

161 KLEVIN ST ROOF TRUSS REPAIRS

Anchorage, Alaska

RM Project #402024.031.002

Structural Calculations
February 21, 2025

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42" TRUSS ANALYSIS AND REPAIR

Member Analysis

TC - Typical Loading (Gravity)											
Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD											
<i>ref.</i>	Gravity Load Design Values						Grade & Loading Inputs				
	d	5.5	in	Depth of Member	Grade:	Hem Fir					
	b	1.5	in	Breadth of Member	Type:	HF #1					
	A	8.25	in ²	Area of Member	Load Duration:	10 Years/Live					
	S	7.56	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service					
	l _u	46	in	Unbraced length	Temperature:	In Service Dry & Temp. ≤100°F					
<i>App. G</i>	K _e	1		Buckling length Coefficient	Incising:	Incising not required					
					Repetitive member:	Spacing ≤ 24 inch oc					
3.3.3 Beam Stability Factor, C_L											
<i>Tbl. 3.3-3</i>	l _e	91	in	Effective length (flexure only)							
<i>Eq. 3.3-5</i>	R _B	15		Slenderness ratio							
	F _b *	1458	psi	Bending value times adjustment factors except C _{fu} , C _v , and C _L							
	F _{DE}	2951	psi								
<i>Eq. 3.3-6</i>	C _L	0.96									
3.7.1 Column Stability Factor, C_p											
<i>Fig. 3F</i>	d	1.5	in	Braced depth corresponding to x-x or y-y							
	l _e /d	31	<50	Slenderness ratio is good							
	F _c *	1485	psi	Compression value times factors except C _p							
		Yes		Braced by sheathing or gyp?							
	F _{CE}	1017225	psi								
	c	0.80									
<i>Eq. 3.7-1</i>	C _p	1.00									
4.4.2 Wood Trusses											
<i>Sct. 3.7</i>	l _e	46	in	Effective length (column only)							
	K _M	2300									
<i>Tbl. F1</i>	COV _E	0.25									
	K _T	0.59									
		No		Does the section 4.4.2.1 apply?							
<i>Eq. 4.4-1</i>	C _T	1.00									
3.9.1 Bending and Axial Tension											
	F _b *	1458	psi	Bending value times factors except C _L							
3.9.2 Bending and Axial Compression											
	l _{e1}	46	in								
<i>Fig. 3H</i>	d ₁	5.5	in	Wide face dimension							
	F _{CE1}	6463	psi > f _c								
Design Stress Value Table											
Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _i	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _b	975	1.00	1.00	1.00	0.96	1.3	1.00	1.00	1.15		
F _t	625	1.00	1.00	1.00		1.3		1.00			
F _v	150	1.00	1.00	1.00				1.00			
F _c	1350	1.00	1.00	1.00		1.1		1.00		1.00	
E	1500000		1.00	1.00				1.00			
E _{min}	550000		1.00	1.00				1.00			1.00

Summary values

F _b '	1395	psi
F _t '	813	psi
F _v '	150	psi
F _c '	1485	psi
E'	1500000	psi
E _{min} '	550000	psi

BC - Typical Loading (Gravity)											
Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD											
ref.	Gravity Load Design Values				Grade & Loading Inputs						
	d	5.5	in	Depth of Member	Grade:	MSR SPF					
	b	1.5	in	Breadth of Member	Type:	2100f-1.8E					
	A	8.25	in ²	Area of Member	Load Duration:	10 Years/Live					
	S	7.56	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service					
	l _u	46	in	Unbraced length	Temperature:	In Service Dry & Temp.≤100°F					
App. G	K _e	1		Buckling length Coefficient	Incising:	Incising not required					
					Repetitive member:	Spacing ≤ 24 inch oc					
3.3.3 Beam Stability Factor, C _L											
Tbl. 3.3-3	l _e	91	in	Effective length (flexure only)							
Eq. 3.3-5	R _B	15		Slenderness ratio							
	F _b *	3140	psi	Bending value times adjustment factors except C _{fu} , C _v , and C _L							
	F _{bE}	4883	psi								
Eq. 3.3-6	C _L	0.93									
3.7.1 Column Stability Factor, C _p											
Fig. 3F	d	5.5	in	Braced depth corresponding to x-x or y-y							
	l _e /d	8	<50	Slenderness ratio is good							
	F _c *	2063	psi	Compression value times factors except C _p							
		No		Braced by sheathing or gyp?							
	F _{cE}	10694	psi								
	c	0.80									
Eq. 3.7-1	C _p	0.96									
4.4.2 Wood Trusses											
Sct. 3.7	l _e	46	in	Effective length (column only)							
	K _M	2300									
Tbl. F1	COV _E	0.25									
	K _T	0.59									
		No		Does the section 4.4.2.1 apply?							
Eq. 4.4-1	C _T	1.00									
3.9.1 Bending and Axial Tension											
	F _b *	3140	psi	Bending value times factors except C _L							
3.9.2 Bending and Axial Compression											
	l _{e1}	46	in								
Fig. 3H	d ₁	5.5	in	Wide face dimension							
	F _{cE1}	10694	psi > f _c								
Design Stress Value Table											
Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _i	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _b	2100	1.00	1.00	1.00	0.93	1.3	1.00	1.00	1.15		
F _t	1575	1.00	1.00	1.00		1.3		1.00			
F _v	160	1.00	1.00	1.00				1.00			
F _c	1875	1.00	1.00	1.00		1.1		1.00		0.96	
E	1800000		1.00	1.00				1.00			
E _{min}	910000		1.00	1.00				1.00			1.00

D1 - Typical Loading (Gravity)											
Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD											
ref.	Gravity Load Design Values						Grade & Loading Inputs				
	d	5.5	in	Depth of Member	Grade:	Doug Fir					
	b	1.5	in	Breadth of Member	Type:	DF #3					
	A	8.25	in ²	Area of Member	Load Duration:	10 Years/Live					
	S	7.56	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service					
	l _u	45	in	Unbraced length	Temperature:	In Service Dry & Temp. ≤100°F					
App. G	K _e	1		Buckling length Coefficient	Incising:	Incising not required					
					Repetitive member:	Spacing ≤ 24 inch oc					
3.7.1 Column Stability Factor, C _p											
Fig. 3F	d	1.5	in	Braced depth corresponding to x-x or y-y							
	l _e /d	30	<50	Slenderness ratio is	good						
	F _c *	853	psi	Compression value times factors except C _p							
		No		Braced by sheathing or gyp?							
	F _{cE}	466	psi								
	c	0.80									
Eq. 3.7-1	C _p	0.47									
4.4.2 Wood Trusses											
Sct. 3.7	l _e	45	in	Effective length (column only)							
	K _M	2300									
Tbl. F1	COV _E	0.25									
	K _T	0.59									
		No		Does the section 4.4.2.1 apply?							
Eq. 4.4-1	C _T	1.00									
Summary values											
	F _t '	423	psi								
	F _c '	397	psi								
	E'	1400000	psi								
	E _{min} '	510000	psi								
Design Stress Value Table											
Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{tu}	C _i	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _t	325	1.00	1.00	1.00		1.3		1.00			
F _c	775	1.00	1.00	1.00		1.1		1.00		0.47	
E	1400000		1.00	1.00				1.00			
E _{min}	510000		1.00	1.00				1.00			1.00

D2 - Typical Loading (Gravity)											
Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD											
ref.	Gravity Load Design Values					Grade & Loading Inputs					
	d	3.5	in	Depth of Member		Grade:	Hem Fir				
	b	1.5	in	Breadth of Member		Type:	HF #2				
	A	5.25	in ²	Area of Member		Load Duration:	10 Years/Live				
	S	3.06	in ³	Section Modulus of Member		Moisture:	≤19% @ fab. & ≤19% in service				
	l _u	40	in	Unbraced length		Temperature:	In Service Dry & Temp. ≤100°F				
App. G	K _e	1		Buckling length Coefficient		Incising:	Incising not required				
						Repetitive member:	Spacing ≤ 24 inch oc				
3.7.1 Column Stability Factor, C _p											
Fig. 3F	d	1.5	in	Braced depth corresponding to x-x or y-y							
	l _e /d	27	<50	Slenderness ratio is	good						
	F _c *	1430	psi	Compression value times factors except C _p							
		No		Braced by sheathing or gyp?							
	F _{cE}	543	psi								
	c	0.80									
Eq. 3.7-1	C _p	0.34									
4.4.2 Wood Trusses											
Sct. 3.7	l _e	40	in	Effective length (column only)							
	K _M	2300									
Tbl. F1	COV _E	0.25									
	K _T	0.59									
		No		Does the section 4.4.2.1 apply?							
Eq. 4.4-1	C _T	1.00									
Summary values											
	F _t '	683	psi								
	F _c '	492	psi								
	E'	1300000	psi								
	E _{min} '	470000	psi								
Design Stress Value Table											
Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _I	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _t	525	1.00	1.00	1.00		1.3		1.00			
F _c	1300	1.00	1.00	1.00		1.1		1.00		0.34	
E	1300000		1.00	1.00				1.00			
E _{min}	470000		1.00	1.00				1.00			1.00

Could not verify in field.
Assuming same as TC.

D - Typical Loading (Gravity)

Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD

ref.	Gravity Load Design Values				Grade & Loading Inputs						
App. G	d	3.5	in	Depth of Member	Grade:	Hem Fir					
	b	1.5	in	Breadth of Member	Type:	HF #1					
	A	5.25	in ²	Area of Member	Load Duration:	10 Years/Live					
	S	3.06	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service					
	l _u	40	in	Unbraced length	Temperature:	In Service Dry & Temp.≤100°F					
	K _e	1		Buckling length Coefficient	Incising:	Incising not required					
					Repetitive member:	Spacing ≤ 24 inch oc					
3.7.1 Column Stability Factor, C _p											
Fig. 3F	d	1.5	in	Braced depth corresponding to x-x or y-y							
	l _e /d	27	<50	Slenderness ratio is	good						
	F _c *	1485	psi	Compression value times factors except C _p							
		No		Braced by sheathing or gyp?							
	F _{cE}	636	psi								
Eq. 3.7-1	c	0.80									
	C _p	0.38									
4.4.2 Wood Trusses											
Sct. 3.7	l _e	40	in	Effective length (column only)							
	K _M	2300									
Tbl. F1	COV _E	0.25									
	K _T	0.59									
		No		Does the section 4.4.2.1 apply?							
Eq. 4.4-1	C _T	1.00									
Summary values											
	F _t '	813	psi								
	F _c '	566	psi								
	E'	1500000	psi								
	E _{min} '	550000	psi								
Design Stress Value Table											
Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _i	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _t	625	1.00	1.00	1.00		1.3		1.00			
F _c	1350	1.00	1.00	1.00		1.1		1.00		0.38	
E	1500000		1.00	1.00				1.00			
E _{min}	550000		1.00	1.00				1.00			1.00

V - Typical Loading (Gravity)

Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD

ref.	Gravity Load Design Values				Grade & Loading Inputs						
	d	3.5	in	Depth of Member	Grade:	Hem Fir					
	b	1.5	in	Breadth of Member	Type:	HF #1					
	A	5.25	in ²	Area of Member	Load Duration:	10 Years/Live					
	S	3.06	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service					
	l _u	26	in	Unbraced length	Temperature:	In Service Dry & Temp.≤100°F					
App. G	K _e	1		Buckling length Coefficient	Incising:	Incising not required					
					Repetitive member:	Spacing ≤ 24 inch oc					
3.7.1 Column Stability Factor, C _p											
Fig. 3F	d	5.5	in	Braced depth corresponding to x-x or y-y							
	l _e /d	5	<50	Slenderness ratio is good							
	F _c *	1485	psi	Compression value times factors except C _p							
		No		Braced by sheathing or gyp?							
	F _{cE}	20231	psi								
	c	0.80									
Eq. 3.7-1	C _p	0.98									
4.4.2 Wood Trusses											
Sct. 3.7	l _e	26	in	Effective length (column only)							
	K _M	2300									
Tbl. F1	COV _E	0.25									
	K _T	0.59									
		No		Does the section 4.4.2.1 apply?							
Eq. 4.4-1	C _T	1.00									
Summary values											
	F _t '	813	psi								
	F _c '	1462	psi								
	E'	1500000	psi								
	E _{min} '	550000	psi								
Design Stress Value Table											
Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _i	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _t	625	1.00	1.00	1.00		1.3		1.00			
F _c	1350	1.00	1.00	1.00		1.1		1.00		0.98	
E	1500000		1.00	1.00				1.00			
E _{min}	550000		1.00	1.00				1.00			1.00

TC - Typical Loading (Uplift)

Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD

ref.	Gravity Load Design Values			Grade & Loading Inputs		
	d	5.5	in	Depth of Member	Grade:	Hem Fir
	b	1.5	in	Breadth of Member	Type:	HF #1
	A	8.25	in ²	Area of Member	Load Duration:	10 Min/Wind or EQ
	S	7.56	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service
	l _u	46	in	Unbraced length	Temperature:	In Service Dry & Temp. ≤100°F
App. G	K _e	1		Buckling length Coefficient	Incising:	Incising not required
					Repetitive member:	Spacing ≤ 24 inch oc

3.3.3 Beam Stability Factor, C_L

Tbl. 3.3-3	l _e	91	in	Effective length (flexure only)
Eq. 3.3-5	R _B	15		Slenderness ratio
	F _b *	2332	psi	Bending value times adjustment factors except C _{fu} , C _v , and C _L
	F _{DE}	2951	psi	
Eq. 3.3-6	C _L	0.89		

3.7.1 Column Stability Factor, C_p

Fig. 3F	d	1.5	in	Braced depth corresponding to x-x or y-y
	l _e /d	31	<50	Slenderness ratio is good
	F _c *	2376	psi	Compression value times factors except C _p
		No		Braced by sheathing or gyp?
	F _{CE}	481	psi	
	c	0.80		
Eq. 3.7-1	C _p	0.19		

4.4.2 Wood Trusses

Sct. 3.7	l _e	46	in	Effective length (column only)
	K _M	2300		
Tbl. F1	COV _E	0.25		
	K _T	0.59		
		No		Does the section 4.4.2.1 apply?
Eq. 4.4-1	C _T	1.00		

3.9.1 Bending and Axial Tension

F _b *	2332	psi	Bending value times factors except C _L
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3.9.2 Bending and Axial Compression

	l _{e1}	46	in	
Fig. 3H	d ₁	5.5	in	Wide face dimension
	F _{CE1}	6463	psi > f _c	

Summary values

F _b '	2083	psi
F _t '	1300	psi
F _v '	240	psi
F _c '	459	psi
E'	1500000	psi
E _{min} '	550000	psi

Design Stress Value Table

Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _i	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _b	975	1.60	1.00	1.00	0.89	1.3	1.00	1.00	1.15		
F _t	625	1.60	1.00	1.00		1.3		1.00			
F _v	150	1.60	1.00	1.00				1.00			
F _c	1350	1.60	1.00	1.00		1.1		1.00		0.19	
E	1500000		1.00	1.00				1.00			
E _{min}	550000		1.00	1.00				1.00			1.00

BC - Typical Loading (Uplift)

Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD

ref.	Gravity Load Design Values			Grade & Loading Inputs		
	d	5.5	in	Depth of Member	Grade:	MSR SPF
	b	1.5	in	Breadth of Member	Type:	2100f-1.8E
	A	8.25	in ²	Area of Member	Load Duration:	10 Min/Wind or EQ
	S	7.56	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service
	l _u	46	in	Unbraced length	Temperature:	In Service Dry & Temp. ≤100°F
App. G	K _e	1		Buckling length Coefficient	Incising:	Incising not required
					Repetitive member:	Spacing ≤ 24 inch oc

3.3.3 Beam Stability Factor, C_L

Tbl. 3.3-3	l _e	91	in	Effective length (flexure only)
Eq. 3.3-5	R _B	15		Slenderness ratio
	F _b *	5023	psi	Bending value times adjustment factors except C _{fu} , C _v , and C _L
	F _{DE}	4883	psi	
Eq. 3.3-6	C _L	0.81		

3.7.1 Column Stability Factor, C_p

Fig. 3F	d	1.5	in	Braced depth corresponding to x-x or y-y
	l _e /d	31	<50	Slenderness ratio is good
	F _c *	3300	psi	Compression value times factors except C _p
		Yes		Braced by sheathing or gyp?
	F _{CE}	1683045	psi	
	c	0.80		
Eq. 3.7-1	C _p	1.00		

4.4.2 Wood Trusses

Sct. 3.7	l _e	46	in	Effective length (column only)
	K _M	2300		
Tbl. F1	COV _E	0.25		
	K _T	0.59		
		No		Does the section 4.4.2.1 apply?
Eq. 4.4-1	C _T	1.00		

3.9.1 Bending and Axial Tension

F _b *	5023	psi	Bending value times factors except C _L
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Summary values

F _b '	4046	psi
F _t '	3276	psi
F _v '	288	psi
F _c '	3299	psi
E'	1800000	psi
E _{min} '	910000	psi

3.9.2 Bending and Axial Compression

	l _{e1}	46	in	
Fig. 3H	d ₁	5.5	in	Wide face dimension
	F _{CE1}	10694	psi > f _c	

Design Stress Value Table

Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _i	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _b	2100	1.60	1.00	1.00	0.81	1.3	1.00	1.00	1.15		
F _t	1575	1.60	1.00	1.00		1.3		1.00			
F _v	180	1.60	1.00	1.00				1.00			
F _c	1875	1.60	1.00	1.00		1.1		1.00		1.00	
E	1800000		1.00	1.00				1.00			
E _{min}	910000		1.00	1.00				1.00			1.00

D1 - Typical Loading (Uplift)

Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD

ref.	Gravity Load Design Values				Grade & Loading Inputs						
	d	5.5	in	Depth of Member	Grade:	Doug Fir					
	b	1.5	in	Breadth of Member	Type:	DF #3					
	A	8.25	in ²	Area of Member	Load Duration:	10 Min/Wind or EQ					
	S	7.56	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service					
	l _u	45	in	Unbraced length	Temperature:	In Service Dry & Temp.≤100°F					
	App. G	K _e	1	Buckling length Coefficient	Incising:	Incising not required					
				Repetitive member:	Spacing ≤ 24 inch oc						
3.7.1 Column Stability Factor, C _p											
Fig. 3F	d	1.5	in	Braced depth corresponding to x-x or y-y							
	l _e /d	30	<50	Slenderness ratio is	good						
	F _c *	1364	psi	Compression value times factors except C _p							
		No		Braced by sheathing or gyp?							
	F _{cE}	466	psi								
	c	0.80									
Eq. 3.7-1	C _p	0.31									
4.4.2 Wood Trusses											
Sct. 3.7	l _e	45	in	Effective length (column only)							
	K _M	2300									
Tbl. F1	COV _E	0.25									
	K _T	0.59									
		No		Does the section 4.4.2.1 apply?							
Eq. 4.4-1	C _T	1.00									
Summary values											
	F _t '	676	psi								
	F _c '	427	psi								
	E'	1400000	psi								
	E _{min} '	510000	psi								
Design Stress Value Table											
Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{tu}	C _I	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _t	325	1.60	1.00	1.00		1.3		1.00			
F _c	775	1.60	1.00	1.00		1.1		1.00		0.31	
E	1400000		1.00	1.00				1.00			
E _{min}	510000		1.00	1.00				1.00			1.00

D2 - Typical Loading (Uplift)

Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD

ref.	Gravity Load Design Values				Grade & Loading Inputs						
App. G	d	3.5	in	Depth of Member	Grade:	Hem Fir					
	b	1.5	in	Breadth of Member	Type:	HF #2					
	A	5.25	in ²	Area of Member	Load Duration:	10 Min/Wind or EQ					
	S	3.06	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service					
	l _u	40	in	Unbraced length	Temperature:	In Service Dry & Temp.≤100°F					
	K _e	1		Buckling length Coefficient	Incising:	Incising not required					
					Repetitive member:	Spacing ≤ 24 inch oc					
3.7.1 Column Stability Factor, C _p											
Fig. 3F	d	1.5	in	Braced depth corresponding to x-x or y-y							
	l _e /d	27	<50	Slenderness ratio is good							
	F _c *	2288	psi	Compression value times factors except C _p							
		No		Braced by sheathing or gyp?							
	F _{cE}	543	psi								
Eq. 3.7-1	c	0.80									
	C _p	0.22									
4.4.2 Wood Trusses											
Sct. 3.7	l _e	40	in	Effective length (column only)							
	K _M	2300									
Tbl. F1	COV _E	0.25									
	K _T	0.59									
		No		Does the section 4.4.2.1 apply?							
Eq. 4.4-1	C _T	1.00									
Summary values											
	F _t '	1092	psi								
	F _c '	514	psi								
	E'	1300000	psi								
	E _{min} '	470000	psi								
Design Stress Value Table											
Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _I	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _t	525	1.60	1.00	1.00		1.3		1.00			
F _c	1300	1.60	1.00	1.00		1.1		1.00		0.22	
E	1300000		1.00	1.00				1.00			
E _{min}	470000		1.00	1.00				1.00			1.00

V - Typical Loading (Uplift)

Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD

ref.	Gravity Load Design Values				Grade & Loading Inputs	
	d	3.5	in	Depth of Member	Grade:	Hem Fir
	b	1.5	in	Breadth of Member	Type:	HF #1
	A	5.25	in ²	Area of Member	Load Duration:	10 Min/Wind or EQ
	S	3.06	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service
	l _u	26	in	Unbraced length	Temperature:	In Service Dry & Temp. ≤100°F
App. G	K _e	1		Buckling length Coefficient	Incising:	Incising not required
					Repetitive member:	Spacing ≤ 24 inch oc

3.7.1 Column Stability Factor, C_p

Fig. 3F	d	1.5	in	Braced depth corresponding to x-x or y-y
	l _e /d	17	<50	Slenderness ratio is good
	F _c *	2376	psi	Compression value times factors except C _p
		No		Braced by sheathing or gyp?
	F _{cE}	1505	psi	
	c	0.80		
Eq. 3.7-1	C _p	0.52		

4.4.2 Wood Trusses

Sct. 3.7	l _e	26	in	Effective length (column only)
	K _M	2300		
Tbl. F1	COV _E	0.25		
	K _T	0.59		
		No		Does the section 4.4.2.1 apply?
Eq. 4.4-1	C _T	1.00		

