007301 ksi	0.993 ksi	-	-
Axial Tension Analysis	0 ksi	0.825 ksi	-	-
Flexural Analysis, Fb1'	0 ksi	1.199 ksi	-	-
Flexural Analysis, Fb2'	0 ksi	1.2 ksi	-	-
Bending & Axial Compression Analysis	-	-	0.0007351	PASS



Company : Anthem Structural Engineers
Designer : JCC
Job Number : 23-072
Model Name : Green Ridge Drive

7/9/2024
4:10:52 PM
Checked by:

**Reviewed
for Code
Compliance**

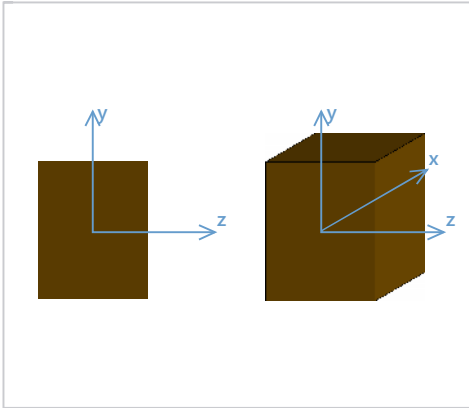
07/12/2024
PASS

Bending & Axial Tension Analysis	-	-	0	PASS
Shear Analysis	0 ksi	0.17 ksi	0	PASS

Detail Report: M13

Load Combination: LC 14: DL+SL

Code check: 0.001 (axial/
bending)



Input Data

Shape:	8X10 (nominal)	I Node:	N25
Member Type:	Column	J Node:	N30
Length (ft):	2.5	I Release:	Fixed
Material Type:	Wood	J Release:	BenPIN
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AWC NDS-18 / SDPWS-15 ASD	T/C Only:	Both Way

Material Properties

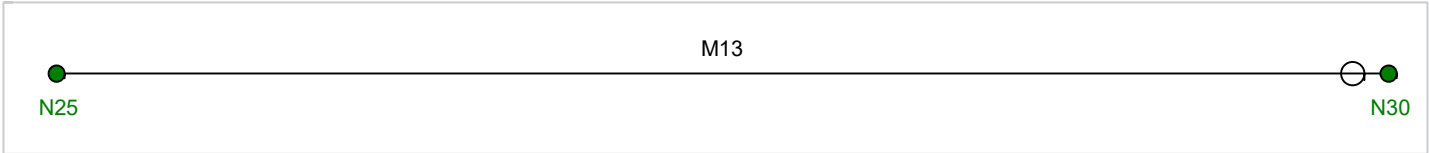
Material:	DF	Grade:	No.1	Nu:	0.3
Type:	Solid Sawn	Cm:	No	Alpha (1e ⁵ °F ⁻¹):	0.3
Database:	Visually Graded	Ci:	No	Density (k/ft ³):	0.035
Species:	Douglas Fir-Larch	Emod:	1		