Summary values

F _t '	1300	psi
F _c '	1236	psi
E'	1500000	psi
E _{min} '	550000	psi

Design Stress Value Table

Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _i	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _t	625	1.60	1.00	1.00		1.3		1.00			
F _c	1350	1.60	1.00	1.00		1.1		1.00		0.52	
E	1500000		1.00	1.00				1.00			
E _{min}	550000		1.00	1.00				1.00			1.00

D - Typical Loading (Uplift)

Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD

ref.	Gravity Load Design Values				Grade & Loading Inputs						
	d	3.5	in	Depth of Member	Grade:	Hem Fir					
	b	1.5	in	Breadth of Member	Type:	HF #1					
	A	5.25	in ²	Area of Member	Load Duration:	10 Min/Wind or EQ					
	S	3.06	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service					
	l _u	40	in	Unbraced length	Temperature:	In Service Dry & Temp.≤100°F					
	App. G	K _e	1	Buckling length Coefficient	Incising:	Incising not required					
				Repetitive member:	Spacing ≤ 24 inch oc						
3.7.1 Column Stability Factor, C _p											
Fig. 3F	d	1.5	in	Braced depth corresponding to x-x or y-y							
	l _e /d	27	<50	Slenderness ratio is	good						
	F _c *	2376	psi	Compression value times factors except C _p							
		No		Braced by sheathing or gyp?							
	F _{cE}	636	psi								
	c	0.80									
Eq. 3.7-1	C _p	0.25									
4.4.2 Wood Trusses											
Sct. 3.7	l _e	40	in	Effective length (column only)							
	K _M	2300									
Tbl. F1	COV _E	0.25									
	K _T	0.59									
		No		Does the section 4.4.2.1 apply?							
Eq. 4.4-1	C _T	1.00									
Summary values											
	F _t '	1300	psi								
	F _c '	596	psi								
	E'	1500000	psi								
	E _{min} '	550000	psi								
Design Stress Value Table											
Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _I	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _t	625	1.60	1.00	1.00		1.3		1.00			
F _c	1350	1.60	1.00	1.00		1.1		1.00		0.25	
E	1500000		1.00	1.00				1.00			
E _{min}	550000		1.00	1.00				1.00			1.00

Assigned Loads in SAP

Tributary width = 1.33 ft

Dead load - Top Chord = 10 psf

Dead load - Bot Chord = 5 psf

Snow load = 40 psf

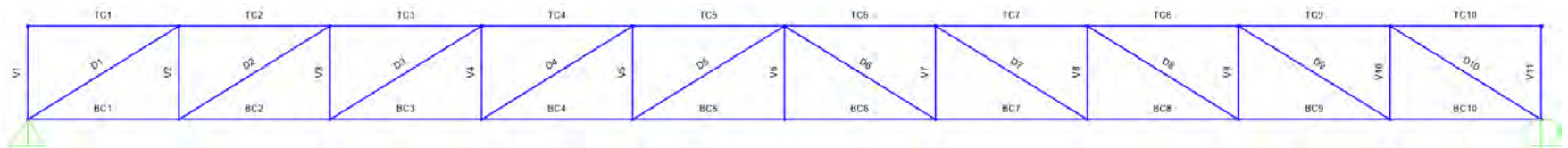
Wind C&C (zone 2, 1, 1') = -45 psf, -33 psf, -20 psf

Load combinations (ASD)

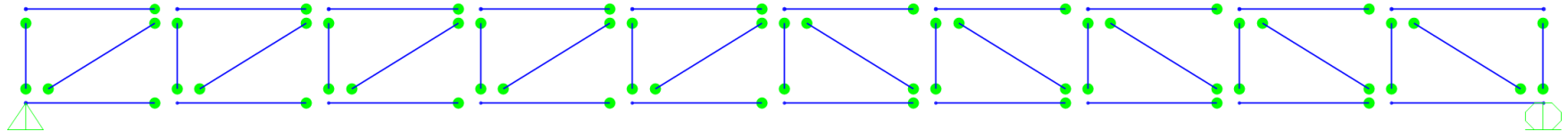
1. $D + S$

2. $0.6D + 0.6W$

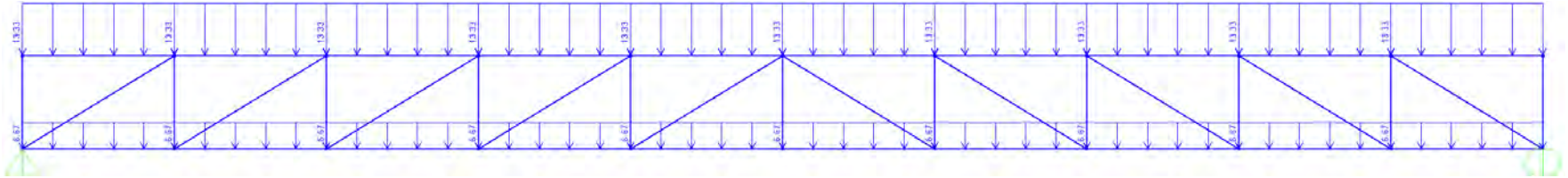
Truss Member Designations



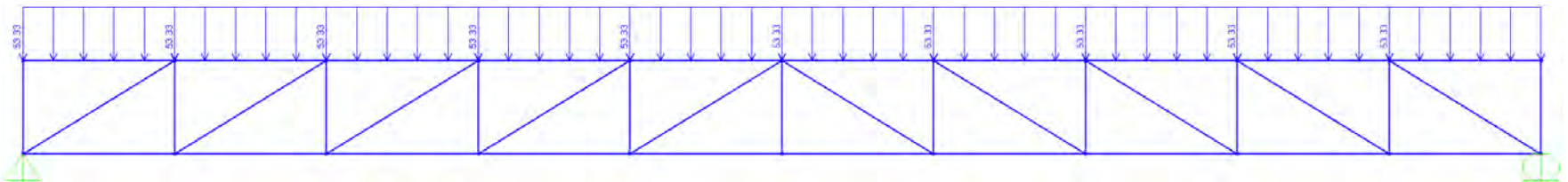
Truss Member Releases



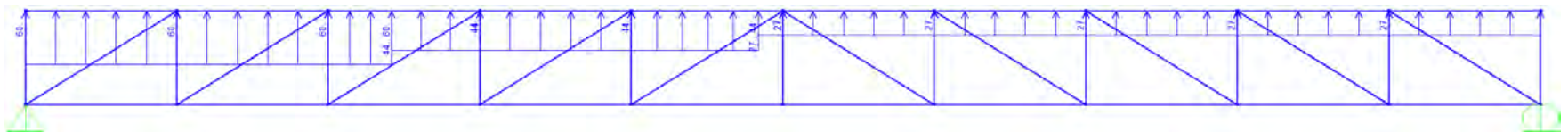
Applied Dead Load, plf



Applied Snow Load, plf



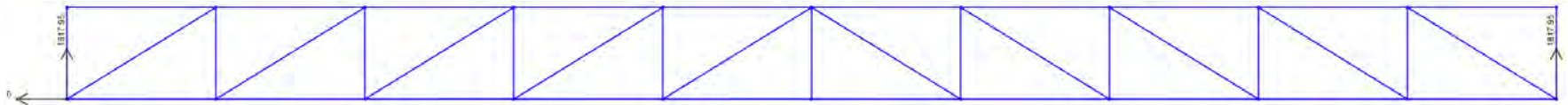
Applied Wind uplift, plf



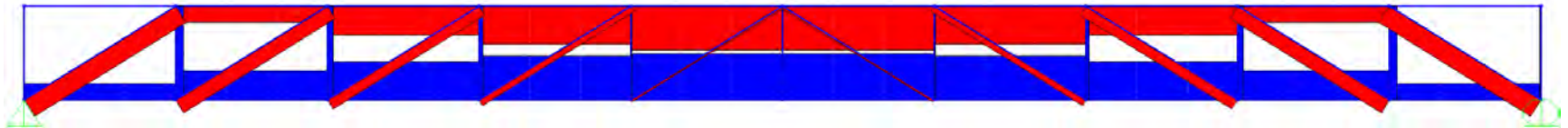
Load Combination:

D+ S

Reactions

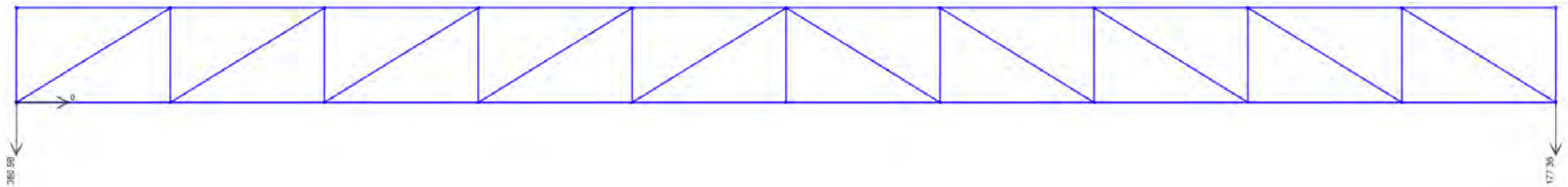


Axial Force

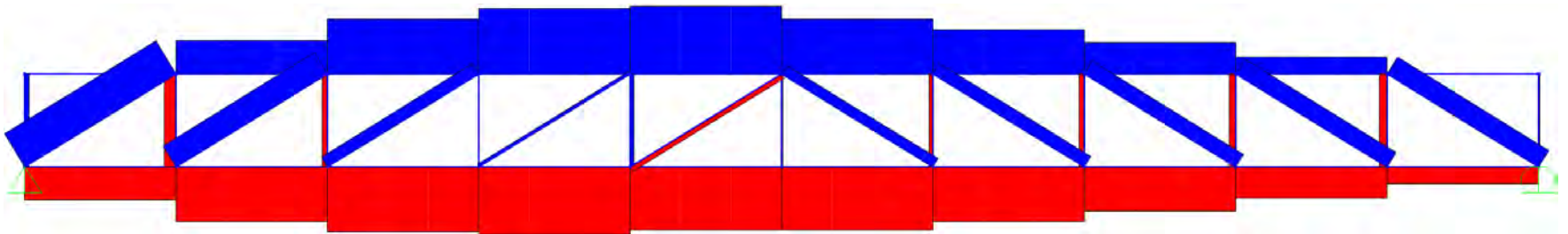


Load Combination:
 $0.6D + 0.6W$

Reactions



Axial Force



Member Connections

TYP TRUSS

Summary Design Values (psi) - See Member Evaluation

	TC	BC	D1	D2	D	V
Fb'	1395	2922	-	-	-	-
Ft'	813	2048	423	683	813	813
Fv'	150	160	-	-	-	-
Fc'	1485	1973	397	492	566	1462
A	8.25	8.25	8.25	5.25	5.25	5.25
S	7.56	7.56	7.56	3.06	3.06	3.06

Processed Model Results - D+S - Top and Bottom Chord

Frame	Output Case	P	V2	M3	Name	Fb'	Ft'	Fv'		Fc'	f _b	f _t	f _v	f _c	DCR Bending	DCR Tension	DCR Shear	DCR Compression	DCR Comb T+B	DCR Comb C+B
Text	Text	Lb	Lb	Lb-ft	-	psi	psi	psi		psi	psi	psi	psi	psi	0.21	0.44	0.13	0.58	0.45	0.58
TC1	D+S	0	-165	0	TC	1395	813	150		1485	0	0	20	0	0.00	0.02	0.13	0.00	0.00	0.00
TC1	D+S	0	-55	182	TC	1395	813	150		1485	289	0	7	0	0.21	0.01	0.04	0.00	0.20	0.21
TC1	D+S	0	55	182	TC	1395	813	150		1485	289	0	7	0	0.21	0.01	0.04	0.00	0.20	0.21
TC1	D+S	0	165	0	TC	1395	813	150		1485	0	0	20	0	0.00	0.02	0.13	0.00	0.00	0.00
TC2	D+S	-2667	-165	0	TC	1395	813	150		1485	0	0	20	323	0.00	0.02	0.13	0.22	0.00	0.05
TC2	D+S	-2667	-55	182	TC	1395	813	150		1485	289	0	7	323	0.21	0.01	0.04	0.22	0.20	0.27
TC2	D+S	-2667	55	182	TC	1395	813	150		1485	289	0	7	323	0.21	0.01	0.04	0.22	0.20	0.27
TC2	D+S	-2667	165	0	TC	1395	813	150		1485	0	0	20	323	0.00	0.02	0.13	0.22	0.00	0.05
TC3	D+S	-4742	-165	0	TC	1395	813	150		1485	0	0	20	575	0.00	0.02	0.13	0.39	0.00	0.15
TC3	D+S	-4742	-55	182	TC	1395	813	150		1485	289	0	7	575	0.21	0.01	0.04	0.39	0.20	0.38
TC3	D+S	-4742	55	182	TC	1395	813	150		1485	289	0	7	575	0.21	0.01	0.04	0.39	0.20	0.38
TC3	D+S	-4742	165	0	TC	1395	813	150		1485	0	0	20	575	0.00	0.02	0.13	0.39	0.00	0.15
TC4	D+S	-6223	-165	0	TC	1395	813	150		1485	0	0	20	754	0.00	0.02	0.13	0.51	0.00	0.26
TC4	D+S	-6223	-55	182	TC	1395	813	150		1485	289	0	7	754	0.21	0.01	0.04	0.51	0.20	0.49
TC4	D+S	-6223	55	182	TC	1395	813	150		1485	289	0	7	754	0.21	0.01	0.04	0.51	0.20	0.49
TC4	D+S	-6223	165	0	TC	1395	813	150		1485	0	0	20	754	0.00	0.02	0.13	0.51	0.00	0.26
TC5	D+S	-7112	-165	0	TC	1395	813	150		1485	0	0	20	862	0.00	0.02	0.13	0.58	0.00	0.34
TC5	D+S	-7112	-55	182	TC	1395	813	150		1485	289	0	7	862	0.21	0.01	0.04	0.58	0.20	0.58
TC5	D+S	-7112	55	182	TC	1395	813	150		1485	289	0	7	862	0.21	0.01	0.04	0.58	0.20	0.58
TC5	D+S	-7112	165	0	TC	1395	813	150		1485	0	0	20	862	0.00	0.02	0.13	0.58	0.00	0.34
TC6	D+S	-7112	-165	0	TC	1395	813	150		1485	0	0	20	862	0.00	0.02	0.13	0.58	0.00	0.34
TC6	D+S	-7112	-55	182	TC	1395	813	150		1485	289	0	7	862	0.21	0.01	0.04	0.58	0.20	0.58
TC6	D+S	-7112	55	182	TC	1395	813	150		1485	289	0	7	862	0.21	0.01	0.04	0.58	0.20	0.58
TC6	D+S	-7112	165	0	TC	1395	813	150		1485	0	0	20	862	0.00	0.02	0.13	0.58	0.00	0.34
TC7	D+S	-6223	-165	0	TC	1395	813	150		1485	0	0	20	754	0.00	0.02	0.13	0.51	0.00	0.26
TC7	D+S	-6223	-55	182	TC	1395	813	150		1485	289	0	7	754	0.21	0.01	0.04	0.51	0.20	0.49
TC7	D+S	-6223	55	182	TC	1395	813	150		1485	289	0	7	754	0.21	0.01	0.04	0.51	0.20	0.49
TC7	D+S	-6223	165	0	TC	1395	813	150		1485	0	0	20	754	0.00	0.02	0.13	0.51	0.00	0.26
TC8	D+S	-4742	-165	0	TC	1395	813	150		1485	0	0	20	575	0.00	0.02	0.13	0.39	0.00	0.15
TC8	D+S	-4742	-55	182	TC	1395	813	150		1485	289	0	7	575	0.21	0.01	0.04	0.39	0.20	0.38
TC8	D+S	-4742	55	182	TC	1395	813	150		1485	289	0	7	575	0.21	0.01	0.04	0.39	0.20	0.38
TC8	D+S	-4742	165	0	TC	1395	813	150		1485	0	0	20	575	0.00	0.02	0.13	0.39	0.00	0.15
TC9	D+S	-2667	-165	0	TC	1395	813	150		1485	0	0	20	323	0.00	0.02	0.13	0.22	0.00	0.05
TC9	D+S	-2667	-55	182	TC	1395	813	150		1485	289	0	7	323	0.21	0.01	0.04	0.22	0.20	0.27
TC9	D+S	-2667	55	182	TC	1395	813	150		1485	289	0	7	323	0.21	0.01	0.04	0.22	0.20	0.27
TC9	D+S	-2667	165	0	TC	1395	813	150		1485	0	0	20	323	0.00	0.02	0.13	0.22	0.00	0.05
TC10	D+S	0	-165	0	TC	1395	813	150		1485	0	0	20	0	0.00	0.02	0.13	0.00	0.00	0.00
TC10	D+S	0	-55	182	TC	1395	813	150		1485	289	0	7	0	0.21	0.01	0.04	0.00	0.20	0.21
TC10	D+S	0	55	182	TC	1395	813	150		1485	289	0	7	0	0.21	0.01	0.04	0.00	0.20	0.21
TC10	D+S	0	165	0	TC	1395	813	150		1485	0	0	20	0	0.00	0.02	0.13	0.00	0.00	0.00
BC1	D+S	2667	-17	0	BC	2922	2048	160		1973	0	323	2	0	0.00	0.16	0.01	0.00	0.16	0.00
BC1	D+S	2667	-6	18	BC	2922	2048	160		1973	29	323	1	0	0.01	0.16	0.00	0.00	0.17	0.01
BC1	D+S	2667	6	18	BC	2922	2048	160		1973	29	323	1	0	0.01	0.16	0.00	0.00	0.17	0.01
BC1	D+S	2667	17	0	BC	2922	2048	160		1973	0	323	2	0	0.00	0.16	0.01	0.00	0.16	0.00
BC2	D+S	4742	-17	0	BC	2922	2048	160		1973	0	575	2	0	0.00	0.28	0.01	0.00	0.28	0.00
BC2	D+S	4742	-6	18	BC	2922	2048	160		1973	29	575	1	0	0.01	0.28	0.00	0.00	0.29	0.01
BC2	D+S	4742	6	18	BC	2922	2048	160		1973	29	575	1	0	0.01	0.28	0.00	0.00	0.29	0.01
BC2	D+S	4742	17	0	BC	2922	2048	160		1973	0	575	2	0	0.00	0.28	0.01	0.00	0.28	0.00
BC3	D+S	6223	-17	0	BC	2922	2048	160		1973	0	754	2	0	0.00	0.37	0.01	0.00	0.37	0.00
BC3	D+S	6223	-6	18	BC	2922	2048	160		1973	29	754	1	0	0.01	0.37	0.00	0.00	0.38	0.01
BC3	D+S	6223	6	18	BC	2922	2048	160		1973	29	754	1	0	0.01	0.37	0.00	0.00	0.38	0.01
BC3	D+S	6223	17	0	BC	2922	2048	160		1973	0	754	2	0	0.00	0.37	0.01	0.00	0.37	0.00
BC4	D+S	7112	-17	0	BC	2922	2048	160		1973	0	862	2	0	0.00	0.42	0.01	0.00	0.42	0.00
BC4	D+S	7112	-6	18	BC	2922	2048	160		1973	29	862	1	0	0.01	0.42	0.00	0.00	0.43	0.01
BC4	D+S	7112	6	18	BC	2922	2048	160		1973	29	862	1	0	0.01	0.42	0.00	0.00	0.43	0.01
BC4	D+S	7112	17	0	BC	2922	2048	160		1973	0	862	2	0	0.00	0.42	0.01	0.00	0.42	0.00
BC5	D+S	7409	-17	0	BC	2922	2048	160		1973	0	898	2	0	0.00	0.44	0.01	0.00	0.44	0.00
BC5	D+S	7409	-6	18	BC	2922	2048	160		1973	29	898	1	0	0.01	0.44	0.00	0.00	0.45	0.01
BC5	D+S	7409	6	18	BC	2922	2048	160		1973	29	898	1	0	0.01	0.44	0.00	0.00	0.45	0.01
BC5	D+S	7409	17	0	BC	2922	2048	160		1973	0	898	2	0	0.00	0.44	0.01	0.00	0.44	0.00
BC6	D+S	7409	-17	0	BC	2922	2048	160		1973	0	898	2	0	0.00	0.44	0.01	0.00	0.44	0.00
BC6	D+S	7409	-6	18	BC	2922	2048	160		1973	29	898	1	0	0.01	0.44	0.00	0.00	0.45	0.01
BC6	D+S	7409	6	18	BC	2922	2048													

TYP TRUSS

Processed Model Results - D+S - Web Members									
Frame	Output Case	P	Name	Ft	Fc	f _t	f _c	DCR Tension	DCR Compression
Text	Text	Lb	-	psi	psi	psi	psi	0.19	0.96
D1	D+S	-3129	D1	423	397	0	379	0.00	0.96
D1	D+S	-3129	D1	423	397	0	379	0.00	0.96
D1	D+S	-3129	D1	423	397	0	379	0.00	0.96
D2	D+S	-2434	D2	683	492	0	295	0.00	0.60
D2	D+S	-2434	D2	683	492	0	295	0.00	0.60
D2	D+S	-2434	D2	683	492	0	295	0.00	0.60
D3	D+S	-1738	D	813	566	0	211	0.00	0.37
D3	D+S	-1738	D	813	566	0	211	0.00	0.37
D3	D+S	-1738	D	813	566	0	211	0.00	0.37
D4	D+S	-1043	D	813	566	0	126	0.00	0.22
D4	D+S	-1043	D	813	566	0	126	0.00	0.22
D4	D+S	-1043	D	813	566	0	126	0.00	0.22
D5	D+S	-348	D	813	566	0	42	0.00	0.07
D5	D+S	-348	D	813	566	0	42	0.00	0.07
D5	D+S	-348	D	813	566	0	42	0.00	0.07
D6	D+S	-348	D	813	566	0	42	0.00	0.07
D6	D+S	-348	D	813	566	0	42	0.00	0.07
D6	D+S	-348	D	813	566	0	42	0.00	0.07
D7	D+S	-1043	D	813	566	0	126	0.00	0.22
D7	D+S	-1043	D	813	566	0	126	0.00	0.22
D7	D+S	-1043	D	813	566	0	126	0.00	0.22
D8	D+S	-1738	D	813	566	0	211	0.00	0.37
D8	D+S	-1738	D	813	566	0	211	0.00	0.37
D8	D+S	-1738	D	813	566	0	211	0.00	0.37
D9	D+S	-2434	D2	683	492	0	295	0.00	0.60
D9	D+S	-2434	D2	683	492	0	295	0.00	0.60
D9	D+S	-2434	D2	683	492	0	295	0.00	0.60
D10	D+S	-3129	D1	423	397	0	379	0.00	0.96
D10	D+S	-3129	D1	423	397	0	379	0.00	0.96
D10	D+S	-3129	D1	423	397	0	379	0.00	0.96
V1	D+S	-165	V	813	1462	0	20	0.00	0.01
V1	D+S	-165	V	813	1462	0	20	0.00	0.01
V1	D+S	-165	V	813	1462	0	20	0.00	0.01
V2	D+S	1306	V	813	1462	158	0	0.19	0.00
V2	D+S	1306	V	813	1462	158	0	0.19	0.00
V2	D+S	1306	V	813	1462	158	0	0.19	0.00
V3	D+S	942	V	813	1462	114	0	0.14	0.00
V3	D+S	942	V	813	1462	114	0	0.14	0.00
V3	D+S	942	V	813	1462	114	0	0.14	0.00
V4	D+S	578	V	813	1462	70	0	0.09	0.00
V4	D+S	578	V	813	1462	70	0	0.09	0.00
V4	D+S	578	V	813	1462	70	0	0.09	0.00
V5	D+S	215	V	813	1462	26	0	0.03	0.00
V5	D+S	215	V	813	1462	26	0	0.03	0.00
V5	D+S	215	V	813	1462	26	0	0.03	0.00
V6	D+S	33	V	813	1462	4	0	0.00	0.00
V6	D+S	33	V	813	1462	4	0	0.00	0.00
V6	D+S	33	V	813	1462	4	0	0.00	0.00
V7	D+S	215	V	813	1462	26	0	0.03	0.00
V7	D+S	215	V	813	1462	26	0	0.03	0.00
V7	D+S	215	V	813	1462	26	0	0.03	0.00
V8	D+S	578	V	813	1462	70	0	0.09	0.00
V8	D+S	578	V	813	1462	70	0	0.09	0.00
V8	D+S	578	V	813	1462	70	0	0.09	0.00
V9	D+S	942	V	813	1462	114	0	0.14	0.00
V9	D+S	942	V	813	1462	114	0	0.14	0.00
V9	D+S	942	V	813	1462	114	0	0.14	0.00
V10	D+S	1306	V	813	1462	158	0	0.19	0.00
V10	D+S	1306	V	813	1462	158	0	0.19	0.00
V10	D+S	1306	V	813	1462	158	0	0.19	0.00
V11	D+S	-165	V	813	1462	0	20	0.00	0.01
V11	D+S	-165	V	813	1462	0	20	0.00	0.01
V11	D+S	-165	V	813	1462	0	20	0.00	0.01

TYP TRUSS

Summary Design Values (psi) - See Member Evaluation

	TC	BC	D1	D2	D	V
Fb'	2083	4046	-	-	-	-
Ft'	1300	3276	676	1092	1300	1300
Fv'	240	288	-	-	-	-
Fc'	459	3299	427	514	596	1236
A	8.25	8.25	8.25	5.25	5.25	5.25
S	7.56	7.56	-	-	-	-

Processed Model Results - 0.6D+0.6W - Top and Bottom Chord																			
Frame	Output Case	P	V2	M3	Name	Fb'	Ft'	Fv'	Fc'	f _b	f _t	f _v	f _c	DCR Bending	DCR Tension	DCR Shear	DCR Compression	DCR Comb T+B	DCR Comb C+B
Text	Text	Lb	Lb	Lb-ft	-	psi	psi	psi	psi	psi	psi	psi	psi	0.06	0.01	0.04	0.04	0.14	0.06
TC1	0.6D + 0.6W	0	69	0	TC	2083	1300	240	459	0	0	8	0	0.00	0.01	0.04	0.00	0.00	0.00
TC1	0.6D + 0.6W	0	23	-76	TC	2083	1300	240	459	-121	0	3	0	0.06	0.00	0.01	0.00	0.05	0.06
TC1	0.6D + 0.6W	0	-23	-76	TC	2083	1300	240	459	-121	0	3	0	0.06	0.00	0.01	0.00	0.05	0.06
TC1	0.6D + 0.6W	0	-69	0	TC	2083	1300	240	459	0	0	8	0	0.00	0.01	0.04	0.00	0.00	0.00
TC2	0.6D + 0.6W	540	69	0	TC	2083	1300	240	459	0	65	8	0	0.00	0.01	0.04	0.00	0.05	0.00
TC2	0.6D + 0.6W	540	23	-76	TC	2083	1300	240	459	-121	65	3	0	0.06	0.00	0.01	0.00	0.10	0.06
TC2	0.6D + 0.6W	540	-23	-76	TC	2083	1300	240	459	-121	65	3	0	0.06	0.00	0.01	0.00	0.10	0.06
TC2	0.6D + 0.6W	540	-69	0	TC	2083	1300	240	459	0	65	8	0	0.00	0.01	0.04	0.00	0.05	0.00
TC3	0.6D + 0.6W	887	61	0	TC	2083	1300	240	459	0	107	7	0	0.00	0.01	0.03	0.00	0.08	0.00
TC3	0.6D + 0.6W	887	15	-63	TC	2083	1300	240	459	-100	107	2	0	0.05	0.00	0.01	0.00	0.13	0.05
TC3	0.6D + 0.6W	887	-19	-57	TC	2083	1300	240	459	-91	107	2	0	0.04	0.00	0.01	0.00	0.12	0.04
TC3	0.6D + 0.6W	887	-50	0	TC	2083	1300	240	459	0	107	6	0	0.00	0.00	0.03	0.00	0.08	0.00
TC4	0.6D + 0.6W	1052	46	0	TC	2083	1300	240	459	0	128	6	0	0.00	0.00	0.02	0.00	0.10	0.00
TC4	0.6D + 0.6W	1052	15	-50	TC	2083	1300	240	459	-80	128	2	0	0.04	0.00	0.01	0.00	0.13	0.04
TC4	0.6D + 0.6W	1052	-15	-50	TC	2083	1300	240	459	-80	128	2	0	0.04	0.00	0.01	0.00	0.13	0.04
TC4	0.6D + 0.6W	1052	-46	0	TC	2083	1300	240	459	0	128	6	0	0.00	0.00	0.02	0.00	0.10	0.00
TC5	0.6D + 0.6W	1094	45	0	TC	2083	1300	240	459	0	133	5	0	0.00	0.00	0.02	0.00	0.10	0.00
TC5	0.6D + 0.6W	1094	15	-49	TC	2083	1300	240	459	-78	133	2	0	0.04	0.00	0.01	0.00	0.14	0.04
TC5	0.6D + 0.6W	1094	-16	-48	TC	2083	1300	240	459	-76	133	2	0	0.04	0.00	0.01	0.00	0.13	0.04
TC5	0.6D + 0.6W	1094	-38	0	TC	2083	1300	240	459	0	133	5	0	0.00	0.00	0.02	0.00	0.10	0.00
TC6	0.6D + 0.6W	885	20	0	TC	2083	1300	240	459	0	107	2	0	0.00	0.00	0.01	0.00	0.08	0.00
TC6	0.6D + 0.6W	885	7	-22	TC	2083	1300	240	459	-36	107	1	0	0.02	0.00	0.00	0.00	0.10	0.02
TC6	0.6D + 0.6W	885	-7	-22	TC	2083	1300	240	459	-36	107	1	0	0.02	0.00	0.00	0.00	0.10	0.02
TC6	0.6D + 0.6W	885	-20	0	TC	2083	1300	240	459	0	107	2	0	0.00	0.00	0.01	0.00	0.08	0.00
TC7	0.6D + 0.6W	715	20	0	TC	2083	1300	240	459	0	87	2	0	0.00	0.00	0.01	0.00	0.07	0.00
TC7	0.6D + 0.6W	715	7	-22	TC	2083	1300	240	459	-36	87	1	0	0.02	0.00	0.00	0.00	0.08	0.02
TC7	0.6D + 0.6W	715	-7	-22	TC	2083	1300	240	459	-36	87	1	0	0.02	0.00	0.00	0.00	0.08	0.02
TC7	0.6D + 0.6W	715	-20	0	TC	2083	1300	240	459	0	87	2	0	0.00	0.00	0.01	0.00	0.07	0.00
TC8	0.6D + 0.6W	510	20	0	TC	2083	1300	240	459	0	62	2	0	0.00	0.00	0.01	0.00	0.05	0.00
TC8	0.6D + 0.6W	510	7	-22	TC	2083	1300	240	459	-36	62	1	0	0.02	0.00	0.00	0.00	0.06	0.02
TC8	0.6D + 0.6W	510	-7	-22	TC	2083	1300	240	459	-36	62	1	0	0.02	0.00	0.00	0.00	0.06	0.02
TC8	0.6D + 0.6W	510	-20	0	TC	2083	1300	240	459	0	62	2	0	0.00	0.00	0.01	0.00	0.05	0.00
TC9	0.6D + 0.6W	272	20	0	TC	2083	1300	240	459	0	33	2	0	0.00	0.00	0.01	0.00	0.03	0.00
TC9	0.6D + 0.6W	272	7	-22	TC	2083	1300	240	459	-36	33	1	0	0.02	0.00	0.00	0.00	0.04	0.02
TC9	0.6D + 0.6W	272	-7	-22	TC	2083	1300	240	459	-36	33	1	0	0.02	0.00	0.00	0.00	0.04	0.02
TC9	0.6D + 0.6W	272	-20	0	TC	2083	1300	240	459	0	33	2	0	0.00	0.00	0.01	0.00	0.03	0.00
TC10	0.6D + 0.6W	0	20	0	TC	2083	1300	240	459	0	0	2	0	0.00	0.00	0.01	0.00	0.00	0.00
TC10	0.6D + 0.6W	0	7	-22	TC	2083	1300	240	459	-36	0	1	0	0.02	0.00	0.00	0.00	0.02	0.02
TC10	0.6D + 0.6W	0	-7	-22	TC	2083	1300	240	459	-36	0	1	0	0.02	0.00	0.00	0.00	0.02	0.02
TC10	0.6D + 0.6W	0	-20	0	TC	2083	1300	240	459	0	0	2	0	0.00	0.00	0.01	0.00	0.00	0.00
BC1	0.6D + 0.6W	-540	-10	0	BC	4046	3276	288	3299	0	0	1	65	0.00	0.00	0.00	0.02	0.00	0.00
BC1	0.6D + 0.6W	-540	-3	11	BC	4046	3276	288	3299	17	0	0	65	0.00	0.00	0.00	0.02	0.00	0.00
BC1	0.6D + 0.6W	-540	3	11	BC	4046	3276	288	3299	17	0	0	65	0.00	0.00	0.00	0.02	0.00	0.00
BC1	0.6D + 0.6W	-540	10	0	BC	4046	3276	288	3299	0	0	1	65	0.00	0.00	0.00	0.02	0.00	0.00
BC2	0.6D + 0.6W	-887	-10	0	BC	4046	3276	288	3299	0	0	1	107	0.00	0.00	0.00	0.03	0.00	0.00
BC2	0.6D + 0.6W	-887	-3	11	BC	4046	3276	288	3299	17	0	0	107	0.00	0.00	0.00	0.03	0.00	0.01
BC2	0.6D + 0.6W	-887	3	11	BC	4046	3276	288	3299	17	0	0	107	0.00	0.00	0.00	0.03	0.00	0.01
BC2	0.6D + 0.6W	-887	10	0	BC	4046	3276	288	3299	0	0	1	107	0.00	0.00	0.00	0.03	0.00	0.00
BC3	0.6D + 0.6W	-1052	-10	0	BC	4046	3276	288	3299	0	0	1	128	0.00	0.00	0.00	0.04	0.00	0.00
BC3	0.6D + 0.6W	-1052	-3	11	BC	4046	3276	288	3299	17	0	0	128	0.00	0.00	0.00	0.04	0.00	0.01
BC3	0.6D + 0.6W	-1052	3	11	BC	4046	3276	288	3299	17	0	0	128	0.00	0.00	0.00	0.04	0.00	0.01
BC3	0.6D + 0.6W	-1052	10	0	BC	4046	3276	288	3299	0	0	1	128	0.00	0.00	0.00	0.04	0.00	0.00
BC4	0.6D + 0.6W	-1094	-10	0	BC	4046	3276	288	3299	0	0	1	133	0.00	0.00	0.00	0.04	0.00	0.00
BC4	0.6D + 0.6W	-1094	-3	11	BC	4046	3276	288	3299	17	0	0	133	0.00	0.00	0.00	0.04	0.00	0.01
BC4	0.6D + 0.6W	-1094	3	11	BC	4046	3276	288	3299	17	0	0	133	0.00	0.00	0.00	0.04	0.00	0.01
BC4	0.6D + 0.6W	-1094	10	0	BC	4046	3276	288	3299	0	0	1	133	0.00	0.00	0.00	0.04	0.00	0.00
BC5	0.6D + 0.6W	-1021	-10	0	BC	4046	3276	288	3299	0	0	1	124	0.00	0.00	0.00	0.04	0.00	0.00
BC5	0.6D + 0.6W	-1021	-3	11	BC	4046	3276	288	3299	17	0	0	124	0.00	0.00	0.00	0.04	0.00	0.01
BC5	0.6D + 0.6W	-1021	3	11	BC	4046	3276	288	3299	17	0	0	124	0.00	0.00	0.00	0.04	0.00	0.01
BC5	0.6D + 0.6W	-1021	10	0	BC	4046	3276	288	3299	0	0	1	124	0.00	0.00	0.00	0.04	0.00	0.00
BC6	0.6D + 0.6W	-1021	-10	0	BC	4046	3276	288	3299	0	0	1	124	0.00	0.00	0.00	0.04	0.00	0.00
BC6	0.6D + 0.6W	-1021	-3	11	BC	4046	3276	288	3299	17	0	0							

TYP TRUSS

Processed Model Results - 0.6D+0.6W - Web Members									
Frame	Output Case	P	Name	Ft	Fc	f _t	f _c	DCR Tension	DCR Compression
Text	Text	Lb	-	psi	psi	psi	psi	0.11	0.02
D1	0.6D + 0.6W	634	D1	676	427	77	0	0.11	0.00
D1	0.6D + 0.6W	634	D1	676	427	77	0	0.11	0.00
D1	0.6D + 0.6W	634	D1	676	427	77	0	0.11	0.00
D2	0.6D + 0.6W	406	D2	1092	514	49	0	0.05	0.00
D2	0.6D + 0.6W	406	D2	1092	514	49	0	0.05	0.00
D2	0.6D + 0.6W	406	D2	1092	514	49	0	0.05	0.00
D3	0.6D + 0.6W	194	D	1300	596	24	0	0.02	0.00
D3	0.6D + 0.6W	194	D	1300	596	24	0	0.02	0.00
D3	0.6D + 0.6W	194	D	1300	596	24	0	0.02	0.00
D4	0.6D + 0.6W	49	D	1300	596	6	0	0.00	0.00
D4	0.6D + 0.6W	49	D	1300	596	6	0	0.00	0.00
D4	0.6D + 0.6W	49	D	1300	596	6	0	0.00	0.00
D5	0.6D + 0.6W	-86	D	1300	596	0	10	0.00	0.02
D5	0.6D + 0.6W	-86	D	1300	596	0	10	0.00	0.02
D5	0.6D + 0.6W	-86	D	1300	596	0	10	0.00	0.02
D6	0.6D + 0.6W	160	D	1300	596	19	0	0.01	0.00
D6	0.6D + 0.6W	160	D	1300	596	19	0	0.01	0.00
D6	0.6D + 0.6W	160	D	1300	596	19	0	0.01	0.00
D7	0.6D + 0.6W	200	D	1300	596	24	0	0.02	0.00
D7	0.6D + 0.6W	200	D	1300	596	24	0	0.02	0.00
D7	0.6D + 0.6W	200	D	1300	596	24	0	0.02	0.00
D8	0.6D + 0.6W	240	D	1300	596	29	0	0.02	0.00
D8	0.6D + 0.6W	240	D	1300	596	29	0	0.02	0.00
D8	0.6D + 0.6W	240	D	1300	596	29	0	0.02	0.00
D9	0.6D + 0.6W	279	D2	1092	514	34	0	0.03	0.00
D9	0.6D + 0.6W	279	D2	1092	514	34	0	0.03	0.00
D9	0.6D + 0.6W	279	D2	1092	514	34	0	0.03	0.00
D10	0.6D + 0.6W	319	D1	676	427	39	0	0.06	0.00
D10	0.6D + 0.6W	319	D1	676	427	39	0	0.06	0.00
D10	0.6D + 0.6W	319	D1	676	427	39	0	0.06	0.00
V1	0.6D + 0.6W	69	V	1300	1236	8	0	0.01	0.00
V1	0.6D + 0.6W	69	V	1300	1236	8	0	0.01	0.00
V1	0.6D + 0.6W	69	V	1300	1236	8	0	0.01	0.00
V2	0.6D + 0.6W	-193	V	1300	1236	0	23	0.00	0.02
V2	0.6D + 0.6W	-193	V	1300	1236	0	23	0.00	0.02
V2	0.6D + 0.6W	-193	V	1300	1236	0	23	0.00	0.02
V3	0.6D + 0.6W	-82	V	1300	1236	0	10	0.00	0.01
V3	0.6D + 0.6W	-82	V	1300	1236	0	10	0.00	0.01
V3	0.6D + 0.6W	-82	V	1300	1236	0	10	0.00	0.01
V4	0.6D + 0.6W	-6	V	1300	1236	0	1	0.00	0.00
V4	0.6D + 0.6W	-6	V	1300	1236	0	1	0.00	0.00
V4	0.6D + 0.6W	-6	V	1300	1236	0	1	0.00	0.00
V5	0.6D + 0.6W	65	V	1300	1236	8	0	0.01	0.00
V5	0.6D + 0.6W	65	V	1300	1236	8	0	0.01	0.00
V5	0.6D + 0.6W	65	V	1300	1236	8	0	0.01	0.00
V6	0.6D + 0.6W	20	V	1300	1236	2	0	0.00	0.00
V6	0.6D + 0.6W	20	V	1300	1236	2	0	0.00	0.00
V6	0.6D + 0.6W	20	V	1300	1236	2	0	0.00	0.00
V7	0.6D + 0.6W	-64	V	1300	1236	0	8	0.00	0.01
V7	0.6D + 0.6W	-64	V	1300	1236	0	8	0.00	0.01
V7	0.6D + 0.6W	-64	V	1300	1236	0	8	0.00	0.01
V8	0.6D + 0.6W	-85	V	1300	1236	0	10	0.00	0.01
V8	0.6D + 0.6W	-85	V	1300	1236	0	10	0.00	0.01
V8	0.6D + 0.6W	-85	V	1300	1236	0	10	0.00	0.01
V9	0.6D + 0.6W	-105	V	1300	1236	0	13	0.00	0.01
V9	0.6D + 0.6W	-105	V	1300	1236	0	13	0.00	0.01
V9	0.6D + 0.6W	-105	V	1300	1236	0	13	0.00	0.01
V10	0.6D + 0.6W	-126	V	1300	1236	0	15	0.00	0.01
V10	0.6D + 0.6W	-126	V	1300	1236	0	15	0.00	0.01
V10	0.6D + 0.6W	-126	V	1300	1236	0	15	0.00	0.01
V11	0.6D + 0.6W	20	V	1300	1236	2	0	0.00	0.00
V11	0.6D + 0.6W	20	V	1300	1236	2	0	0.00	0.00
V11	0.6D + 0.6W	20	V	1300	1236	2	0	0.00	0.00

Use 1/2" Ø bolts for conn w/ 1/2" plywood ea side, typ.

Table 3 from APA E825E

Bolt Diameter	plywood thickness	Face Grain Direction	Plywood End	Plywood Edge	Ultimate Lateral Load	ASD Capacity
1/2	1/2	0	3 in	1.50 in	4750 lb	950 lb
		90	3 in	1.50 in	4570 lb	914 lb

Value used in bolt connection calcs, see preceding calculations.

Note: If (2) bolt's capacity is greater than load, individual check is not required.