Shape Properties

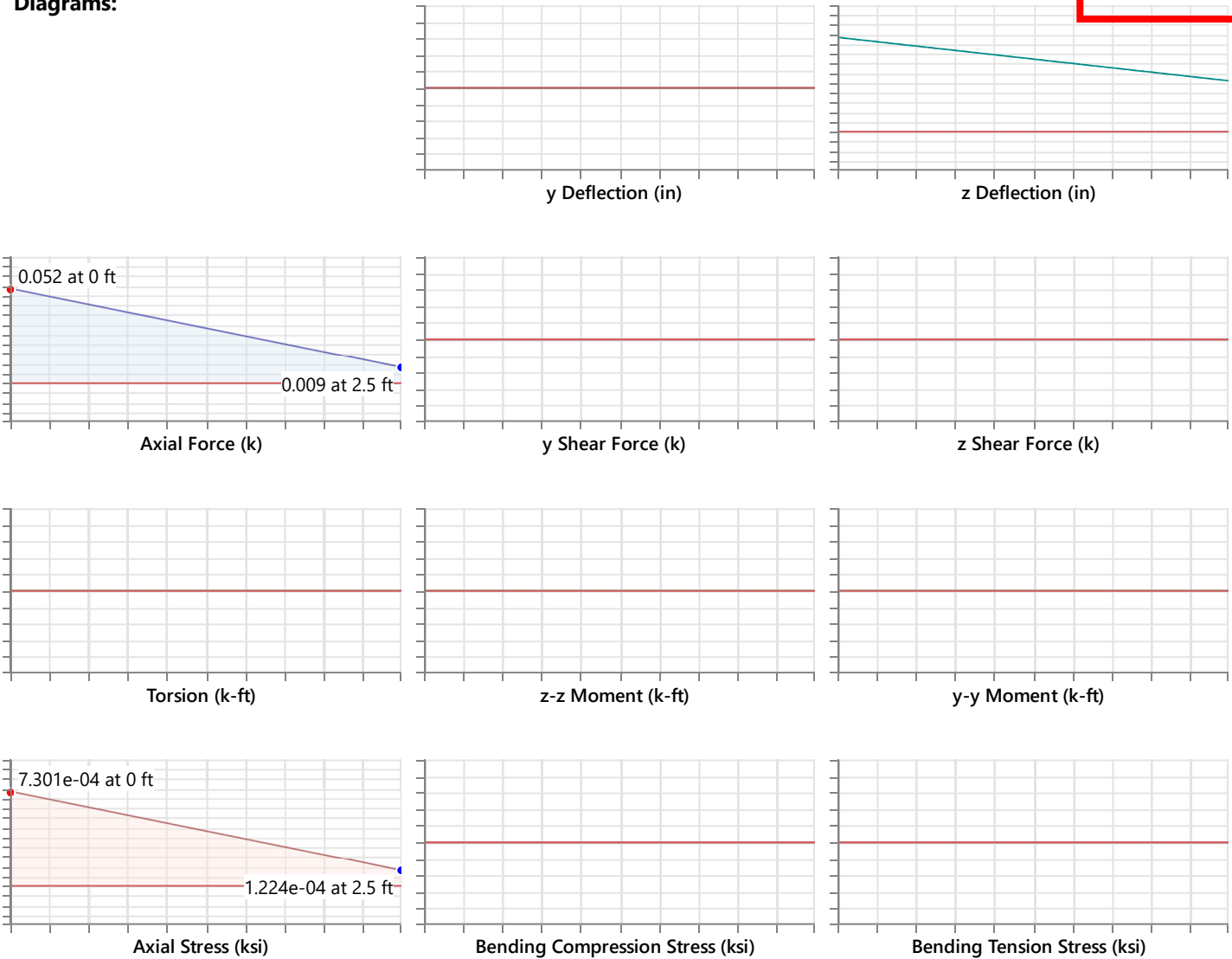
Fb (ksi):	1.2	E (ksi):	1600	b (actual) (in):	7.5
Ft (ksi):	0.825	Emod:	1	d (actual) (in):	9.5
Fv (ksi):	0.17	COVE (Table F1):	0.25		
Fc (ksi):	1	Emin (ksi):	584.494		

Design Properties

le2 (ft):	2.5	y sway:	No	Cfu:	1
le1 (ft):	2.5	z sway:	No	CP:	0.993
le-bend top:	Lbyy	Cb:	1	Max Defl Ratio:	L/10000
le-bend bot (ft):	2.5	Rb:	2.251	Max Defl Location:	0
Ky-y:	1	CL:	1	Span:	N/A
Kz-z:	1	Cr:	1		



Diagrams:



WARNING: Detail Report Based On Less Than 10 Sections!

AWC NDS-18 / SDPWS-15 ASD Code Check

Limit State	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	-	-	-	-
Applied Loading - Shear + Torsion	-	-	-	-
Axial Compression Analysis	0.0007301 ksi	0.993 ksi	-	-
Axial Tension Analysis	0 ksi	0.825 ksi	-	-
Flexural Analysis, Fb1'	0 ksi	1.199 ksi	-	-
Flexural Analysis, Fb2'	0 ksi	1.2 ksi	-	-
Bending & Axial Compression Analysis	-	-	0.0007351	PASS



Company : Anthem Structural Engineers
Designer : JCC
Job Number : 23-072
Model Name : Green Ridge Drive

7/9/2024
4:10:54 PM
Checked by:

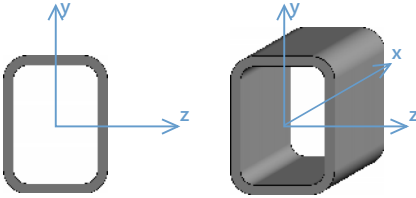
**Reviewed
for Code
Compliance**

07/12/2024
PASS

Bending & Axial Tension Analysis	-	-	0	PASS
Shear Analysis	0 ksi	0.17 ksi	0	PASS

Detail Report: M14

Load Combination: Envelope Code check: 0.743 (LC 5)



Input Data

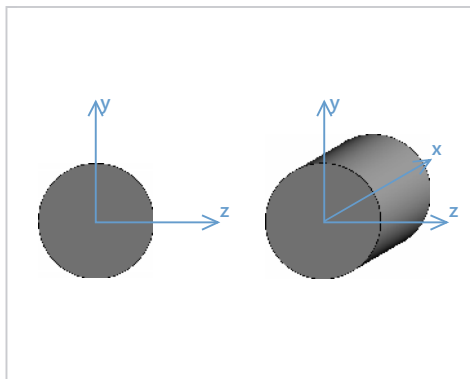
Shape:	HSS8X6X10	I Node:	N22
Member Type:	Beam	J Node:	N23
Length (ft):	8.778	I Release:	BenPIN
Material Type:	Hot Rolled Steel	J Release:	BenPIN
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AISC 15th (360-16): LRFD	T/C Only:	Both Way

WARNING: Detail Report Based On Less Than 10 Sections!

AISC 15th (360-16): LRFD Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	5	-	-	-	-
Applied Loading - Shear + Torsion	5	-	-	-	-
Axial Tension Analysis	5	0 k	630 k	-	-
Axial Compression Analysis	5	44.039 k	538.417 k	-	-
Flexural Analysis (Strong Axis)	5	95.027 k-ft	135.375 k-ft	-	-
Flexural Analysis (Weak Axis)	-	0 k-ft	110.625 k-ft	-	-
Shear Analysis (Major Axis y)	5	21.807 k	196.307 k	0.111	PASS
Shear Analysis (Minor Axis z)	5	0 k	133.559 k	0	PASS
Bending & Axial Interaction Check (UC Bending Max)	5	-	-	0.743	PASS
Torsional Analysis	5	0 k-ft	103.408 k-ft	0	PASS