Loading on members from SAP analysis and splice locations

		# of bolts	AR
TC Splice=	1094 lb	2	60%
BC Splice=	7112 lb	8	Need further check to account for group action factor.
End Conn=	2667 lb	3	Need further check to account for group action factor.
D1 web=	634 lb	2	35%
D2 web=	406 lb	2	22%
D web=	240 lb	2	13%
T web=	1306 lb	2	71%

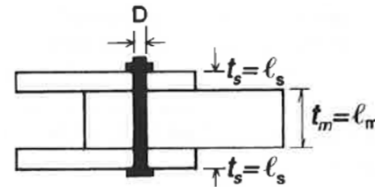
Client _____
 4300 B Street, Suite 302 Project 161 Klevin St Typical Truss Repair
 Anchorage, Alaska 99502 42" Truss Design
 Ph: 907 562-3439
 Fax: 907 561-5319 Project No. 402024.031

Design by GC
 Date 2/11/2025
 Checked by EH
 Date _____

~ BOLTED SHEAR CONNECTION PER NDS 2018 CHAPTER 11.3 ~

INPUT: Bot splice, plywood gusset w/ 1/2"Ø bolt

Method: ASD			NDS Ref.:
Forces: Shear: $R_s = 7112.0 \text{ lbs}$ Resultant Load: $R_R = 7112.0 \text{ lbs}$			11.3.2
Fastener: Thru Bolt Double Shear # of Fasteners, $n = 10$ Size: 1/2" Length, $L = 2.00 \text{ in}$ Nominal Diameter ^B , $D = 0.500 \text{ in}$			
Wood: Side Member Material ^C : Plywood Structural 1 or OSB Main Member Material ^C : Wood			
Side Member Specific Gravity, $G_s = 0.43$ ← N/A Main Member Specific Gravity, $G_m = 0.43$ Side Member Thickness, $t_{sm} = 0.50 \text{ in}$ Main Member Thickness, $t_m = 1.50 \text{ in}$ *Only used for toe-nailing: 2.00 in			
Shear: Main Member Shear Action Angle, $\theta_m = 0^\circ$ 0° = // to grain Side Member Shear Action Angle, $\theta_s = 0^\circ$ 90° = ⊥ to grain			
ASD & LRFD		Shear Load Duration: 10 Years/Live Load Moisture Content ^A : ≤19% @ fab. & ≤19% in service Temperature: In Service Dry & Temp. ≤100°F Group Action: Input C_g below Geometry: Input C_Δ below End Grain: NO End Grain Diaphragm: NOT a Diaphragm Toe-nail: NO Toe-Nailing Format Conversion: 3.32/Φ Φ Resistance: 0.65 Time Effect: λ approximated below, see N.3.3	11.3.2 11.3.3 11.3.4 11.3.6 12.5.1 12.5.2 12.5.3 12.5.4 11.3.7 11.3.8 11.3.9



Connection OK 97%

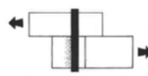
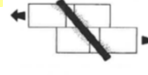
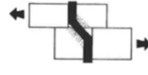
Adjustment Factors:			NDS Pg #	NDS Ref.:
Shear				
Load Duration Factor:	$C_D = 1.00$	ASD only	pg. 11	11.3.2
Wet Service Factor:	$C_M^1 = 1.00$	ASD & LRFD	pg. 67	11.3.3
Temperature Factor:	$C_t = 1.00$	ASD & LRFD	pg. 67	11.3.4
Group Action Factor:	$C_g = 0.81$	ASD & LRFD	pg. 68-72	11.3.6
Geometry Factor:	$C_\Delta = 1.00$	ASD & LRFD	pg. 89-90	12.5.1
End Grain Factor:	$C_{eg} = 1.00$	ASD & LRFD	pg. 91	12.5.2
Diaphragm Factor:	$C_{di} = 1.00$	ASD & LRFD	pg. 91	12.5.3
Toe-nail Factor:	$C_{tn} = 1.00$	ASD & LRFD	pg. 91	12.5.4
Format Conversion Factor:	$K_F = 3.32$	LRFD only	pg. 187	11.3.7
Resistance Factor:	$\Phi_z = 0.65$	LRFD only	pg. 187	11.3.8
Time Effect Factor:	$\lambda = 0.80$	LRFD only	pg. 187	11.3.9

Client _____
 4300 B Street, Suite 302 Project 161 Klevin St Typical Truss Repair
 Anchorage, Alaska 99502 42" Truss Design
 Ph: 907 562-3439
 Fax: 907 561-5319 Project No. 402024.031

Design by GC
 Date 2/11/2025
 Checked by EH
 Date _____

~ BOLTED SHEAR CONNECTION PER NDS 2018 CHAPTER 11.3 ~

INPUT: Bot splice, plywood gusset w/ 1/2"Ø bolt

Shear Capacity:				NDS Ref.:		
$p_m= 1.5$ in	$\ell_s= 0.5$ in	$\ell_m=$ <table><tr><td>Thru Bolt</td></tr><tr><td>1.50 in</td></tr></table>	Thru Bolt	1.50 in		12.3.5
Thru Bolt						
1.50 in						
$D_r= 0.5$ in	$F_{yb}= 45,000$ psi			Tbl 12.3.3		
$F_{em\perp}= 2,537$ psi	$F_{em }= 4,816$ psi					
$F_{es\perp}= 4,637$ psi	$F_{es }= 4,637$ psi					
$R_e= 1.039$	$R_t= 3.000$					
$F_{em\theta}= 4,816$ psi	$F_{es\theta}= 4,637$ psi					
Yield Mode						
$I_m \quad Z = \frac{D \ell_m F_{em}}{R_d}$	$R_d= 4.000$	$Z= 903$ lbs/fastener		Mode I _m Tbl 12.3.1A		
$I_s \quad Z = \frac{D \ell_s F_{es}}{R_d}$	$R_d= 4.000$	$Z= 914$ lbs/fastener Tbl. 3 APA E825E		Mode I _s Tbl 12.3.1B		
$II \quad Z = \frac{k_1 D \ell_s F_{es}}{R_d}$	$k_1= 1.032$ $R_d= 3.600$	$Z= N/A$		Mode II		
$III_m \quad Z = \frac{k_2 D \ell_m F_{em}}{(1 + 2R_e) R_d}$	$k_2= 1.491$ $R_d= 3.200$	$Z= N/A$		Mode III _m		
$III_s \quad Z = \frac{k_3 D \ell_s F_{em}}{(2 + R_e) R_d}$	$k_3= 3.781$ $R_d= 3.200$	$Z= 914$ lbs/fastener Tbl. 3 APA E825E		Mode III _s		
$IV \quad Z = \frac{D_2}{R_d} \sqrt{\frac{2F_{em} F_{yb}}{3(1 + R_e)}}$	$R_d= 3.200$	$Z= 1315$ lbs/fastener		Mode IV		
Controlling Z= 903 lbs/fastener				11.3		
Z' = Cd*Cm*Ct*Cg*CA*Ceg*Ctn*Z*n= 7311 lbs						

A. If Moisture Content is >19% at time of fabrication and ≤19% in service, 0.4 is a conservative factor. For a more precise factor see NDS 10.3.3.

B. Diameter of lag screws are for "reduced body diameter" lag screws. (Similar to tables 11J & 11k in NDS)

C. The adjusted values for $F_{e\perp}$ and $F_{e\parallel}$ are not supported by NDS for diameters of fasteners >1/4" in plywood or OSB & therefore not recommended.

F_e is assumed for all fastener sizes herein.

NDS Group Action Factor, C_g

2018 NDS Section 11.3.6

Equation 11.3-1

Group Action Factor, C_g

Type of conn=	Wood-Wood	
Spacing btwn bolts=	1.5	in
A_m =	8.25	si
A_s =	6.9	si
		$\leq 2*(5/8"*5.5")$
E_m =	1500000	psi
		$\leq$ HF No. 1
E_s =	1015000	psi
γ =	63640	lb/in
n =	10	
R_{ea} =	0.56	
u =	1.0	
m =	0.86	
(a)=	0.82	
(b)=	11.62	
(c)=	11.50	
$C_g = (a/b)*c =$	0.81	

Eq. 11.3-1 broken up

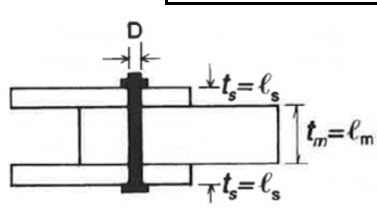
(eq. 11.3-1)

Client _____
 4300 B Street, Suite 302 Project 161 Klevin St Typical Truss Repair
 Anchorage, Alaska 99502 42" Truss Design
 Ph: 907 562-3439
 Fax: 907 561-5319 Project No. 402024.031

Design by GC
 Date 2/11/2025
 Checked by EH
 Date _____

~ BOLTED SHEAR CONNECTION PER NDS 2018 CHAPTER 11.3 ~

INPUT: End Conn, plywood gusset w/ 1/2"Ø bolt

Method: ASD			NDS Ref.:
Forces: Shear: $R_s = 2667.0 \text{ lbs}$ Resultant Load: $R_R = 2667.0 \text{ lbs}$			11.3.2
Fastener: Thru Bolt Double Shear # of Fasteners, $n = 3$ Size: 1/2" Length, $L = 2.00 \text{ in}$ Nominal Diameter ^B , $D = 0.500 \text{ in}$	ASD ASD & LRFD LRFD	Shear Load Duration: 10 Years/Live Load Moisture Content ^A : ≤19% @ fab. & ≤19% in service Temperature: In Service Dry & Temp. ≤100°F Group Action: Input C_g below Geometry: Input C_Δ below End Grain: NO End Grain Diaphragm: NOT a Diaphragm Toe-nail: NO Toe-Nailing	11.3.3 11.3.4 11.3.6 12.5.1 12.5.2 12.5.3 12.5.4
Wood: Side Member Material ^C : Plywood Structural 1 or OSB Main Member Material ^C : Wood		Format Conversion: 3.32/Φ Φ Resistance: 0.65 Time Effect: λ approximated below, see N.3.3	11.3.7 11.3.8 11.3.9
Side Member Specific Gravity, $G_s = 0.43$ ← N/A Main Member Specific Gravity, $G_m = 0.43$ Side Member Thickness, $t_{sm} = 0.50 \text{ in}$ Main Member Thickness, $t_m = 1.50 \text{ in}$ *Only used for toe-nailing: 2.00 in			
Shear: Main Member Shear Action Angle, $\theta_m = 0^\circ$ 0° = // to grain Side Member Shear Action Angle, $\theta_s = 0^\circ$ 90° = ⊥ to grain		Connection OK 100%	

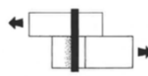
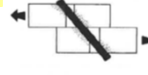
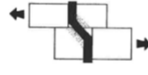
Adjustment Factors:			NDS Pg #	NDS Ref.:
Shear				
Load Duration Factor:	$C_D = 1.00$	ASD only	pg. 11	11.3.2
Wet Service Factor:	$C_M^1 = 1.00$	ASD & LRFD	pg. 67	11.3.3
Temperature Factor:	$C_t = 1.00$	ASD & LRFD	pg. 67	11.3.4
Group Action Factor:	$C_g = 0.99$	ASD & LRFD	pg. 68-72	11.3.6
Geometry Factor:	$C_\Delta = 1.00$	ASD & LRFD	pg. 89-90	12.5.1
End Grain Factor:	$C_{eg} = 1.00$	ASD & LRFD	pg. 91	12.5.2
Diaphragm Factor:	$C_{di} = 1.00$	ASD & LRFD	pg. 91	12.5.3
Toe-nail Factor:	$C_{tn} = 1.00$	ASD & LRFD	pg. 91	12.5.4
Format Conversion Factor:	$K_F = 3.32$	LRFD only	pg. 187	11.3.7
Resistance Factor:	$\Phi_z = 0.65$	LRFD only	pg. 187	11.3.8
Time Effect Factor:	$\lambda = 0.80$	LRFD only	pg. 187	11.3.9

Client _____
 4300 B Street, Suite 302 Project 161 Klevin St Typical Truss Repair
 Anchorage, Alaska 99502 42" Truss Design
 Ph: 907 562-3439
 Fax: 907 561-5319 Project No. 402024.031

Design by GC
 Date 2/11/2025
 Checked by EH
 Date _____

~ BOLTED SHEAR CONNECTION PER NDS 2018 CHAPTER 11.3 ~

INPUT: End Conn, plywood gusset w/ 1/2"Ø bolt

Shear Capacity:				NDS Ref.:		
$p_m= 1.5$ in	$\ell_s= 0.5$ in	$\ell_m=$ <table><tr><td>Thru Bolt</td></tr><tr><td>1.50 in</td></tr></table>	Thru Bolt	1.50 in		12.3.5
Thru Bolt						
1.50 in						
$D_r= 0.5$ in	$F_{yb}= 45,000$ psi			Tbl 12.3.3		
$F_{em\perp}= 2,537$ psi	$F_{em\parallel}= 4,816$ psi					
$F_{es\perp}= 4,637$ psi	$F_{es\parallel}= 4,637$ psi					
$R_e= 1.039$	$R_t= 3.000$					
$F_{em\theta}= 4,816$ psi	$F_{es\theta}= 4,637$ psi					
Yield Mode						
$I_m \quad Z = \frac{D \ell_m F_{em}}{R_d}$	$R_d= 4.000$	$Z= 903$ lbs/fastener		Mode I _m Tbl 12.3.1A		
$I_s \quad Z = \frac{D \ell_s F_{es}}{R_d}$	$R_d= 4.000$	$Z= 914$ lbs/fastener Tbl. 3 APA E825E		Mode I _s Tbl 12.3.1B		
$II \quad Z = \frac{k_1 D \ell_s F_{es}}{R_d}$	$k_1= 1.032$ $R_d= 3.600$	$Z= N/A$		Mode II		
$III_m \quad Z = \frac{k_2 D \ell_m F_{em}}{(1 + 2R_e) R_d}$	$k_2= 1.491$ $R_d= 3.200$	$Z= N/A$		Mode III _m		
$III_s \quad Z = \frac{k_3 D \ell_s F_{em}}{(2 + R_e) R_d}$	$k_3= 3.781$ $R_d= 3.200$	$Z= 914$ lbs/fastener Tbl. 3 APA E825E		Mode III _s		
$IV \quad Z = \frac{D_2}{R_d} \sqrt{\frac{2F_{em} F_{yb}}{3(1 + R_e)}}$	$R_d= 3.200$	$Z= 1315$ lbs/fastener		Mode IV		
Controlling Z= 903 lbs/fastener				11.3		
Z' = Cd*Cm*Ct*Cg*CA*Ceg*Ctn*Z*n= 2676 lbs						

- A. If Moisture Content is >19% at time of fabrication and ≤19% in service, 0.4 is a conservative factor. For a more precise factor see NDS 10.3.3.
 B. Diameter of lag screws are for "reduced body diameter" lag screws. (Similar to tables 11J & 11k in NDS)
 C. The adjusted values for $F_{e\perp}$ and $F_{e\parallel}$ are not supported by NDS for diameters of fasteners >1/4" in plywood or OSB & therefore not recommended.
 F_e is assumed for all fastener sizes herein.

NDS Group Action Factor, C_g

2018 NDS Section 11.3.6

Equation 11.3-1

Group Action Factor, C_g

Type of conn=	Wood-Wood	
Spacing btwn bolts=	1.5	in
A_m =	8.25	si
A_s =	6.9	si
		$\leq 2*(5/8"*5.5")$
E_m =	1500000	psi
		$\leq$ HF No. 1
E_s =	1015000	psi
γ =	63640	lb/in
n =	3	
R_{ea} =	0.56	
u =	1.0	
m =	0.86	
(a)=	0.50	
(b)=	5.87	
(c)=	11.50	
$C_g = (a/b)*c =$	0.99	

Eq. 11.3-1 broken up

(eq. 11.3-1)

48" TRUSS ANALYSIS AND REPAIR

Member Analysis

TC - Typical Loading (Gravity)											
Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD											
<i>ref.</i>	Gravity Load Design Values						Grade & Loading Inputs				
	d	5.5	in	Depth of Member	Grade:	Doug Fir					
	b	1.5	in	Breadth of Member	Type:	DF Set Str					
	A	8.25	in ²	Area of Member	Load Duration:	10 Years/Live					
	S	7.56	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service					
	l _u	74	in	Unbraced length	Temperature:	In Service Dry & Temp. ≤100°F					
App. G	K _e	1		Buckling length Coefficient	Incising:	Incising not required					
					Repetitive member:	Spacing ≤ 24 inch oc					
3.3.3 Beam Stability Factor, C_L											
Tbl. 3.3-3	l _e	137	in	Effective length (flexure only)							
Eq. 3.3-5	R _B	18		Slenderness ratio							
	F _b *	2243	psi	Bending value times adjustment factors except C _{fu} , C _v , and C _L							
	F _{DE}	2470	psi								
Eq. 3.3-6	C _L	0.85									
3.7.1 Column Stability Factor, C_p											
Fig. 3F	d	1.5	in	Braced depth corresponding to x-x or y-y							
	l _e /d	49	<50	Slenderness ratio is good							
	F _c *	1870	psi	Compression value times factors except C _p							
		Yes		Braced by sheathing or gyp?							
	F _{CE}	1276155	psi								
	c	0.80									
Eq. 3.7-1	C _p	1.00									
4.4.2 Wood Trusses											
Sct. 3.7	l _e	74	in	Effective length (column only)							
	K _M	2300									
Tbl. F1	COV _E	0.25									
	K _T	0.59									
		No		Does the section 4.4.2.1 apply?							
Eq. 4.4-1	C _T	1.00									
3.9.1 Bending and Axial Tension											
	F _b *	2243	psi	Bending value times factors except C _L							
3.9.2 Bending and Axial Compression											
	l _{e1}	74	in								
Fig. 3H	d ₁	5.5	in	Wide face dimension							
	F _{CE1}	3133	psi > f _c								
Design Stress Value Table											
Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _i	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _b	1500	1.00	1.00	1.00	0.85	1.3	1.00	1.00	1.15		
F _t	1500	1.00	1.00	1.00		1.3		1.00			
F _v	180	1.00	1.00	1.00				1.00			
F _c	1700	1.00	1.00	1.00		1.1		1.00		1.00	
E	1900000		1.00	1.00				1.00			
E _{min}	690000		1.00	1.00				1.00			1.00

Summary values

F _b '	1914	psi
F _t '	1950	psi
F _v '	180	psi
F _c '	1869	psi
E'	1900000	psi
E _{min} '	690000	psi

BC - Typical Loading (Gravity)											
Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD											
ref.	Gravity Load Design Values						Grade & Loading Inputs				
	d	5.5	in	Depth of Member	Grade:	Hem Fir					
	b	1.5	in	Breadth of Member	Type:	HF #1					
	A	8.25	in ²	Area of Member	Load Duration:	10 Years/Live					
	S	7.56	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service					
	l _u	74	in	Unbraced length	Temperature:	In Service Dry & Temp. ≤100°F					
App. G	K _e	1		Buckling length Coefficient	Incising:	Incising not required					
					Repetitive member:	Spacing ≤ 24 inch oc					
3.3.3 Beam Stability Factor, C _L											
Tbl. 3.3-3	l _e	137	in	Effective length (flexure only)							
Eq. 3.3-5	R _B	18		Slenderness ratio							
	F _b *	1458	psi	Bending value times adjustment factors except C _{fu} , C _v , and C _L							
	F _{DE}	1969	psi								
Eq. 3.3-6	C _L	0.91									
3.7.1 Column Stability Factor, C _p											
Fig. 3F	d	1.5	in	Braced depth corresponding to x-x or y-y							
	l _e /d	49	<50	Slenderness ratio is good							
	F _c *	1485	psi	Compression value times factors except C _p							
		No		Braced by sheathing or gyp?							
	F _{CE}	186	psi								
	c	0.80									
Eq. 3.7-1	C _p	0.12									
4.4.2 Wood Trusses											
Sct. 3.7	l _e	74	in	Effective length (column only)							
	K _M	2300									
Tbl. F1	COV _E	0.25									
	K _T	0.59									
		No		Does the section 4.4.2.1 apply?							
Eq. 4.4-1	C _T	1.00									
3.9.1 Bending and Axial Tension											
	F _b *	1458	psi	Bending value times factors except C _L							
3.9.2 Bending and Axial Compression											
	l _{e1}	74	in								
Fig. 3H	d ₁	5.5	in	Wide face dimension							
	F _{CE1}	2497	psi > f _c								
Design Stress Value Table											
Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _i	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _b	975	1.00	1.00	1.00	0.91	1.3	1.00	1.00	1.15		
F _t	975	1.00	1.00	1.00		1.3		1.00			
F _v	150	1.00	1.00	1.00				1.00			
F _c	1350	1.00	1.00	1.00		1.1		1.00		0.12	
E	1500000		1.00	1.00				1.00			
E _{min}	550000		1.00	1.00				1.00			1.00

Summary values

F _b '	1322	psi
F _t '	1268	psi
F _v '	150	psi
F _c '	181	psi
E'	1500000	psi
E _{min} '	550000	psi

D1 - Typical Loading (Gravity)																							
Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD																							
ref.	Gravity Load Design Values						Grade & Loading Inputs																
	d	5.5	in	Depth of Member	Grade:	Doug Fir																	
	b	1.5	in	Breadth of Member	Type:	DF #2																	
	A	8.25	in ²	Area of Member	Load Duration:	10 Years/Live																	
	S	7.56	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service																	
	l _u	84	in	Unbraced length	Temperature:	In Service Dry & Temp. ≤100°F																	
App. G	K _e	1		Buckling length Coefficient	Incising:	Incising not required																	
					Repetitive member:	Spacing ≤ 24 inch oc																	
3.7.1 Column Stability Factor, C _p																							
Fig. 3F	d	1.5	in	Braced depth corresponding to x-x or y-y		Repair solution. Add 2x bracing at mid point. (N) C _p = 0.37																	
	l _e /d	56	<50	Slenderness ratio is ng																			
	F _c *	1485	psi	Compression value times factors except C _p																			
		No		Braced by sheathing or gyp?																			
	F _{cE}	152	psi																				
	c	0.80																					
Eq. 3.7-1	C _p	0.10																					
4.4.2 Wood Trusses																							
Sct. 3.7	l _e	84	in	Effective length (column only)		Summary values <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>F_t'</td> <td>1170</td> <td>psi</td> </tr> <tr> <td>F_c'</td> <td>549</td> <td>psi</td> </tr> <tr> <td>E'</td> <td>1600000</td> <td>psi</td> </tr> <tr> <td>E_{min}'</td> <td>580000</td> <td>psi</td> </tr> </table>						F _t '	1170	psi	F _c '	549	psi	E'	1600000	psi	E _{min} '	580000	psi
F _t '	1170	psi																					
F _c '	549	psi																					
E'	1600000	psi																					
E _{min} '	580000	psi																					
	K _M	2300																					
Tbl. F1	COV _E	0.25																					
	K _T	0.59																					
		No		Does the section 4.4.2.1 apply?																			
Eq. 4.4-1	C _T	1.00																					
Design Stress Value Table																							
Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _I	C _r	C _p	C _T												
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11												
Unit:	psi	-	-	-	-	-	-	-	-	-	-												
F _t	900	1.00	1.00	1.00		1.3		1.00															
F _c	1350	1.00	1.00	1.00		1.1		1.00		0.10													
E	1600000		1.00	1.00				1.00															
E _{min}	580000		1.00	1.00				1.00			1.00												

D - Typical Loading (Gravity)

Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD

ref.	Gravity Load Design Values				Grade & Loading Inputs						
	d	3.5	in	Depth of Member	Grade:	Doug Fir					
	b	1.5	in	Breadth of Member	Type:	DF Constr					
	A	5.25	in ²	Area of Member	Load Duration:	10 Years/Live					
	S	3.06	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service					
	l _u	47	in	Unbraced length	Temperature:	In Service Dry & Temp.≤100°F					
App. G	K _e	1		Buckling length Coefficient	Incising:	Incising not required					
					Repetitive member:	Spacing ≤ 24 inch oc					
3.7.1 Column Stability Factor, C _p											
Fig. 3F	d	1.5	in	Braced depth corresponding to x-x or y-y							
	l _e /d	31	<50	Slenderness ratio is good							
	F _c *	1650	psi	Compression value times factors except C _p							
		No		Braced by sheathing or gyp?							
	F _{cE}	460	psi								
	c	0.80									
Eq. 3.7-1	C _p	0.26									
4.4.2 Wood Trusses											
Sct. 3.7	l _e	47	in	Effective length (column only)							
	K _M	2300									
Tbl. F1	COV _E	0.25									
	K _T	0.59									
		No		Does the section 4.4.2.1 apply?							
Eq. 4.4-1	C _T	1.00									
Summary values											
	F _t '	1000	psi								
	F _c '	430	psi								
	E'	1500000	psi								
	E _{min} '	550000	psi								
Design Stress Value Table											
Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _i	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _t	1000	1.00	1.00	1.00		1.00		1.00			
F _c	1650	1.00	1.00	1.00		1.00		1.00		0.26	
E	1500000		1.00	1.00				1.00			
E _{min}	550000		1.00	1.00				1.00			1.00

V - Typical Loading (Gravity)

Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD

ref.	Gravity Load Design Values				Grade & Loading Inputs						
App. G	d	3.5	in	Depth of Member	Grade:	Doug Fir					
	b	1.5	in	Breadth of Member	Type:	DF Constr					
	A	5.25	in ²	Area of Member	Load Duration:	10 Years/Live					
	S	3.06	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service					
	l _u	36	in	Unbraced length	Temperature:	In Service Dry & Temp.≤100°F					
	K _e	1		Buckling length Coefficient	Incising:	Incising not required					
					Repetitive member:	Spacing ≤ 24 inch oc					
3.7.1 Column Stability Factor, C _p											
Fig. 3F	d	5.5	in	Braced depth corresponding to x-x or y-y							
	l _e /d	7	<50	Slenderness ratio is good							
	F _c *	1650	psi	Compression value times factors except C _p							
		No		Braced by sheathing or gyp?							
	F _{cE}	10552	psi								
Eq. 3.7-1	c	0.80									
	C _p	0.97									
4.4.2 Wood Trusses											
Sct. 3.7	l _e	36	in	Effective length (column only)							
	K _M	2300									
Tbl. F1	COV _E	0.25									
	K _T	0.59									
		No		Does the section 4.4.2.1 apply?							
Eq. 4.4-1	C _T	1.00									
Summary values											
	F _t '	1000	psi								
	F _c '	1593	psi								
	E'	1500000	psi								
	E _{min} '	550000	psi								
Design Stress Value Table											
Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _i	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _t	1000	1.00	1.00	1.00		1.00		1.00			
F _c	1650	1.00	1.00	1.00		1.00		1.00		0.97	
E	1500000		1.00	1.00				1.00			
E _{min}	550000		1.00	1.00				1.00			1.00

TC - Typical Loading (Uplift)

Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD

ref.	Gravity Load Design Values			Grade & Loading Inputs		
	d	5.5	in	Depth of Member	Grade:	Doug Fir
	b	1.5	in	Breadth of Member	Type:	DF Set Str
	A	8.25	in ²	Area of Member	Load Duration:	10 Min/Wind or EQ
	S	7.56	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service
	l _u	74	in	Unbraced length	Temperature:	In Service Dry & Temp. ≤100°F
App. G	K _e	1		Buckling length Coefficient	Incising:	Incising not required
					Repetitive member:	Spacing ≤ 24 inch oc

3.3.3 Beam Stability Factor, C_L

Tbl. 3.3-3	l _e	137	in	Effective length (flexure only)
Eq. 3.3-5	R _B	18		Slenderness ratio
	F _b *	3588	psi	Bending value times adjustment factors except C _{fu} , C _v , and C _L
	F _{DE}	2470	psi	
Eq. 3.3-6	C _L	0.63		

3.7.1 Column Stability Factor, C_p

Fig. 3F	d	1.5	in	Braced depth corresponding to x-x or y-y
	l _e /d	49	<50	Slenderness ratio is good
	F _c *	2992	psi	Compression value times factors except C _p
		No		Braced by sheathing or gyp?
	F _{CE}	233	psi	
	c	0.80		
Eq. 3.7-1	C _p	0.08		

4.4.2 Wood Trusses

Sct. 3.7	l _e	74	in	Effective length (column only)
	K _M	2300		
Tbl. F1	COV _E	0.25		
	K _T	0.59		
		No		Does the section 4.4.2.1 apply?
Eq. 4.4-1	C _T	1.00		

3.9.1 Bending and Axial Tension

F _b *	3588	psi	Bending value times factors except C _L
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3.9.2 Bending and Axial Compression

	l _{e1}	74	in	
Fig. 3H	d ₁	5.5	in	Wide face dimension
	F _{CE1}	3133	psi > f _c	

Summary values

F _b '	2274	psi
F _t '	3120	psi
F _v '	288	psi
F _c '	229	psi
E'	1900000	psi
E _{min} '	690000	psi

Design Stress Value Table

Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _i	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _b	1500	1.60	1.00	1.00	0.63	1.3	1.00	1.00	1.15		
F _t	1500	1.60	1.00	1.00		1.3		1.00			
F _v	180	1.60	1.00	1.00				1.00			
F _c	1700	1.60	1.00	1.00		1.1		1.00		0.08	
E	1900000		1.00	1.00				1.00			
E _{min}	690000		1.00	1.00				1.00			1.00

BC - Typical Loading (Uplift)

Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD

ref.	Gravity Load Design Values	Grade & Loading Inputs
	d 5.5 in Depth of Member	Grade: Hem Fir
	b 1.5 in Breadth of Member	Type: HF #1
	A 8.25 in ² Area of Member	Load Duration: 10 Min/Wind or EQ
	S 7.56 in ³ Section Modulus of Member	Moisture: ≤19% @ fab. & ≤19% in service
	l _u 74 in Unbraced length	Temperature: In Service Dry & Temp. ≤100°F
App. G	K _e 1 Buckling length Coefficient	Incising: Incising not required
		Repetitive member: Spacing ≤ 24 inch oc

3.3.3 Beam Stability Factor, C_L

Tbl. 3.3-3	l _e 137 in	Effective length (flexure only)
Eq. 3.3-5	R _B 18	Slenderness ratio
	F _b * 2332 psi	Bending value times adjustment factors except C _{fu} , C _v , and C _L
	F _{DE} 1969 psi	
Eq. 3.3-6	C _L 0.74	

3.7.1 Column Stability Factor, C_p

Fig. 3F	d 1.5 in	Braced depth corresponding to x-x or y-y
	l _e /d 49 <50	Slenderness ratio is good
	F _c * 2376 psi	Compression value times factors except C _p
	Yes	Braced by sheathing or gyp?
	F _{CE} 1017225 psi	
	c 0.80	
Eq. 3.7-1	C _p 1.00	

4.4.2 Wood Trusses

Sct. 3.7	l _e 74 in	Effective length (column only)
	K _M 2300	
Tbl. F1	COV _E 0.25	
	K _T 0.59	
	No	Does the section 4.4.2.1 apply?
Eq. 4.4-1	C _T 1.00	

3.9.1 Bending and Axial Tension

F _b *	2332 psi	Bending value times factors except C _L
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Summary values

F _b '	1724 psi
F _t '	2028 psi
F _v '	240 psi
F _c '	2375 psi
E'	1500000 psi
E _{min} '	550000 psi

3.9.2 Bending and Axial Compression

	l _{e1} 74 in	
Fig. 3H	d ₁ 5.5 in	Wide face dimension
	F _{CE1} 2497 psi > f _c	

Design Stress Value Table

Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _i	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _b	975	1.60	1.00	1.00	0.74	1.3	1.00	1.00	1.15		
F _t	975	1.60	1.00	1.00		1.3		1.00			
F _v	150	1.60	1.00	1.00				1.00			
F _c	1350	1.60	1.00	1.00		1.1		1.00		1.00	
E	1500000		1.00	1.00				1.00			
E _{min}	550000		1.00	1.00				1.00			1.00

D1 - Typical Loading (Uplift)

Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD

ref.	Gravity Load Design Values				Grade & Loading Inputs						
	d	5.5	in	Depth of Member	Grade:	Doug Fir					
	b	1.5	in	Breadth of Member	Type:	DF #2					
	A	8.25	in ²	Area of Member	Load Duration:	10 Min/Wind or EQ					
	S	7.56	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service					
	l _u	84	in	Unbraced length	Temperature:	In Service Dry & Temp.≤100°F					
App. G	K _e	1		Buckling length Coefficient	Incising:	Incising not required					
					Repetitive member:	Spacing ≤ 24 inch oc					
3.7.1 Column Stability Factor, C _p											
Fig. 3F	d	1.5	in	Braced depth corresponding to x-x or y-y							
	l _e /d	56	<50	Slenderness ratio is	ng	Repair solution.					
	F _c *	2376	psi	Compression value times factors except C _p		Add 2x bracing at mid point.					
		No		Braced by sheathing or gyp?	(N) C _p =	0.24					
	F _{cE}	152	psi								
	c	0.80									
Eq. 3.7-1	C _p	0.06									
4.4.2 Wood Trusses											
Sct. 3.7	l _e	84	in	Effective length (column only)							
	K _M	2300									
Tbl. F1	COV _E	0.25									
	K _T	0.59									
		No		Does the section 4.4.2.1 apply?							
Eq. 4.4-1	C _T	1.00									
Summary values											
	F _t '	1872	psi								
	F _c '	570	psi								
	E'	1600000	psi								
	E _{min} '	580000	psi								
Design Stress Value Table											
Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _i	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _t	900	1.60	1.00	1.00		1.3		1.00			
F _c	1350	1.60	1.00	1.00		1.1		1.00		0.06	
E	1600000		1.00	1.00				1.00			
E _{min}	580000		1.00	1.00				1.00			1.00

D - Typical Loading (Uplift)

Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD

ref.	Gravity Load Design Values				Grade & Loading Inputs						
	d	3.5	in	Depth of Member	Grade:	Doug Fir					
	b	1.5	in	Breadth of Member	Type:	DF Constr					
	A	5.25	in ²	Area of Member	Load Duration:	10 Min/Wind or EQ					
	S	3.06	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service					
	l _u	47	in	Unbraced length	Temperature:	In Service Dry & Temp.≤100°F					
App. G	K _e	1		Buckling length Coefficient	Incising:	Incising not required					
					Repetitive member:	Spacing ≤ 24 inch oc					
3.7.1 Column Stability Factor, C _p											
Fig. 3F	d	1.5	in	Braced depth corresponding to x-x or y-y							
	l _e /d	31	<50	Slenderness ratio is good							
	F _c *	2640	psi	Compression value times factors except C _p							
		No		Braced by sheathing or gyp?							
	F _{cE}	460	psi								
	c	0.80									
Eq. 3.7-1	C _p	0.17									
4.4.2 Wood Trusses											
Sct. 3.7	l _e	47	in	Effective length (column only)							
	K _M	2300									
Tbl. F1	COV _E	0.25									
	K _T	0.59									
		No		Does the section 4.4.2.1 apply?							
Eq. 4.4-1	C _T	1.00									
Summary values											
	F _t '	1600	psi								
	F _c '	443	psi								
	E'	1500000	psi								
	E _{min} '	550000	psi								
Design Stress Value Table											
Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _i	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _t	1000	1.60	1.00	1.00		1.00		1.00			
F _c	1650	1.60	1.00	1.00		1.00		1.00		0.17	
E	1500000		1.00	1.00				1.00			
E _{min}	550000		1.00	1.00				1.00			1.00

V - Typical Loading (Uplift)

Code References to 2018 NDS & Supplement - Sawn lumber Only - ASD

ref.	Gravity Load Design Values				Grade & Loading Inputs						
	d	3.5	in	Depth of Member	Grade:	Doug Fir					
	b	1.5	in	Breadth of Member	Type:	DF Constr					
	A	5.25	in ²	Area of Member	Load Duration:	10 Min/Wind or EQ					
	S	3.06	in ³	Section Modulus of Member	Moisture:	≤19% @ fab. & ≤19% in service					
	l _u	36	in	Unbraced length	Temperature:	In Service Dry & Temp.≤100°F					
App. G	K _e	1		Buckling length Coefficient	Incising:	Incising not required					
					Repetitive member:	Spacing ≤ 24 inch oc					
3.7.1 Column Stability Factor, C _p											
Fig. 3F	d	1.5	in	Braced depth corresponding to x-x or y-y							
	l _e /d	24	<50	Slenderness ratio is good							
	F _c *	2640	psi	Compression value times factors except C _p							
		No		Braced by sheathing or gyp?							
	F _{cE}	785	psi								
	c	0.80									
Eq. 3.7-1	C _p	0.28									
4.4.2 Wood Trusses											
Sct. 3.7	l _e	36	in	Effective length (column only)							
	K _M	2300									
Tbl. F1	COV _E	0.25									
	K _T	0.59									
		No		Does the section 4.4.2.1 apply?							
Eq. 4.4-1	C _T	1.00									
Summary values											
	F _t '	1600	psi								
	F _c '	729	psi								
	E'	1500000	psi								
	E _{min} '	550000	psi								
Design Stress Value Table											
Value:	Base	C _D	C _M	C _t	C _L	C _F	C _{fu}	C _i	C _r	C _p	C _T
Ref:	-	4.3.2	4.3.3	4.3.4	4.3.5	4.3.6	4.3.7	4.3.8	4.3.9	4.3.10	4.3.11
Unit:	psi	-	-	-	-	-	-	-	-	-	-
F _t	1000	1.60	1.00	1.00		1.00		1.00			
F _c	1650	1.60	1.00	1.00		1.00		1.00		0.28	
E	1500000		1.00	1.00				1.00			
E _{min}	550000		1.00	1.00				1.00			1.00

Assigned Loads in SAP

Tributary width = 2 ft

Dead load - Top Chord = 10 psf

Dead load - Bot Chord = 5 psf

Snow load = 40 psf

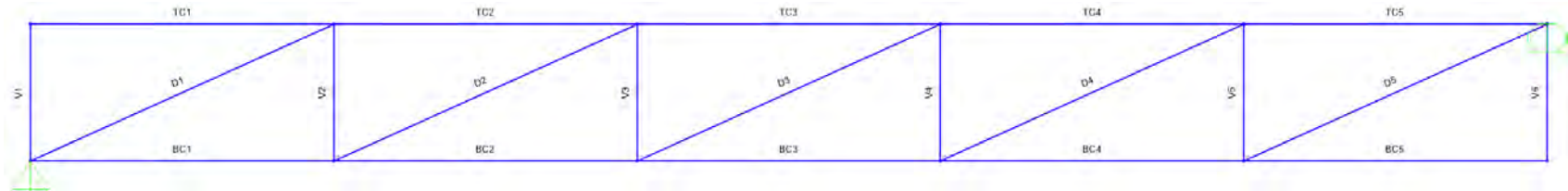
Wind C&C (zone 2, 1, 1') = -45 psf, -33 psf, -18 psf

Load combinations (ASD)

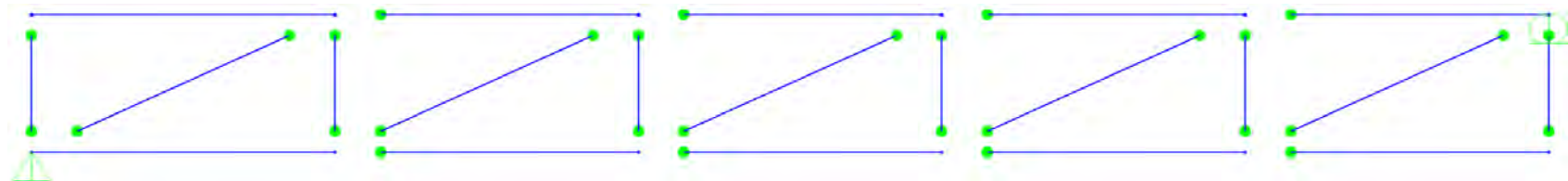
1. $D + S$

2. $0.6D + 0.6W$

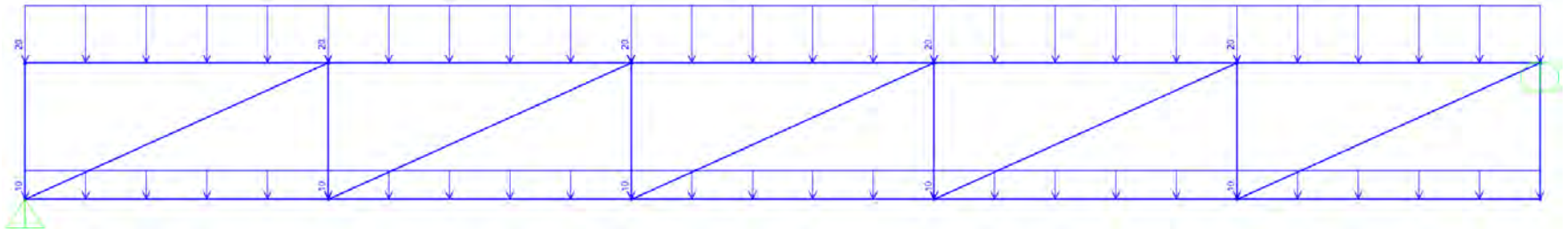
Truss Member Designations



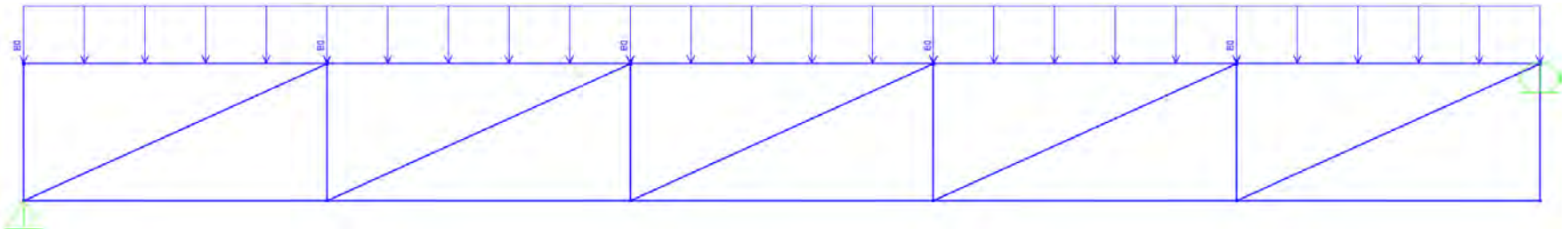
Truss Member Releases



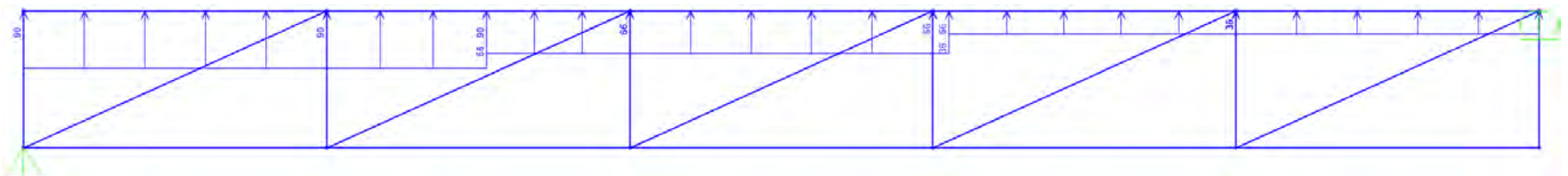
Applied Dead Load, plf



Applied Snow Load, plf



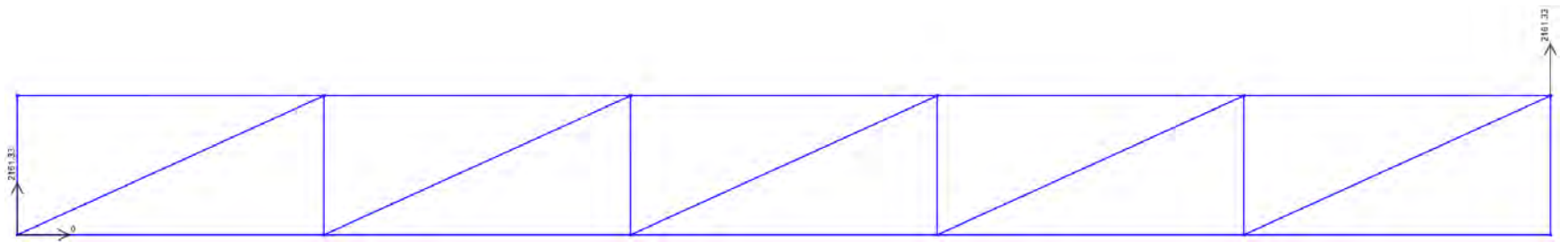
Applied Wind uplift, plf



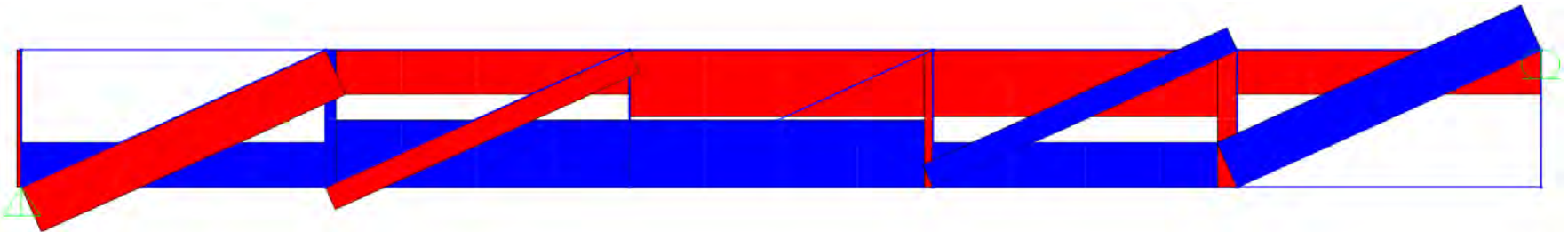
Load Combination:

D+ S

Reactions

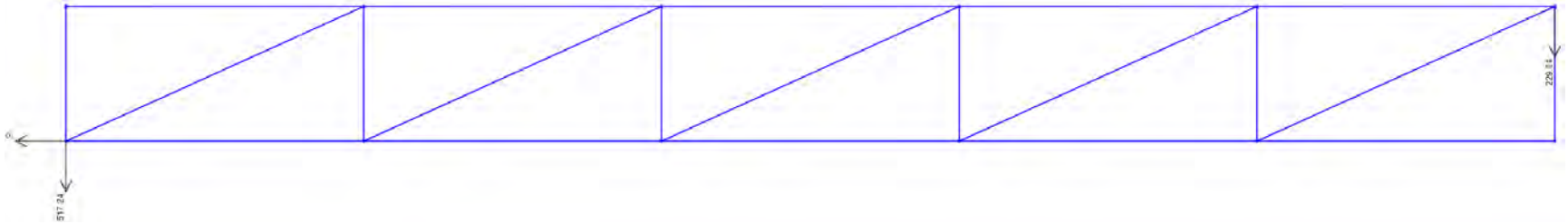


Axial Force

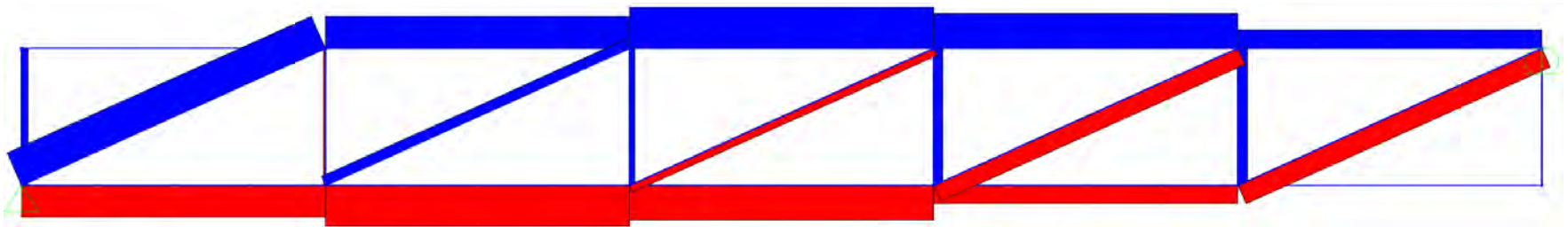


Load Combination:
 $0.6D + 0.6W$

Reactions



Axial Force



Member Connections

TYP TRUSS

Summary Design Values (psi) - See Member Evaluation

	TC	BC	D1	D	V
Fb'	1914	1322	-	-	-
Ft'	1950	1268	1170	1000	1000
Fv'	180	150	-	-	-
Fc'	1869	181	549	430	1593
A	8.25	8.25	8.25	5.25	5.25
S	7.56	7.56	7.56	3.06	3.06

Processed Model Results - D+S - Top and Bottom Chord

Frame	Output Case	P	V2	M3	Name	Fb'	Ft'	Fv'	Fc'	f _b	f _t	f _v	f _c	DCR Bending	DCR Tension	DCR Shear	DCR Compression	DCR Comb T+B	DCR Comb C+B
Text	Text	Lb	Lb	Lb-ft	-	psi	psi	psi	psi	psi	psi	psi	psi	0.64	0.55	0.26	0.37	0.64	0.96
TC1	D+S	0	-393	0	TC	1914	1950	180	1869	0	0	48	0	0.00	0.02	0.26	0.00	0.00	0.00
TC1	D+S	0	-196	579	TC	1914	1950	180	1869	919	0	24	0	0.48	0.01	0.13	0.00	0.41	0.48
TC1	D+S	0	0	772	TC	1914	1950	180	1869	1225	0	0	0	0.64	0.00	0.00	0.00	0.55	0.64
TC1	D+S	0	196	579	TC	1914	1950	180	1869	919	0	24	0	0.48	0.01	0.13	0.00	0.41	0.48
TC1	D+S	0	393	0	TC	1914	1950	180	1869	0	0	48	0	0.00	0.02	0.26	0.00	0.00	0.00
TC2	D+S	-3843	-393	0	TC	1914	1950	180	1869	0	0	48	466	0.00	0.02	0.26	0.25	0.00	0.06
TC2	D+S	-3843	-196	579	TC	1914	1950	180	1869	919	0	24	466	0.48	0.01	0.13	0.25	0.41	0.63
TC2	D+S	-3843	0	772	TC	1914	1950	180	1869	1225	0	0	466	0.64	0.00	0.00	0.25	0.55	0.81
TC2	D+S	-3843	196	579	TC	1914	1950	180	1869	919	0	24	466	0.48	0.01	0.13	0.25	0.41	0.63
TC2	D+S	-3843	393	0	TC	1914	1950	180	1869	0	0	48	466	0.00	0.02	0.26	0.25	0.00	0.06
TC3	D+S	-5764	-393	0	TC	1914	1950	180	1869	0	0	48	699	0.00	0.02	0.26	0.37	0.00	0.14
TC3	D+S	-5764	-196	579	TC	1914	1950	180	1869	919	0	24	699	0.48	0.01	0.13	0.37	0.41	0.76
TC3	D+S	-5764	0	772	TC	1914	1950	180	1869	1225	0	0	699	0.64	0.00	0.00	0.37	0.55	0.96
TC3	D+S	-5764	196	579	TC	1914	1950	180	1869	919	0	24	699	0.48	0.01	0.13	0.37	0.41	0.76
TC3	D+S	-5764	393	0	TC	1914	1950	180	1869	0	0	48	699	0.00	0.02	0.26	0.37	0.00	0.14
TC4	D+S	-5764	-393	0	TC	1914	1950	180	1869	0	0	48	699	0.00	0.02	0.26	0.37	0.00	0.14
TC4	D+S	-5764	-196	579	TC	1914	1950	180	1869	919	0	24	699	0.48	0.01	0.13	0.37	0.41	0.76
TC4	D+S	-5764	0	772	TC	1914	1950	180	1869	1225	0	0	699	0.64	0.00	0.00	0.37	0.55	0.96
TC4	D+S	-5764	196	579	TC	1914	1950	180	1869	919	0	24	699	0.48	0.01	0.13	0.37	0.41	0.76
TC4	D+S	-5764	393	0	TC	1914	1950	180	1869	0	0	48	699	0.00	0.02	0.26	0.37	0.00	0.14
TC5	D+S	-3843	-393	0	TC	1914	1950	180	1869	0	0	48	466	0.00	0.02	0.26	0.25	0.00	0.06
TC5	D+S	-3843	-196	579	TC	1914	1950	180	1869	919	0	24	466	0.48	0.01	0.13	0.25	0.41	0.63
TC5	D+S	-3843	0	772	TC	1914	1950	180	1869	1225	0	0	466	0.64	0.00	0.00	0.25	0.55	0.81
TC5	D+S	-3843	196	579	TC	1914	1950	180	1869	919	0	24	466	0.48	0.01	0.13	0.25	0.41	0.63
TC5	D+S	-3843	393	0	TC	1914	1950	180	1869	0	0	48	466	0.00	0.02	0.26	0.25	0.00	0.06
BC1	D+S	3843	-39	0	BC	1322	1268	150	181	0	466	5	0	0.00	0.37	0.03	0.00	0.37	0.00
BC1	D+S	3843	-20	58	BC	1322	1268	150	181	92	466	2	0	0.07	0.37	0.02	0.00	0.43	0.07
BC1	D+S	3843	0	77	BC	1322	1268	150	181	123	466	0	0	0.09	0.37	0.00	0.00	0.45	0.09
BC1	D+S	3843	20	58	BC	1322	1268	150	181	92	466	2	0	0.07	0.37	0.02	0.00	0.43	0.07
BC1	D+S	3843	39	0	BC	1322	1268	150	181	0	466	5	0	0.00	0.37	0.03	0.00	0.37	0.00
BC2	D+S	5764	-39	0	BC	1322	1268	150	181	0	699	5	0	0.00	0.55	0.03	0.00	0.55	0.00
BC2	D+S	5764	-20	58	BC	1322	1268	150	181	92	699	2	0	0.07	0.55	0.02	0.00	0.61	0.07
BC2	D+S	5764	0	77	BC	1322	1268	150	181	123	699	0	0	0.09	0.55	0.00	0.00	0.64	0.09
BC2	D+S	5764	20	58	BC	1322	1268	150	181	92	699	2	0	0.07	0.55	0.02	0.00	0.61	0.07
BC2	D+S	5764	39	0	BC	1322	1268	150	181	0	699	5	0	0.00	0.55	0.03	0.00	0.55	0.00
BC3	D+S	5764	-39	0	BC	1322	1268	150	181	0	699	5	0	0.00	0.55	0.03	0.00	0.55	0.00
BC3	D+S	5764	-20	58	BC	1322	1268	150	181	92	699	2	0	0.07	0.55	0.02	0.00	0.61	0.07
BC3	D+S	5764	0	77	BC	1322	1268	150	181	123	699	0	0	0.09	0.55	0.00	0.00	0.64	0.09
BC3	D+S	5764	20	58	BC	1322	1268	150	181	92	699	2	0	0.07	0.55	0.02	0.00	0.61	0.07
BC3	D+S	5764	39	0	BC	1322	1268	150	181	0	699	5	0	0.00	0.55	0.03	0.00	0.55	0.00
BC4	D+S	3843	-39	0	BC	1322	1268	150	181	0	466	5	0	0.00	0.37	0.03	0.00	0.37	0.00
BC4	D+S	3843	-20	58	BC	1322	1268	150	181	92	466	2	0	0.07	0.37	0.02	0.00	0.43	0.07
BC4	D+S	3843	0	77	BC	1322	1268	150	181	123	466	0	0	0.09	0.37	0.00	0.00	0.45	0.09
BC4	D+S	3843	20	58	BC	1322	1268	150	181	92	466	2	0	0.07	0.37	0.02	0.00	0.43	0.07
BC4	D+S	3843	39	0	BC	1322	1268	150	181	0	466	5	0	0.00	0.37	0.03	0.00	0.37	0.00
BC5	D+S	0	-39	0	BC	1322	1268	150	181	0	0	5	0	0.00	0.00	0.03	0.00	0.00	0.00
BC5	D+S	0	-20	58	BC	1322	1268	150	181	92	0	2	0	0.07	0.00	0.02	0.00	0.06	0.07
BC5	D+S	0	0	77	BC	1322	1268	150	181	123	0	0	0	0.09	0.00	0.00	0.00	0.08	0.09
BC5	D+S	0	20	58	BC	1322	1268	150	181	92	0	2	0	0.07	0.00	0.02	0.00	0.06	0.07
BC5	D+S	0	39	0	BC	1322	1268	150	181	0	0	5	0	0.00	0.00	0.03	0.00	0.00	0.00

Processed Model Results - D+S - Web Members

Frame	Output Case	P	Name	Ft	Fc	f _t	f _c	DCR Tension	DCR Compression
Text	Text	Lb	-	psi	psi	psi	psi	0.51	0.93
D1	D+S	-4214	D1	1170	549	0	511	0.00	0.93
D1	D+S	-4214	D1	1170	549	0	511	0.00	0.93
D1	D+S	-4214	D1	1170	549	0	511	0.00	0.93
D2	D+S	-2107	D	1000	430	0	255	0.00	0.59
D2	D+S	-2107	D	1000	430	0	255	0.00	0.59
D2	D+S	-2107	D	1000	430	0	255	0.00	0.59
D3	D+S	0	D	1000	430	0	0	0.00	0.00
D3	D+S	0	D	1000	430	0	0	0.00	0.00
D3	D+S	0	D	1000	430	0	0	0.00	0.00
D4	D+S	2107	D	1000	430	255	0	0.26	0.00
D4	D+S	2107	D	1000	430	255	0	0.26	0.00
D4	D+S	2107	D	1000	430	255	0	0.26	0.00
D5	D+S	4214	D	1000	430	511	0	0.51	0.00
D5	D+S	4214	D	1000	430	511	0	0.51	0.00
D5	D+S	4214	D	1000	430	511	0	0.51	0.00
V1	D+S	-393	V	1000	1593	0	48	0.00	0.03
V1	D+S	-393	V	1000	1593	0	48	0.00	0.03
V1	D+S	-393	V	1000	1593	0	48	0.00	0.03
V2	D+S	943	V	1000	1593	114	0	0.11	0.00
V2	D+S	943	V	1000	1593	114	0	0.11	0.00
V2	D+S	943	V	1000	1593	114	0	0.11	0.00
V3	D+S	79	V	1000	1593	10	0	0.01	0.00
V3	D+S	79	V	1000	1593	10	0	0.01	0.00

<- D1 w/ added brace at mid span, would fail otherwise.

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V3	D+S	79	V	1000	1593	10	0	0.01	0.00
V4	D+S	-786	V	1000	1593	0	95	0.00	0.06
V4	D+S	-786	V	1000	1593	0	95	0.00	0.06
V4	D+S	-786	V	1000	1593	0	95	0.00	0.06
V5	D+S	-1650	V	1000	1593	0	200	0.00	0.13
V5	D+S	-1650	V	1000	1593	0	200	0.00	0.13
V5	D+S	-1650	V	1000	1593	0	200	0.00	0.13
V6	D+S	39	V	1000	1593	5	0	0.00	0.00
V6	D+S	39	V	1000	1593	5	0	0.00	0.00
V6	D+S	39	V	1000	1593	5	0	0.00	0.00

TYP TRUSS

Summary Design Values (psi) - See Member Evaluation

	TC	BC	D1	D	V
Fb'	2274	1724	-	-	-
Ft'	3120	2028	1872	1600	1600
Fv'	288	240	-	-	-
Fc'	229	2375	570	443	729
A	8.25	8.25	8.25	5.25	5.25
S	7.56	7.56	-	-	-

Processed Model Results - 0.6D+0.6W - Top and Bottom Chord

Frame	Output Case	P	V2	M3	Name	Fb'	Ft'	Fv'	Fc'	f _b	f _t	f _v	f _c	DCR Bending	DCR Tension	DCR Shear	DCR Compression	DCR Comb T+B	DCR Comb C+B
Text	Text	Lb	Lb	Lb-ft	-	psi	psi	psi	psi	psi	psi	psi	psi	0.23	0.01	0.07	0.05	0.15	0.23
TC1	0.6D + 0.6W	0	165	0	TC	2274	3120	288	229	0	0	20	0	0.00	0.01	0.07	0.00	0.00	0.00
TC1	0.6D + 0.6W	0	83	-243	TC	2274	3120	288	229	-386	0	10	0	0.17	0.00	0.03	0.00	0.11	0.17
TC1	0.6D + 0.6W	0	0	-324	TC	2274	3120	288	229	-515	0	0	0	0.23	0.00	0.00	0.00	0.14	0.23
TC1	0.6D + 0.6W	0	-83	-243	TC	2274	3120	288	229	-386	0	10	0	0.17	0.00	0.03	0.00	0.11	0.17
TC1	0.6D + 0.6W	0	-165	0	TC	2274	3120	288	229	0	0	20	0	0.00	0.01	0.07	0.00	0.00	0.00
TC2	0.6D + 0.6W	835	152	0	TC	2274	3120	288	229	0	101	18	0	0.00	0.01	0.06	0.00	0.03	0.00
TC2	0.6D + 0.6W	835	70	-218	TC	2274	3120	288	229	-346	101	8	0	0.15	0.00	0.03	0.00	0.13	0.15
TC2	0.6D + 0.6W	835	-13	-275	TC	2274	3120	288	229	-436	101	2	0	0.19	0.00	0.01	0.00	0.15	0.19
TC2	0.6D + 0.6W	835	-70	-191	TC	2274	3120	288	229	-303	101	8	0	0.13	0.00	0.03	0.00	0.12	0.13
TC2	0.6D + 0.6W	835	-124	0	TC	2274	3120	288	229	0	101	15	0	0.00	0.00	0.05	0.00	0.03	0.00
TC3	0.6D + 0.6W	1070	108	0	TC	2274	3120	288	229	0	130	13	0	0.00	0.00	0.05	0.00	0.04	0.00
TC3	0.6D + 0.6W	1070	54	-160	TC	2274	3120	288	229	-254	130	7	0	0.11	0.00	0.02	0.00	0.11	0.11
TC3	0.6D + 0.6W	1070	0	-213	TC	2274	3120	288	229	-338	130	0	0	0.15	0.00	0.00	0.00	0.14	0.15
TC3	0.6D + 0.6W	1070	-54	-160	TC	2274	3120	288	229	-254	130	7	0	0.11	0.00	0.02	0.00	0.11	0.11
TC3	0.6D + 0.6W	1070	-108	0	TC	2274	3120	288	229	0	130	13	0	0.00	0.00	0.05	0.00	0.04	0.00
TC4	0.6D + 0.6W	892	45	0	TC	2274	3120	288	229	0	108	5	0	0.00	0.00	0.02	0.00	0.03	0.00
TC4	0.6D + 0.6W	892	19	-57	TC	2274	3120	288	229	-90	108	2	0	0.04	0.00	0.01	0.00	0.06	0.04
TC4	0.6D + 0.6W	892	0	-75	TC	2274	3120	288	229	-119	108	0	0	0.05	0.00	0.00	0.00	0.07	0.05
TC4	0.6D + 0.6W	892	-19	-56	TC	2274	3120	288	229	-89	108	2	0	0.04	0.00	0.01	0.00	0.06	0.04
TC4	0.6D + 0.6W	892	-38	0	TC	2274	3120	288	229	0	108	5	0	0.00	0.00	0.02	0.00	0.03	0.00
TC5	0.6D + 0.6W	478	38	0	TC	2274	3120	288	229	0	58	5	0	0.00	0.00	0.02	0.00	0.02	0.00
TC5	0.6D + 0.6W	478	19	-56	TC	2274	3120	288	229	-88	58	2	0	0.04	0.00	0.01	0.00	0.04	0.04
TC5	0.6D + 0.6W	478	0	-74	TC	2274	3120	288	229	-118	58	0	0	0.05	0.00	0.00	0.00	0.05	0.05
TC5	0.6D + 0.6W	478	-19	-56	TC	2274	3120	288	229	-88	58	2	0	0.04	0.00	0.01	0.00	0.04	0.04
TC5	0.6D + 0.6W	478	-38	0	TC	2274	3120	288	229	0	58	5	0	0.00	0.00	0.02	0.00	0.02	0.00
BC1	0.6D + 0.6W	-835	-24	0	BC	1724	2028	240	2375	0	0	3	101	0.00	0.00	0.01	0.04	0.00	0.00
BC1	0.6D + 0.6W	-835	-12	35	BC	1724	2028	240	2375	55	0	1	101	0.03	0.00	0.01	0.04	0.02	0.04
BC1	0.6D + 0.6W	-835	0	46	BC	1724	2028	240	2375	74	0	0	101	0.04	0.00	0.00	0.04	0.03	0.05
BC1	0.6D + 0.6W	-835	12	35	BC	1724	2028	240	2375	55	0	1	101	0.03	0.00	0.01	0.04	0.02	0.04
BC1	0.6D + 0.6W	-835	24	0	BC	1724	2028	240	2375	0	0	3	101	0.00	0.00	0.01	0.04	0.00	0.00
BC2	0.6D + 0.6W	-1070	-24	0	BC	1724	2028	240	2375	0	0	3	130	0.00	0.00	0.01	0.05	0.00	0.00
BC2	0.6D + 0.6W	-1070	-12	35	BC	1724	2028	240	2375	55	0	1	130	0.03	0.00	0.01	0.05	0.02	0.04
BC2	0.6D + 0.6W	-1070	0	46	BC	1724	2028	240	2375	74	0	0	130	0.04	0.00	0.00	0.05	0.03	0.05
BC2	0.6D + 0.6W	-1070	12	35	BC	1724	2028	240	2375	55	0	1	130	0.03	0.00	0.01	0.05	0.02	0.04
BC2	0.6D + 0.6W	-1070	24	0	BC	1724	2028	240	2375	0	0	3	130	0.00	0.00	0.01	0.05	0.00	0.00
BC3	0.6D + 0.6W	-892	-24	0	BC	1724	2028	240	2375	0	0	3	108	0.00	0.00	0.01	0.05	0.00	0.00
BC3	0.6D + 0.6W	-892	-12	35	BC	1724	2028	240	2375	55	0	1	108	0.03	0.00	0.01	0.05	0.02	0.04
BC3	0.6D + 0.6W	-892	0	46	BC	1724	2028	240	2375	74	0	0	108	0.04	0.00	0.00	0.05	0.03	0.05
BC3	0.6D + 0.6W	-892	12	35	BC	1724	2028	240	2375	55	0	1	108	0.03	0.00	0.01	0.05	0.02	0.04
BC3	0.6D + 0.6W	-892	24	0	BC	1724	2028	240	2375	0	0	3	108	0.00	0.00	0.01	0.05	0.00	0.00
BC4	0.6D + 0.6W	-478	-24	0	BC	1724	2028	240	2375	0	0	3	58	0.00	0.00	0.01	0.02	0.00	0.00
BC4	0.6D + 0.6W	-478	-12	35	BC	1724	2028	240	2375	55	0	1	58	0.03	0.00	0.01	0.02	0.02	0.03
BC4	0.6D + 0.6W	-478	0	46	BC	1724	2028	240	2375	74	0	0	58	0.04	0.00	0.00	0.02	0.03	0.04
BC4	0.6D + 0.6W	-478	12	35	BC	1724	2028	240	2375	55	0	1	58	0.03	0.00	0.01	0.02	0.02	0.03
BC4	0.6D + 0.6W	-478	24	0	BC	1724	2028	240	2375	0	0	3	58	0.00	0.00	0.01	0.02	0.00	0.00
BC5	0.6D + 0.6W	0	-24	0	BC	1724	2028	240	2375	0	0	3	0	0.00	0.00	0.01	0.00	0.00	0.00
BC5	0.6D + 0.6W	0	-12	35	BC	1724	2028	240	2375	55	0	1	0	0.03	0.00	0.01	0.00	0.02	0.03
BC5	0.6D + 0.6W	0	0	46	BC	1724	2028	240	2375	74	0	0	0	0.04	0.00	0.00	0.00	0.03	0.04
BC5	0.6D + 0.6W	0	12	35	BC	1724	2028	240	2375	55	0	1	0	0.03	0.00	0.01	0.00	0.02	0.03
BC5	0.6D + 0.6W	0	24	0	BC	1724	2028	240	2375	0	0	3	0	0.00	0.00	0.01	0.00	0.00	0.00