Detail Report: M15

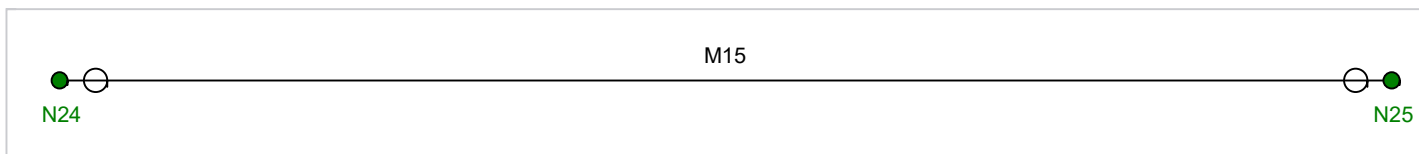


Input Data

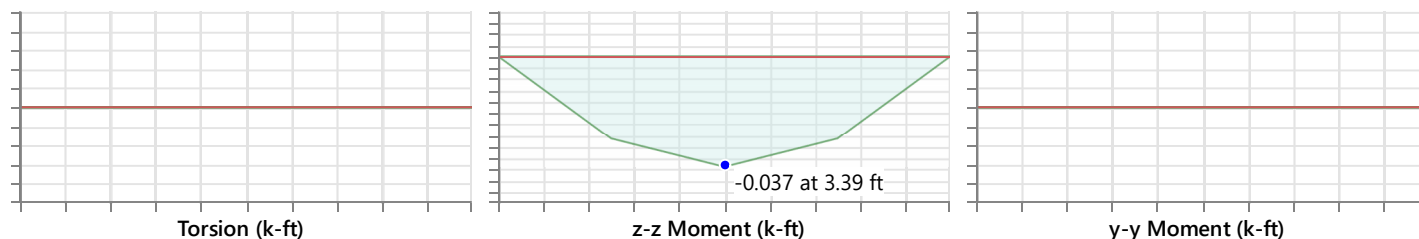
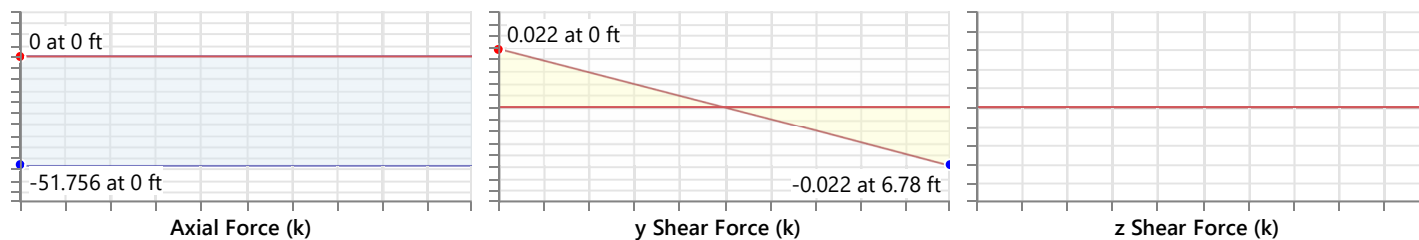
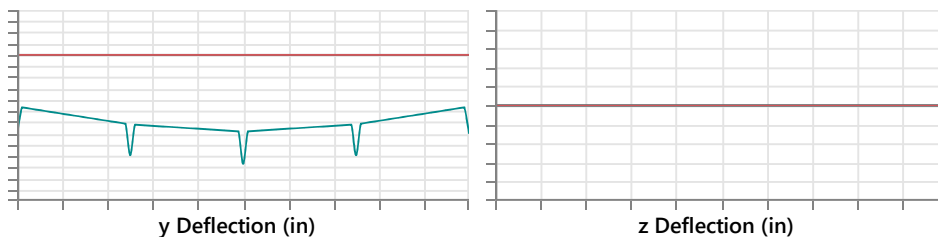
Shape:	BAR1	I Node:	N24
Member Type:	Beam	J Node:	N25
Length (ft):	6.778	I Release:	BenPIN
Material Type:	General	J Release:	BenPIN
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	None	T/C Only:	Tension Only

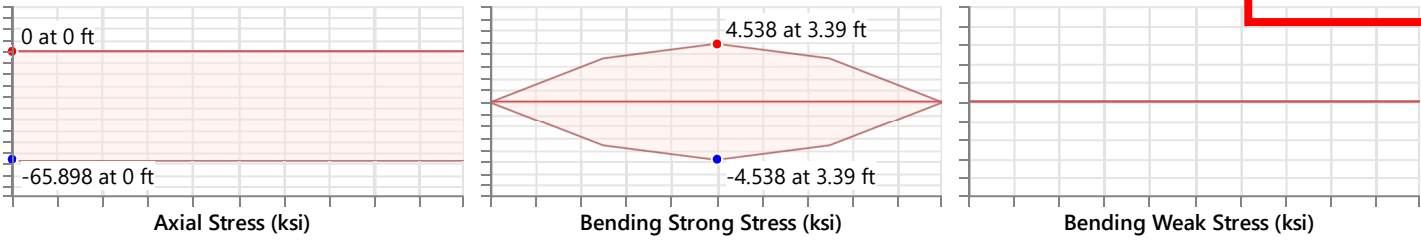
Material Properties

Material:	gen_Steel	G (ksi):	11154	Therm. Coeff. (/1E5 F):	0.65
E (ksi):	29000	Nu:	0.3	Density (k/ft³):	0.847



Diagrams:





WARNING: Detail Report Based On Less Than 10 Sections!