Processed Model Results - 0.6D+0.6W - Web Members

Frame	Output Case	P	Name	Ft'	Fc'	f _t	f _c	DCR Tension	DCR Compression
Text	Text	Lb	-	psi	psi	psi	psi	0.06	0.14
D1	0.6D + 0.6W	916	D1	1872	570	111	0	0.06	0.00
D1	0.6D + 0.6W	916	D1	1872	570	111	0	0.06	0.00
D1	0.6D + 0.6W	916	D1	1872	570	111	0	0.06	0.00
D2	0.6D + 0.6W	257	D	1600	443	31	0	0.02	0.00
D2	0.6D + 0.6W	257	D	1600	443	31	0	0.02	0.00
D2	0.6D + 0.6W	257	D	1600	443	31	0	0.02	0.00
D3	0.6D + 0.6W	-195	D	1600	443	0	24	0.00	0.05
D3	0.6D + 0.6W	-195	D	1600	443	0	24	0.00	0.05
D3	0.6D + 0.6W	-195	D	1600	443	0	24	0.00	0.05
D4	0.6D + 0.6W	-454	D	1600	443	0	55	0.00	0.12
D4	0.6D + 0.6W	-454	D	1600	443	0	55	0.00	0.12
D4	0.6D + 0.6W	-454	D	1600	443	0	55	0.00	0.12
D5	0.6D + 0.6W	-524	D	1600	443	0	63	0.00	0.14
D5	0.6D + 0.6W	-524	D	1600	443	0	63	0.00	0.14
D5	0.6D + 0.6W	-524	D	1600	443	0	63	0.00	0.14
V1	0.6D + 0.6W	165	V	1600	729	20	0	0.01	0.00
V1	0.6D + 0.6W	165	V	1600	729	20	0	0.01	0.00
V1	0.6D + 0.6W	165	V	1600	729	20	0	0.01	0.00
V2	0.6D + 0.6W	-58	V	1600	729	0	7	0.00	0.01
V2	0.6D + 0.6W	-58	V	1600	729	0	7	0.00	0.01
V2	0.6D + 0.6W	-58	V	1600	729	0	7	0.00	0.01
V3	0.6D + 0.6W	127	V	1600	729	15	0	0.01	0.00

TYP TRUSS

V3	0.6D + 0.6W	127	V	1600	729	15	0	0.01	0.00
V3	0.6D + 0.6W	127	V	1600	729	15	0	0.01	0.00
V4	0.6D + 0.6W	234	V	1600	729	28	0	0.02	0.00
V4	0.6D + 0.6W	234	V	1600	729	28	0	0.02	0.00
V4	0.6D + 0.6W	234	V	1600	729	28	0	0.02	0.00
V5	0.6D + 0.6W	262	V	1600	729	32	0	0.02	0.00
V5	0.6D + 0.6W	262	V	1600	729	32	0	0.02	0.00
V5	0.6D + 0.6W	262	V	1600	729	32	0	0.02	0.00
V6	0.6D + 0.6W	24	V	1600	729	3	0	0.00	0.00
V6	0.6D + 0.6W	24	V	1600	729	3	0	0.00	0.00
V6	0.6D + 0.6W	24	V	1600	729	3	0	0.00	0.00

Use 1/2" Ø bolts for conn w/ 1/2" plywood ea side, typ.

Table 3 from APA E825E

Bolt Diameter	plywood thickness	Face Grain Direction	Plywood End	Plywood Edge	Ultimate Lateral Load	ASD Capacity
1/2	1/2	0	3 in	1.50 in	4750 lb	950 lb
		90	3 in	1.50 in	4570 lb	914 lb

Value used in bolt connection calcs, see preceding calculations.

Note: If (2) bolt's capacity is greater than load, individual check is not required.

Loading on members from SAP analysis and splice locations

		# of bolts	AR
TC Splice=	1070 lb	2	59%
BC1 Splice=	5764 lb	7	Need further check to account for group action factor.
BC2 Splice=	3843 lb	5	Need further check to account for group action factor.
L End conn=	3843 lb	5	Need further check to account for group action factor.
R End conn=	4214 lb	5	Need further check to account for <u>eccentricity</u> . & group action.
D1 web=	4214 lb	5	Need further check to account for group action factor.
D web=	2107 lb	3	Need further check to account for group action factor.
T web=	943 lb	2	52%

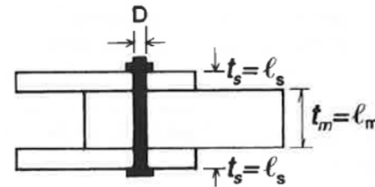
Client _____
 4300 B Street, Suite 302 Project 161 Klevin St Typical Truss Repair
 Anchorage, Alaska 99502 48" Truss Design
 Ph: 907 562-3439
 Fax: 907 561-5319 Project No. 402024.031

Design by GC
 Date 2/11/2025
 Checked by EH
 Date _____

~ BOLTED SHEAR CONNECTION PER NDS 2018 CHAPTER 11.3 ~

INPUT: BC1, plywood gusset w/ 1/2"Ø bolt

Method: ASD			NDS Ref.:
Forces: Shear: $R_s = 5764.0 \text{ lbs}$ Resultant Load: $R_R = 5764.0 \text{ lbs}$			11.3.2
Fastener: Thru Bolt Double Shear # of Fasteners, $n = 8$ Size: 1/2" Length, $L = 2.00 \text{ in}$ Nominal Diameter ^B , $D = 0.500 \text{ in}$			
Wood: Side Member Material ^C : Plywood Structural 1 or OSB Main Member Material ^C : Wood			
Side Member Specific Gravity, $G_s = 0.43$ ← N/A Main Member Specific Gravity, $G_m = 0.43$ Side Member Thickness, $t_{sm} = 0.50 \text{ in}$ Main Member Thickness, $t_m = 1.50 \text{ in}$ *Only used for toe-nailing: 2.00 in			
Shear: Main Member Shear Action Angle, $\theta_m = 0^\circ$ $0^\circ = //$ to grain Side Member Shear Action Angle, $\theta_s = 0^\circ$ $90^\circ = \perp$ to grain			
ASD & LRFD Shear Load Duration: 10 Years/Live Load Moisture Content ^A : ≤19% @ fab. & ≤19% in service Temperature: In Service Dry & Temp. ≤100°F Group Action: Input C_g below Geometry: Input C_Δ below End Grain: NO End Grain Diaphragm: NOT a Diaphragm Toe-nail: NO Toe-Nailing Format Conversion: 3.32/Φ Φ Resistance: 0.65 Time Effect: λ approximated below, see N.3.3			11.3.2 11.3.3 11.3.4 11.3.6 12.5.1 12.5.2 12.5.3 12.5.4 11.3.7 11.3.8 11.3.9



Connection OK 91%

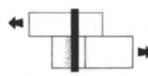
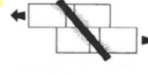
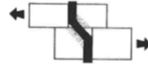
Adjustment Factors:			NDS Pg #	NDS Ref.:
Shear				
Load Duration Factor:	$C_D = 1.00$	ASD only	pg. 11	11.3.2
Wet Service Factor:	$C_M^1 = 1.00$	ASD & LRFD	pg. 67	11.3.3
Temperature Factor:	$C_t = 1.00$	ASD & LRFD	pg. 67	11.3.4
Group Action Factor:	$C_g = 0.87$	ASD & LRFD	pg. 68-72	11.3.6
Geometry Factor:	$C_\Delta = 1.00$	ASD & LRFD	pg. 89-90	12.5.1
End Grain Factor:	$C_{eg} = 1.00$	ASD & LRFD	pg. 91	12.5.2
Diaphragm Factor:	$C_{di} = 1.00$	ASD & LRFD	pg. 91	12.5.3
Toe-nail Factor:	$C_{tn} = 1.00$	ASD & LRFD	pg. 91	12.5.4
Format Conversion Factor:	$K_F = 3.32$	LRFD only	pg. 187	11.3.7
Resistance Factor:	$\Phi_z = 0.65$	LRFD only	pg. 187	11.3.8
Time Effect Factor:	$\lambda = 0.80$	LRFD only	pg. 187	11.3.9

Client _____
 4300 B Street, Suite 302 Project 161 Klevin St Typical Truss Repair
 Anchorage, Alaska 99502 48" Truss Design
 Ph: 907 562-3439
 Fax: 907 561-5319 Project No. 402024.031

Design by GC
 Date 2/11/2025
 Checked by EH
 Date _____

~ BOLTED SHEAR CONNECTION PER NDS 2018 CHAPTER 11.3 ~

INPUT: BC1, plywood gusset w/ 1/2"Ø bolt

Shear Capacity:				NDS Ref.:		
$p_m= 1.5$ in	$\ell_s= 0.5$ in	$\ell_m=$ <table><tr><td>Thru Bolt</td></tr><tr><td>1.50 in</td></tr></table>	Thru Bolt	1.50 in		12.3.5
Thru Bolt						
1.50 in						
$D_r= 0.5$ in	$F_{yb}= 45,000$ psi			Tbl 12.3.3		
$F_{em\perp}= 2,537$ psi	$F_{em\parallel}= 4,816$ psi					
$F_{es\perp}= 4,637$ psi	$F_{es\parallel}= 4,637$ psi					
$R_e= 1.039$	$R_t= 3.000$					
$F_{em\theta}= 4,816$ psi	$F_{es\theta}= 4,637$ psi					
Yield Mode						
$I_m \quad Z = \frac{D \ell_m F_{em}}{R_d}$	$R_d= 4.000$	$Z= 903$ lbs/fastener		Mode I _m Tbl 12.3.1A		
$I_s \quad Z = \frac{D \ell_s F_{es}}{R_d}$	$R_d= 4.000$	$Z= 914$ lbs/fastener Tbl. 3 APA E825E		Mode I _s Tbl 12.3.1B		
$II \quad Z = \frac{k_1 D \ell_s F_{es}}{R_d}$	$k_1= 1.032$ $R_d= 3.600$	$Z= N/A$		Mode II		
$III_m \quad Z = \frac{k_2 D \ell_m F_{em}}{(1 + 2R_e) R_d}$	$k_2= 1.491$ $R_d= 3.200$	$Z= N/A$		Mode III _m		
$III_s \quad Z = \frac{k_3 D \ell_s F_{em}}{(2 + R_e) R_d}$	$k_3= 3.781$ $R_d= 3.200$	$Z= 914$ lbs/fastener Tbl. 3 APA E825E		Mode III _s		
$IV \quad Z = \frac{D_2}{R_d} \sqrt{\frac{2 F_{em} F_{yb}}{3(1 + R_e)}}$	$R_d= 3.200$	$Z= 1315$ lbs/fastener		Mode IV		
Controlling Z= 903 lbs/fastener				11.3		
Z' = Cd*Cm*Ct*Cg*CA*Ceg*Ctn*Z*n= 6300 lbs						

- A. If Moisture Content is >19% at time of fabrication and ≤19% in service, 0.4 is a conservative factor. For a more precise factor see NDS 10.3.3.
- B. Diameter of lag screws are for "reduced body diameter" lag screws. (Similar to tables 11J & 11k in NDS)
- C. The adjusted values for $F_{e\perp}$ and $F_{e\parallel}$ are not supported by NDS for diameters of fasteners >1/4" in plywood or OSB & therefore not recommended.
 F_e is assumed for all fastener sizes herein.

NDS Group Action Factor, C_g

2018 NDS Section 11.3.6

Equation 11.3-1

Group Action Factor, C_g

Type of conn=	Wood-Wood	
Spacing btwn bolts=	1.5	in
A_m =	8.25	si
A_s =	6.9	si
		$\leq 2*(5/8"*5.5")$
E_m =	1500000	psi
		$\leq$ HF No. 1
E_s =	1015000	psi
γ =	63640	lb/in
n =	8	
R_{ea} =	0.56	
u =	1.0	
m =	0.86	
(a)=	0.78	
(b)=	10.30	
(c)=	11.50	
$C_g = (a/b)*c =$	0.87	

Eq. 11.3-1 broken up

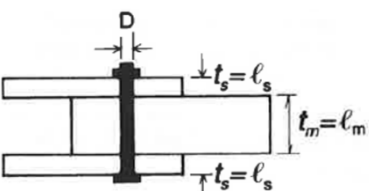
(eq. 11.3-1)

Client _____
 4300 B Street, Suite 302 Project 161 Klevin St Typical Truss Repair
 Anchorage, Alaska 99502 48" Truss Design
 Ph: 907 562-3439
 Fax: 907 561-5319 Project No. 402024.031

Design by GC
 Date 2/11/2025
 Checked by EH
 Date _____

~ BOLTED SHEAR CONNECTION PER NDS 2018 CHAPTER 11.3 ~

INPUT: BC2 & L End Conn, plywood gusset w/ 1/2"Ø bolt

Method: ASD			NDS Ref.:
Forces: Shear: $R_s = 3843.0 \text{ lbs}$ Resultant Load: $R_R = 3843.0 \text{ lbs}$	ASD Shear Load Duration: 10 Years/Live Load Moisture Content ^A : ≤19% @ fab. & ≤19% in service Temperature: In Service Dry & Temp. ≤100°F Group Action: Input C_g below Geometry: Input C_Δ below End Grain: NO End Grain Diaphragm: NOT a Diaphragm Toe-nail: NO Toe-Nailing	11.3.2 11.3.3 11.3.4 11.3.6 12.5.1 12.5.2 12.5.3 12.5.4	
Fastener: Thru Bolt Double Shear # of Fasteners, $n = 5$ Size: 1/2" Length, $L = 2.00 \text{ in}$ Nominal Diameter ^B , $D = 0.500 \text{ in}$	ASD & LRFD Format Conversion: 3.32/Φ Φ Resistance: 0.65 Time Effect: λ approximated below, see N.3.3	11.3.7 11.3.8 11.3.9	
Wood: Side Member Material ^C : Plywood Structural 1 or OSB Main Member Material ^C : Wood			
Side Member Specific Gravity, $G_s = 0.43$ ← N/A Main Member Specific Gravity, $G_m = 0.43$ Side Member Thickness, $t_{sm} = 0.50 \text{ in}$ Main Member Thickness, $t_m = 1.50 \text{ in}$ *Only used for toe-nailing: 2.00 in			
Shear: Main Member Shear Action Angle, $\theta_m = 0^\circ$ 0° = // to grain Side Member Shear Action Angle, $\theta_s = 0^\circ$ 90° = ⊥ to grain		Connection OK 89%	

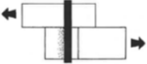
Adjustment Factors:			NDS Pg #	NDS Ref.:
Shear				
Load Duration Factor:	$C_D = 1.00$	ASD only	pg. 11	11.3.2
Wet Service Factor:	$C_M^1 = 1.00$	ASD & LRFD	pg. 67	11.3.3
Temperature Factor:	$C_t = 1.00$	ASD & LRFD	pg. 67	11.3.4
Group Action Factor:	$C_g = 0.95$	ASD & LRFD	pg. 68-72	11.3.6
Geometry Factor:	$C_\Delta = 1.00$	ASD & LRFD	pg. 89-90	12.5.1
End Grain Factor:	$C_{eg} = 1.00$	ASD & LRFD	pg. 91	12.5.2
Diaphragm Factor:	$C_{di} = 1.00$	ASD & LRFD	pg. 91	12.5.3
Toe-nail Factor:	$C_{tn} = 1.00$	ASD & LRFD	pg. 91	12.5.4
Format Conversion Factor:	$K_F = 3.32$	LRFD only	pg. 187	11.3.7
Resistance Factor:	$\Phi_z = 0.65$	LRFD only	pg. 187	11.3.8
Time Effect Factor:	$\lambda = 0.80$	LRFD only	pg. 187	11.3.9

Reid Middleton

Client _____
 4300 B Street, Suite 302 Project 161 Klevin St Typical Truss Repair
 Anchorage, Alaska 99502 48" Truss Design
 Ph: 907 562-3439
 Fax: 907 561-5319 Project No. 402024.031

Design by GC
 Date 2/11/2025
 Checked by EH
 Date _____

~ BOLTED SHEAR CONNECTION PER NDS 2018 CHAPTER 11.3 ~**INPUT: BC2 & L End Conn, plywood gusset w/ 1/2"Ø bolt**

Shear Capacity:				NDS Ref.:
$p_m = 1.5$ in	$\ell_s = 0.5$ in	$\ell_m =$ Thru Bolt		12.3.5
$D_r = 0.5$ in	$F_{yb} = 45,000$ psi	1.50 in		
$F_{em\perp} = 2,537$ psi	$F_{em\parallel} = 4,816$ psi			Tbl 12.3.3
$F_{es\perp} = 4,637$ psi	$F_{es\parallel} = 4,637$ psi			
$R_e = 1.039$	$R_t = 3.000$			
$F_{em\theta} = 4,816$ psi	$F_{es\theta} = 4,637$ psi			
Yield Mode				
$I_m \quad Z = \frac{D \ell_m F_{em}}{R_d}$	$R_d = 4.000$	$Z = 903$ lbs/fastener		Mode I _m Tbl 12.3.1A
$I_s \quad Z = \frac{D \ell_s F_{es}}{R_d}$	$R_d = 4.000$	$Z = 914$ lbs/fastener Tbl. 3 APA E825E		Mode I _s Tbl 12.3.1B
$II \quad Z = \frac{k_1 D \ell_s F_{es}}{R_d}$	$k_1 = 1.032$ $R_d = 3.600$	$Z = N/A$		Mode II
$III_m \quad Z = \frac{k_2 D \ell_m F_{em}}{(1 + 2R_e) R_d}$	$k_2 = 1.491$ $R_d = 3.200$	$Z = N/A$		Mode III _m
$III_s \quad Z = \frac{k_3 D \ell_s F_{em}}{(2 + R_e) R_d}$	$k_3 = 3.781$ $R_d = 3.200$	$Z = 914$ lbs/fastener Tbl. 3 APA E825E		Mode III _s
$IV \quad Z = \frac{D_2}{R_d} \sqrt{\frac{2 F_{em} F_{yb}}{3(1 + R_e)}}$	$R_d = 3.200$	$Z = 1315$ lbs/fastener		Mode IV
Controlling Z= 903 lbs/fastener				11.3
Z' = Cd*Cm*Ct*Cg*CA*Ceg*Ctn*Z*n= 4302 lbs				

A. If Moisture Content is >19% at time of fabrication and ≤19% in service, 0.4 is a conservative factor. For a more precise factor see NDS 10.3.3.

B. Diameter of lag screws are for "reduced body diameter" lag screws. (Similar to tables 11J & 11k in NDS)

C. The adjusted values for $F_{e\perp}$ and $F_{e\parallel}$ are not supported by NDS for diameters of fasteners >1/4" in plywood or OSB & therefore not recommended.

F_e is assumed for all fastener sizes herein.

NDS Group Action Factor, C_g

2018 NDS Section 11.3.6

Equation 11.3-1

Group Action Factor, C_g

Type of conn=	Wood-Wood	
Spacing btwn bolts=	1.5	in
A_m =	8.25	si
A_s =	6.9	si
		$\leq 2*(5/8"*5.5")$
E_m =	1500000	psi
		$\leq$ HF No. 1
E_s =	1015000	psi
γ =	63640	lb/in
n =	5	
R_{ea} =	0.56	
u =	1.0	
m =	0.86	
(a)=	0.66	
(b)=	8.01	
(c)=	11.50	
$C_g = (a/b)*c =$	0.95	

Eq. 11.3-1 broken up

(eq. 11.3-1)

Project: 48" Truss Repair, 402024.031

Date: 2/11/2025

Engineer: GC

Eccentric loading on the end diagonal connections; elastic method.