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Wood Dowel Type Lateral Connection Capacity - NDS 2015

LOCATION: HSS to Truss Top Chord - Detail 2/S2.0

General Information		Connector Information	
Connection Part of Diaphragm?	No	Type:	Bolt
Toe Nails in Connection?	No	Diameter:	0.75 in
Load Duration:	Two Months (Snow)	Length:	Not Used
Temperature:	T ≤ 100°F	Fyb:	45000 psi
Moisture content:	Fabrication ≤ 19%	Penetration:	N/A in
	In Use ≤ 19%	Min Penetration Req't:	N/A

Main Member Input Information		Fastener Orientation				
Material	A36 Steel	Fasteners/Row	2			
Thickness	0.375 in	Number of Rows	3			
Depth	7 in	Spacing	Provided	Min	Full Value	CA
Orientation:	Not Applicable	Spacing in row (x)	3.0 in	2.25 in	3.0 in	1.0
Species	Not Applicable	Spacing btwn rows (y)	3.0 in	1.88 in	-	1.0
Grade	Not Applicable	l/d	0.5			
Angle to Grain	Not Used					
Compression?	N/A					
Incising?	N/A					
E _m	2.9E+07 psi					

Dowel Bearing Strength:

F _e	87000 psi	F _{e⊥}	87000 psi
F _{em}	87000 psi	l _m	0.375 in

Side Member Input Information		Edge & End Distance Requirements				
Material:	Wood-Timber	Main Member				
# of Plies:	2	Provided	Min	Full Value	C _A	
Thickness:	3.25 in	Not Checked				
Depth:	9.5 in					
Timber Type:	Beam/Stringer					
Species:	Douglas Fir-Larch	Side Member				
Grade:	No.1	Provided	Min	Full Value		
Angle to Grain:	68°	End Distance (d)	24.0 in	1.76 in	3.53 in	1.0
Compression?	No	Loaded Edge (e)	3.0 in	2.54 in	-	1.0
Incising?	N/A	Unloaded Edge (f)	3.5 in	1.13 in	-	1.0
E _s	1.6E+06 psi					
G	0.5					
Dowel Bearing Strength:						
F _e	5600 psi	F _{e⊥}	2580 psi			
F _{es}	2791 psi	l _s	3.25 in			

Yield Limit Equations					Load Modifications			
Re	31.169	Mode	Rd	Z	Group Action		Adjustment Factors	
Rt	0.115	I _m	4.75556	5145 lbs	Am	2.625	C _D	1.15
k1	0.513	I _s	4.75556	2861 lbs	As	112.5	C _M	1.0
k2	11.317	II	4.28	N/A	R _{EA}	0.423	C _t	1.0
k3	0.635	III _m	3.80444	N/A	γ	175,370	C _g	1.0
Kθ	1.189	III _s	3.80444	2134 lbs	u	1.005	C _Δ	1.0
KD	8.0	IV	3.80444	2664 lbs	m	0.906	C _{eg}	1.0
					C _g *	0.998	C _{di}	1.0
							C _{tn}	1.0

Results

Connection Capacity 14,697 lbs

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Wood Dowel Type Lateral Connection Capacity - NDS 2015

LOCATION: Hammer Beam to Top Chord - Detail 4/S2.0

General Information		Connector Information	
Connection Part of Diaphragm?	No	Type:	Bolt
Toe Nails in Connection?	No	Diameter:	0.75 in
Load Duration:	Two Months (Snow)	Length:	Not Used
Temperature:	T ≤ 100°F	Fyb:	45000 psi
Moisture content:	Fabrication ≤ 19%	Penetration:	N/A in
	In Use ≤ 19%	Min Penetration Req't:	N/A

Main Member Input Information		Fastener Orientation				
Material	A36 Steel	Fasteners/Row	4			
Thickness	0.375 in	Number of Rows	2			
Depth	7 in	Spacing	Provided	Min	Full Value	CA
Orientation:	Not Applicable	Spacing in row (x)	3.0 in	2.25 in	3.0 in	1.0
Species	Not Applicable	Spacing btwn rows (y)	4.0 in	1.88 in	-	1.0
Grade	Not Applicable	l/d	0.5			
Angle to Grain	Not Used					
Compression?	N/A					
Incising?	N/A					
E _m	2.9E+07 psi					

Dowel Bearing Strength:

F _e	87000 psi	F _{e⊥}	87000 psi
F _{em}	87000 psi	l _m	0.375 in

Side Member Input Information		Edge & End Distance Requirements				
Material:	Wood-Timber	Main Member				
# of Plies:	2	Provided	Min	Full Value	C _Δ	
Thickness:	3.75 in	Not Checked				
Depth:	9.5 in					
Timber Type:	Beam/Stringer					
Species:	Douglas Fir-Larch	Side Member				
Grade:	No.1	Provided	Min	Full Value		
Angle to Grain:	23°	End Distance (d)	4.5 in	2.33 in	4.65 in	0.97
Compression?	No	Loaded Edge (e)	2.5 in	1.6 in	-	1.0
Incising?	N/A	Unloaded Edge (f)	2.5 in	1.13 in	-	1.0
E _s	1.6E+06 psi					
G	0.5					
Dowel Bearing Strength:						
F _e	5600 psi	F _{e⊥}	2580 psi			
F _{es}	4751 psi	l _s	3.75 in			