Axial load, $F =$ 4214 lbs See SAP analysis
Y eccentricity, $e_x =$ 3.88 in See Sketch
Y eccentricity, $e_y =$ 13.94 in See Sketch
Angle of diagonal, $\Theta =$ 22 ° See Sketch
Number bolts, $n =$ 10 bolts
Vertical Force at wp, $F_y =$ 158 lbs
Horizontal force at wp, $F_x =$ 391 lbs

Center of bolt group

	x	y	r	r^2	Load at bolt, lbs	Check Σ , lb-in
bolt 1	0.00	0.00	7.65	59	111	846
bolt 2	2.00	0.00	5.88	35	85	499
bolt 3	4.00	0.00	4.30	18	62	267
bolt 4	6.00	0.00	3.24	10	47	151
bolt 5	8.00	0.00	3.23	10	47	151
bolt 6	6.69	6.00	2.94	9	43	125
bolt 7	9.44	4.13	2.65	7	38	101
bolt 8	9.44	7.13	4.72	22	68	323
bolt 9	12.25	5.25	5.68	32	82	466
bolt 10	12.25	8.25	7.37	54	106	785
Σ	70.06	30.75		257		3714
Centroid	7.01	3.08				

Moment about Centroid of bolts, $Y_{\text{axis}} =$ 2200 lb-in

Moment about Centroid of bolts, $X_{\text{axis}} =$ 1514 lb-in

$\Sigma =$ 3714 lb-in

Load on bolt, max case

$x =$ -7.01 in
 $r =$ 7.65 in
 $\Theta =$ 23.72 °
 $f_x =$ 44.5 lbs
 $f_y =$ 101 lbs

$\Sigma F_x =$ 435 lbs

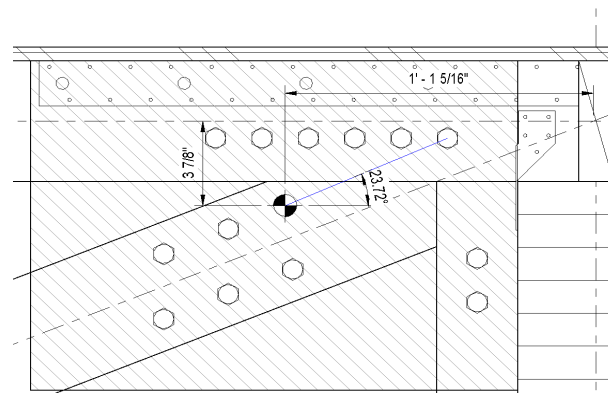
$\Sigma F_y =$ 259 lbs

Combined resultant for all bolts

angle= 31 °

Force= 5065 lbs

Sketch



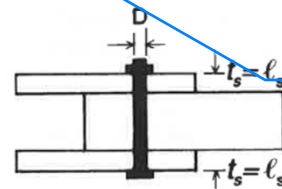
Client _____
 4300 B Street, Suite 302 Project 161 Klevin St Typical Truss Repair
 Anchorage, Alaska 99502 48" Truss Design
 Ph: 907 562-3439
 Fax: 907 561-5319 Project No. 402024.031

Design by GC
 Date 2/11/2025
 Checked by EH
 Date _____

~ BOLTED SHEAR CONNECTION PER NDS 2018 CHAPTER 11.3 ~

INPUT: R End Conn, plywood gusset w/ 1/2"Ø bolt (Eccentric loading)

Method: ASD			NDS Ref.:
Forces: Shear: $R_s = 5065.0 \text{ lbs}$ Resultant Load: $R_R = 5065.0 \text{ lbs}$	ASD Shear Load Duration: 10 Years/Live Load Moisture Content ^A : ≤19% @ fab. & ≤19% in service Temperature: In Service Dry & Temp. ≤100°F Group Action: Input C_g below Geometry: Input C_Δ below End Grain: NO End Grain Diaphragm: NOT a Diaphragm Toe-nail: NO Toe-Nailing		11.3.2 11.3.3 11.3.4 11.3.6 12.5.1 12.5.2 12.5.3 12.5.4
Fastener: Thru Bolt Double Shear # of Fasteners, $n = 10$ Size: 1/2" Length, $L = 2.00 \text{ in}$ Nominal Diameter ^B , $D = 0.500 \text{ in}$	ASD & LRFD Format Conversion: 3.32/Φ Φ Resistance: 0.65 Time Effect: λ approximated below, see N.3.3		11.3.7 11.3.8 11.3.9
Wood: Side Member Material ^C : Plywood Structural 1 or OSB Main Member Material ^C : Wood			
Side Member Specific Gravity, $G_s = 0.43$ ← N/A Main Member Specific Gravity, $G_m = 0.50$ Side Member Thickness, $t_{sm} = 0.50 \text{ in}$ Main Member Thickness, $t_m = 1.50 \text{ in}$ *Only used for toe-nailing: 2.00 in			
Shear: Main Member Shear Action Angle, $\theta_m = 31^\circ$ 0° = // to grain Side Member Shear Action Angle, $\theta_s = 0^\circ$ 90° = ⊥ to grain			



Total number of bolts acting in a group.

Connection OK 79%

Adjustment Factors:			NDS Pg #	NDS Ref.:
Shear				
Load Duration Factor:	$C_D = 1.00$	ASD only	pg. 11	11.3.2
Wet Service Factor:	$C_M^1 = 1.00$	ASD & LRFD	pg. 67	11.3.3
Temperature Factor:	$C_t = 1.00$	ASD & LRFD	pg. 67	11.3.4
Group Action Factor:	$C_g = 0.79$	ASD & LRFD	pg. 68-72	11.3.6
Geometry Factor:	$C_\Delta = 1.00$	ASD & LRFD	pg. 89-90	12.5.1
End Grain Factor:	$C_{eg} = 1.00$	ASD & LRFD	pg. 91	12.5.2
Diaphragm Factor:	$C_{di} = 1.00$	ASD & LRFD	pg. 91	12.5.3
Toe-nail Factor:	$C_{tn} = 1.00$	ASD & LRFD	pg. 91	12.5.4
Format Conversion Factor:	$K_F = 3.32$	LRFD only	pg. 187	11.3.7
Resistance Factor:	$\Phi_z = 0.65$	LRFD only	pg. 187	11.3.8
Time Effect Factor:	$\lambda = 0.80$	LRFD only	pg. 187	11.3.9

Client _____
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 Anchorage, Alaska 99502 48" Truss Design
 Ph: 907 562-3439
 Fax: 907 561-5319 Project No. 402024.031

Design by GC
 Date 2/11/2025
 Checked by EH
 Date _____

~ BOLTED SHEAR CONNECTION PER NDS 2018 CHAPTER 11.3 ~

INPUT: R End Conn, plywood gusset w/ 1/2"Ø bolt (Eccentric loading)

Shear Capacity:				NDS Ref.:
$p_m = 1.5$ in	$\ell_s = 0.5$ in	$\ell_m =$	Thru Bolt	12.3.5
$D_r = 0.5$ in	$F_{yb} = 45,000$ psi		1.50 in	
$F_{em\perp} = 3,158$ psi	$F_{em\parallel} = 5,600$ psi			Tbl 12.3.3
$F_{es\perp} = 4,637$ psi	$F_{es\parallel} = 4,637$ psi			
$R_e = 1.002$	$R_t = 3.000$			
$F_{em\theta} = 4,647$ psi	$F_{es\theta} = 4,637$ psi			
Yield Mode				
I_m	$Z = \frac{D \ell_m F_{em}}{R_d}$	$R_d = 4.344$	$Z = 802$ lbs/fastener	Mode I _m Tbl 12.3.1A
I_s	$Z = \frac{D \ell_s F_{es}}{R_d}$	$R_d = 4.344$	$Z = 914$ lbs/fastener Tbl. 3 APA E825E	Mode I _s Tbl 12.3.1B
II	$Z = \frac{k_1 D \ell_s F_{es}}{R_d}$	$k_1 = 1.002$ $R_d = 3.910$	$Z = N/A$	Mode II
III _m	$Z = \frac{k_2 D \ell_m F_{em}}{(1 + 2R_e) R_d}$	$k_2 = 1.482$ $R_d = 3.476$	$Z = N/A$	Mode III _m
III _s	$Z = \frac{k_3 D \ell_s F_{em}}{(2 + R_e) R_d}$	$k_3 = 3.835$ $R_d = 3.476$	$Z = 914$ lbs/fastener Tbl. 3 APA E825E	Mode III _s
IV	$Z = \frac{D_2}{R_d} \sqrt{\frac{2 F_{em} F_{yb}}{3(1 + R_e)}}$	$R_d = 3.476$	$Z = 1200$ lbs/fastener	Mode IV
Controlling Z= 802 lbs/fastener				
Z' = Cd*Cm*Ct*Cg*CA*Ceg*Ctn*Z*n= 6373 lbs				11.3

- A. If Moisture Content is >19% at time of fabrication and ≤19% in service, 0.4 is a conservative factor. For a more precise factor see NDS 10.3.3.
 B. Diameter of lag screws are for "reduced body diameter" lag screws. (Similar to tables 11J & 11k in NDS)
 C. The adjusted values for $F_{e\perp}$ and $F_{e\parallel}$ are not supported by NDS for diameters of fasteners >1/4" in plywood or OSB & therefore not recommended.
 F_e is assumed for all fastener sizes herein.

NDS Group Action Factor, C_g

2018 NDS Section 11.3.6

Equation 11.3-1

Group Action Factor, C_g

Type of conn=	Wood-Wood	
Spacing btwn bolts=	1.5	in
A_m =	8.25	si
A_s =	6.9	si
		$\leq 2*(5/8"*5.5")$
E_m =	1900000	psi
		$\leq \text{DF Sel Str.}$
E_s =	1015000	psi
γ =	63640	lb/in
n =	10	
R_{ea} =	0.45	
u =	1.0	
m =	0.87	
(a)=	0.82	
(b)=	11.33	
(c)=	11.03	
$C_g = (a/b)*c =$	0.79	

Eq. 11.3-1 broken up

(eq. 11.3-1)

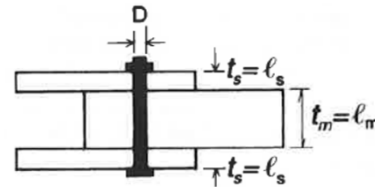
Client _____
 4300 B Street, Suite 302 Project 161 Klevin St Typical Truss Repair
 Anchorage, Alaska 99502 48" Truss Design
 Ph: 907 562-3439
 Fax: 907 561-5319 Project No. 402024.031

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 Date 2/11/2025
 Checked by EH
 Date _____

~ BOLTED SHEAR CONNECTION PER NDS 2018 CHAPTER 11.3 ~

INPUT: D1, plywood gusset w/ 1/2"Ø bolt

Method: ASD			NDS Ref.: 11.3.2 11.3.3 11.3.4 11.3.6 12.5.1 12.5.2 12.5.3 12.5.4 11.3.7 11.3.8 11.3.9
Forces: Shear: $R_s = 4214.0 \text{ lbs}$ Resultant Load: $R_R = 4214.0 \text{ lbs}$			
Fastener: Thru Bolt Double Shear # of Fasteners, $n = 5$ Size: 1/2" Length, $L = 2.00 \text{ in}$ Nominal Diameter ^B , $D = 0.500 \text{ in}$			
Wood: Side Member Material ^C : Plywood Structural 1 or OSB Main Member Material ^C : Wood			
Side Member Specific Gravity, $G_s = 0.43$ ← N/A Main Member Specific Gravity, $G_m = 0.50$ Side Member Thickness, $t_{sm} = 0.50 \text{ in}$ Main Member Thickness, $t_m = 1.50 \text{ in}$ *Only used for toe-nailing: 2.00 in			
Shear: Main Member Shear Action Angle, $\theta_m = 22^\circ$ 0° = // to grain Side Member Shear Action Angle, $\theta_s = 0^\circ$ 90° = ⊥ to grain			
Adjustment Factors:		Shear	
Load Duration Factor: $C_D = 1.00$ ASD only pg. 11		11.3.2	
Wet Service Factor: $C_M^1 = 1.00$ ASD & LRFD pg. 67		11.3.3	
Temperature Factor: $C_t = 1.00$ ASD & LRFD pg. 67		11.3.4	
Group Action Factor: $C_g = 0.95$ ASD & LRFD pg. 68-72		11.3.6	
Geometry Factor: $C_\Delta = 1.00$ ASD & LRFD pg. 89-90		12.5.1	
End Grain Factor: $C_{eg} = 1.00$ ASD & LRFD pg. 91		12.5.2	
Diaphragm Factor: $C_{di} = 1.00$ ASD & LRFD pg. 91		12.5.3	
Toe-nail Factor: $C_{tn} = 1.00$ ASD & LRFD pg. 91		12.5.4	
Format Conversion Factor: $K_F = 3.32$ LRFD only pg. 187		11.3.7	
Resistance Factor: $\Phi_z = 0.65$ LRFD only pg. 187		11.3.8	
Time Effect Factor: $\lambda = 0.80$ LRFD only pg. 187		11.3.9	



Connection OK 99%

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 Date _____

~ BOLTED SHEAR CONNECTION PER NDS 2018 CHAPTER 11.3 ~

INPUT: D1, plywood gusset w/ 1/2"Ø bolt

Shear Capacity:				NDS Ref.:		
$p_m= 1.5$ in	$\ell_s= 0.5$ in	$\ell_m=$ <table><tr><td>Thru Bolt</td></tr><tr><td>1.50 in</td></tr></table>	Thru Bolt	1.50 in		12.3.5
Thru Bolt						
1.50 in						
$D_r= 0.5$ in	$F_{yb}= 45,000$ psi			Tbl 12.3.3		
$F_{em\perp}= 3,158$ psi	$F_{em\parallel}= 5,600$ psi					
$F_{es\perp}= 4,637$ psi	$F_{es\parallel}= 4,637$ psi					
$R_e= 1.089$	$R_t= 3.000$					
$F_{em\theta}= 5,052$ psi	$F_{es\theta}= 4,637$ psi					
Yield Mode						
$I_m \quad Z = \frac{D \ell_m F_{em}}{R_d}$	$R_d= 4.244$	$Z= 893$ lbs/fastener		Mode I _m Tbl 12.3.1A		
$I_s \quad Z = \frac{D \ell_s F_{es}}{R_d}$	$R_d= 4.244$	$Z= 914$ lbs/fastener Tbl. 3 APA E825E		Mode I _s Tbl 12.3.1B		
$II \quad Z = \frac{k_1 D \ell_s F_{es}}{R_d}$	$k_1= 1.074$ $R_d= 3.820$	$Z= N/A$		Mode II		
$III_m \quad Z = \frac{k_2 D \ell_m F_{em}}{(1 + 2R_e) R_d}$	$k_2= 1.505$ $R_d= 3.396$	$Z= N/A$		Mode III _m		
$III_s \quad Z = \frac{k_3 D \ell_s F_{em}}{(2 + R_e) R_d}$	$k_3= 3.710$ $R_d= 3.396$	$Z= 914$ lbs/fastener Tbl. 3 APA E825E		Mode III _s		
$IV \quad Z = \frac{D_2}{R_d} \sqrt{\frac{2F_{em} F_{yb}}{3(1 + R_e)}}$	$R_d= 3.396$	$Z= 1254$ lbs/fastener		Mode IV		
Controlling Z= 893 lbs/fastener				11.3		
Z' = Cd*Cm*Ct*Cg*CA*Ceg*Ctn*Z*n= 4246 lbs						

- A. If Moisture Content is >19% at time of fabrication and ≤19% in service, 0.4 is a conservative factor. For a more precise factor see NDS 10.3.3.
- B. Diameter of lag screws are for "reduced body diameter" lag screws. (Similar to tables 11J & 11k in NDS)
- C. The adjusted values for $F_{e\perp}$ and $F_{e\parallel}$ are not supported by NDS for diameters of fasteners >1/4" in plywood or OSB & therefore not recommended.
 F_e is assumed for all fastener sizes herein.

NDS Group Action Factor, C_g

2018 NDS Section 11.3.6

Equation 11.3-1

Group Action Factor, C_g

Type of conn=	Wood-Wood	
Spacing btwn bolts=	1.5	in
A_m =	8.25	si
A_s =	6.9	si
		$\leq 2*(5/8"*5.5")$
E_m =	1600000	psi
		$\leq$ DF No. 2
E_s =	1015000	psi
γ =	63640	lb/in
n =	5	
R_{ea} =	0.53	
u =	1.0	
m =	0.87	
(a)=	0.66	
(b)=	7.90	
(c)=	11.36	
$C_g = (a/b)*c =$	0.95	

Eq. 11.3-1 broken up

(eq. 11.3-1)

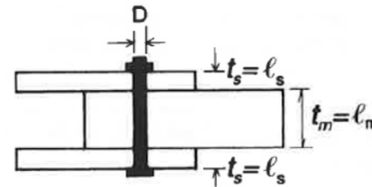
Client _____
 4300 B Street, Suite 302 Project 161 Klevin St Typical Truss Repair
 Anchorage, Alaska 99502 48" Truss Design
 Ph: 907 562-3439
 Fax: 907 561-5319 Project No. 402024.031

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 Date _____

~ BOLTED SHEAR CONNECTION PER NDS 2018 CHAPTER 11.3 ~

INPUT: D, plywood gusset w/ 1/2"Ø bolt

Method: ASD Forces: Shear: $R_s = 2107.0 \text{ lbs}$ Resultant Load: $R_R = 2107.0 \text{ lbs}$ Fastener: Thru Bolt Double Shear # of Fasteners, $n = 3$ Size: 1/2" Length, $L = 2.00 \text{ in}$ Nominal Diameter ^B , $D = 0.500 \text{ in}$ Wood: Side Member Material ^C : Plywood Structural 1 or OSB Main Member Material ^C : Wood Side Member Specific Gravity, $G_s = 0.43$ ← N/A Main Member Specific Gravity, $G_m = 0.50$ Side Member Thickness, $t_{sm} = 0.50 \text{ in}$ Main Member Thickness, $t_m = 1.50 \text{ in}$ *Only used for toe-nailing: 2.00 in Shear: Main Member Shear Action Angle, $\theta_m = 22^\circ$ 0° = // to grain Side Member Shear Action Angle, $\theta_s = 0^\circ$ 90° = ⊥ to grain	ASD Shear Load Duration: 10 Years/Live Load Moisture Content ^A : ≤19% @ fab. & ≤19% in service Temperature: In Service Dry & Temp. ≤100°F Group Action: Input C_g below Geometry: Input C_Δ below End Grain: NO End Grain Diaphragm: NOT a Diaphragm Toe-nail: NO Toe-Nailing ASD & LRFD Format Conversion: 3.32/Φ Φ Resistance: 0.65 Time Effect: λ approximated below, see N.3.3 LRFD	NDS Ref.: 11.3.2 11.3.3 11.3.4 11.3.6 12.5.1 12.5.2 12.5.3 12.5.4 11.3.7 11.3.8 11.3.9
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Connection OK 80%

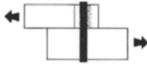
Adjustment Factors:			NDS Pg #	NDS Ref.:
Shear				
Load Duration Factor:	$C_D = 1.00$	ASD only	pg. 11	11.3.2
Wet Service Factor:	$C_M^1 = 1.00$	ASD & LRFD	pg. 67	11.3.3
Temperature Factor:	$C_t = 1.00$	ASD & LRFD	pg. 67	11.3.4
Group Action Factor:	$C_g = 0.98$	ASD & LRFD	pg. 68-72	11.3.6
Geometry Factor:	$C_\Delta = 1.00$	ASD & LRFD	pg. 89-90	12.5.1
End Grain Factor:	$C_{eg} = 1.00$	ASD & LRFD	pg. 91	12.5.2
Diaphragm Factor:	$C_{di} = 1.00$	ASD & LRFD	pg. 91	12.5.3
Toe-nail Factor:	$C_{tn} = 1.00$	ASD & LRFD	pg. 91	12.5.4
Format Conversion Factor:	$K_F = 3.32$	LRFD only	pg. 187	11.3.7
Resistance Factor:	$\Phi_z = 0.65$	LRFD only	pg. 187	11.3.8
Time Effect Factor:	$\lambda = 0.80$	LRFD only	pg. 187	11.3.9

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 Date _____

~ BOLTED SHEAR CONNECTION PER NDS 2018 CHAPTER 11.3 ~

INPUT: D, plywood gusset w/ 1/2"Ø bolt

Shear Capacity:				NDS Ref.:		
$p_m= 1.5$ in	$\ell_s= 0.5$ in	$\ell_m=$ <table><tr><td>Thru Bolt</td></tr><tr><td>1.50 in</td></tr></table>	Thru Bolt	1.50 in		12.3.5
Thru Bolt						
1.50 in						
$D_r= 0.5$ in	$F_{yb}= 45,000$ psi			Tbl 12.3.3		
$F_{em\perp}= 3,158$ psi	$F_{em\parallel}= 5,600$ psi					
$F_{es\perp}= 4,637$ psi	$F_{es\parallel}= 4,637$ psi					
$R_e= 1.089$	$R_t= 3.000$					
$F_{em\theta}= 5,052$ psi	$F_{es\theta}= 4,637$ psi					
Yield Mode						
$I_m \quad Z = \frac{D \ell_m F_{em}}{R_d}$	$R_d= 4.244$	$Z= 893$ lbs/fastener		Mode I _m Tbl 12.3.1A		
$I_s \quad Z = \frac{D \ell_s F_{es}}{R_d}$	$R_d= 4.244$	$Z= 914$ lbs/fastener Tbl. 3 APA E825E		Mode I _s Tbl 12.3.1B		
$II \quad Z = \frac{k_1 D \ell_s F_{es}}{R_d}$	$k_1= 1.074$ $R_d= 3.820$	$Z= N/A$		Mode II		
$III_m \quad Z = \frac{k_2 D \ell_m F_{em}}{(1 + 2R_e) R_d}$	$k_2= 1.505$ $R_d= 3.396$	$Z= N/A$		Mode III _m		
$III_s \quad Z = \frac{k_3 D \ell_s F_{em}}{(2 + R_e) R_d}$	$k_3= 3.710$ $R_d= 3.396$	$Z= 914$ lbs/fastener Tbl. 3 APA E825E		Mode III _s		
$IV \quad Z = \frac{D_2}{R_d} \sqrt{\frac{2F_{em} F_{yb}}{3(1 + R_e)}}$	$R_d= 3.396$	$Z= 1254$ lbs/fastener		Mode IV		
Controlling Z= 893 lbs/fastener				11.3		
Z' = Cd*Cm*Ct*Cg*CA*Ceg*Ctn*Z*n= 2628 lbs						

- A. If Moisture Content is >19% at time of fabrication and ≤19% in service, 0.4 is a conservative factor. For a more precise factor see NDS 10.3.3.
- B. Diameter of lag screws are for "reduced body diameter" lag screws. (Similar to tables 11J & 11k in NDS)
- C. The adjusted values for $F_{e\perp}$ and $F_{e\parallel}$ are not supported by NDS for diameters of fasteners >1/4" in plywood or OSB & therefore not recommended.
 F_e is assumed for all fastener sizes herein.

NDS Group Action Factor, C_g

2018 NDS Section 11.3.6

Equation 11.3-1

Group Action Factor, C_g

Type of conn=	Wood-Wood	
Spacing btwn bolts=	1.5	in
A_m =	5.25	si
A_s =	4.4	si
		$\leq 2*(5/8"*3.5")$
E_m =	1500000	psi
		$\leq$ DF Constr.
E_s =	1015000	psi
γ =	63640	lb/in
n =	3	
R_{ea} =	0.56	
u =	1.0	
m =	0.83	
(a)=	0.56	
(b)=	5.29	
(c)=	9.35	
$C_g = (a/b)*c =$	0.98	

Eq. 11.3-1 broken up

(eq. 11.3-1)