Yield Limit Equations					Load Modifications	
Re	18.312	Mode	Rd	Z	Group Action	Adjustment Factors
Rt	0.1	I _m	4.25556	5750 lbs	Am	C _D 1.15
k1	0.443	I _s	4.25556	6280 lbs	As	C _M 1.0
k2	8.514	II	3.83	N/A	R _{EA}	C _t 1.0
k3	0.546	III _m	3.40444	N/A	γ	C _g 0.98
Kθ	1.064	III _s	3.40444	3862 lbs	u	C _Δ 0.97
KD	8.0	IV	3.40444	3842 lbs	m	C _{eg} 1.0
					C _g *	C _{di} 1.0
						C _{tn} 1.0

Results

Connection Capacity 33,642 lbs

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Wood Dowel Type Lateral Connection Capacity - NDS 2015

LOCATION: Tie Rod Connection - Detail 2/S2.0

General Information		Connector Information	
Connection Part of Diaphragm?	No	Type:	Bolt
Toe Nails in Connection?	No	Diameter:	0.75 in
Load Duration:	Two Months (Snow)	Length:	Not Used
Temperature:	T≤100°F	Fyb:	45000 psi
Moisture content:	Fabrication ≤19%	Penetration:	N/A in
	In Use ≤19%	Min Penetration Req't:	N/A

Main Member Input Information		Fastener Orientation				
Material	A36 Steel	Fasteners/Row	4			
Thickness	0.375 in	Number of Rows	2			
Depth	7 in	Spacing	Provided	Min	Full Value	CΔ
Orientation:	Not Applicable	Spacing in row (x)	3.0 in	2.25 in	3.0 in	1.0
Species	Not Applicable	Spacing btwn rows (y)	4.0 in	1.13 in	-	1.0
Grade	Not Applicable	l/d	0.5			
Angle to Grain	Not Used					
Compression?	N/A					
Incising?	N/A					
E _m	2.9E+07 psi					

Dowel Bearing Strength:

F _e	87000 psi	F _{e⊥}	87000 psi
F _{em}	87000 psi	l _m	0.375 in

Side Member Input Information		Edge & End Distance Requirements				
Material:	Wood-Timber	Main Member				
# of Plies:	2	Provided	Min	Full Value	C _Δ	
Thickness:	3.75 in	Not Checked				
Depth:	9.5 in					
Timber Type:	Beam/Stringer					
Species:	Douglas Fir-Larch	Side Member				
Grade:	No.1	Provided	Min	Full Value		
Angle to Grain:	0°	End Distance (d)	4.5 in	2.61 in	5.23 in	0.86
Compression?	No	Edge Distance (e,f)	2.75 in	1.13 in	-	1.0
Incising?	N/A					
E _s	1.6E+06 psi					
G	0.5					
Dowel Bearing Strength:						
F _e	5600 psi	F _{e⊥}	2580 psi			
F _{es}	5600 psi	l _s	3.75 in			

Yield Limit Equations					Load Modifications				
Re	15.536	Mode	Rd	Z	Group Action		Adjustment Factors		
Rt	0.1	I _m	4	6117 lbs	Am	2.625	C _D	1.15	
k1	0.434	I _s	4	7875 lbs	As	71.25	C _M	1.0	
k2	7.792	II	3.6	N/A	R _{EA}	0.668	C _t	1.0	
k3	0.54	III _m	3.2	N/A	γ	175,370	C _G	0.99	
Kθ	1.0	III _s	3.2	4707 lbs	u	1.006	C _Δ	0.86	
KD	8.0	IV	3.2	4417 lbs	m	0.898	C _{eg}	1.0	
					C _g *	0.988	C _{di}	1.0	
							C _{tn}	1.0	

Results	
Connection Capacity	34,565 lbs