COLUMN-CAPACITY

Member Ref:	23
Frame:	Moment
Floor:	First
Member:	Column
Ref. 2:	1-M

ASSUMPTIONS:

No transverse loads are applied to the member (Per section 7)

1. MATERIAL PROPERTIES:

Modulus of Elasticity:	$E =$	29000	ksi
	$G =$	11200	ksi
Yield Strength:	$F_{y} =$	50	ksi

2. MEMBER GEOMETRIC INFORMATION:

Beam Length	$L =$	15	ft	15	*Project Information*

Column Slenderness Parameters:

Unbraced Length, x:	$L_{bx} =$	15	ft	Global or Local System?
Unbraced Length, y:	$L_{by} =$	15	ft	
Unbraced Length, z:	$L_{bz} =$	15	ft	
Eff. Length Factor, x:	$K_{x} =$	1		
Eff. Length Factor, y:	$K_{y} =$	1		
Eff. Length Factor, z:	$K_{z} =$	1		

Reference: Excel

Section Information | *Eq/Fig/Table/Notes*

3. SECTION PROPERTIES

Section: W **W8X40**
Member is in: Compression

Moment of Inertia, x:	$I_{xw} =$	146	in^4	Depth:	d =	8.25	in
Moment of Inertia, y	$I_{yw} =$	49.1	in^4	Width:	$b_f =$	8.07	in
Polar Moment of Inertia:	$J_w =$	1.12	in^4	Flange Thickness:	$t_f =$	0.56	in
Radius of Gyration, x:	$r_{xw} =$	3.53	in	Web Thickness:	$t_w =$	0.36	in
Radius of Gyration, y	ryw =	2.04	in	Area:	A =	11.7	in^2
Section Modulus:	$S_x =$	35.5	in^3	r_{ts}	$r_{ts} =$	2.81	in
Plastic Section Modulus, x:	Z =	39.8	in^3	Distance flange/centro	$h_0 =$	11.60	in
T	T =	0	in	Warping Constant	$C_w =$	726	in

3. PRELIMINARY ANALYSIS

Eq. E 6-2a/b

Slenderness Ratios:	$(KL/r)_x =$	51.0			
	$(KL/r)_y =$	88.2	AISC	Table	3-2
	$(KL)_z =$	180.0	AISC	Table	3-2
Largest Possible Ratio:		88.2			
Compressive Control:		113.43	E		
Critical Stress, Fcr equation:		**USE E3-2**			

4. LOCAL SLENDERNESS CHECK:

Table B4.1a

	Web	**Flange**
Member	**h/tw**	**bf/2t**
	17.6	7.21
Critical	λ_r	λ_r
Case	[case 5]	[case 1]
	35.9	*35.9*
Check	Nonslender	Nonslender

Reference: AISC 14th
Section | *Eq/Fig/Table/Notes*

5. BUCKLING ANALYSIS:

E

Euler Buckling Stress:	$F_{e3} =$	36.8	ksi	*Eq. E3-4*
Torsional Buckling Stress:	$F_{e4} =$	97.2	ksi	*Eq. E4-4*
Controling Euler Stress:	Fe3 =	36.8	ksi	
Critical Buckling Stress:	$F_{cr} =$	28.3	ksi	*Eq. E3-2*

6. COLUMN CAPACITY:

Eq. E3-1

Compressive Strength:	P_{n} =	331.1	ksi	*Eq. E3-1*
Factor:	Φ =	0.9		
Column Capacity:	$\Phi.P_{n}$ =	298.0	ksi	

BEAM-COLUMN ANALYSIS

1. MATERIAL PROPERTIES:

Modulus of Elasticity:	E =	29000	ksi
	G =	11200	ksi
Yield Strength:	$F_{y} =$	50	ksi

2. MEMBER GEOMETRIC INFORMATION:

Beam Length	L =	15	ft	*Project Information*
Column Slenderness Parameters:				
Unbraced Length, x:	$L_{bx} =$	15	ft	*Global or Local System?*
Unbraced Length, y:	$L_{by} =$	15	ft	
Unbraced Length, z:	$L_{bz} =$	15	ft	
Eff. Length Factor Check:		**K>1**		*Check for values below*
Eff. Length Factor, x:	$K_{x} =$	1.88		
Eff. Length Factor, y:	$K_{y} =$	1.88		
Eff. Length Factor, z:	$K_{z} =$	1		
Plastic Zones Lengths and Info:				
Full plastic yield Length:	$L_{p} =$	7.2	ft	
LTB Length:	$L_{r} =$	29.9	ft	
	$\phi_b BF =$	2.46	kips	
	$\phi_b M_{px} =$	149	kip.ft	

Reference: Section Information — Excel *Eq/Fig/Table/Notes*

3. SECTION PROPERTIES

Section:	W	**W8X40**	
Member is in:		Compression	

Moment of Inertia, x:	$I_{xw} =$	146	in^4	Depth:	d =	8.25	in
Moment of Inertia, y	$I_{yw} =$	49.1	in^4	Width:	$b_{f} =$	8.07	in
Polar Moment of Inertia:	$J_{w} =$	1.12	in^4	Flange Thickness:	$t_{f} =$	0.56	in
Radius of Gyration, x:	$r_{xw} =$	3.53	in	Web Thickness:	$t_{w} =$	0.36	in
Radius of Gyration, y	ryw =	2.04	in	Area:	A =	11.7	in^2
Section Modulus:	$S_{x} =$	35.5	in^3	r_{ts}	$r_{ts} =$	2.81	in
Plastic Section Modulus, x:	Z =	39.8	in^3	Distance flange/centro	$h_{0} =$	11.60	in
Plastic Section Modulus, y:	$Z_{y} =$	18.5	in	Warping Constant	$C_{w} =$	726	in
T	T =	0	in	Section Modulus:	$S_{y} =$	12.2	in^3

3. SLENDERNESS CHARACTERISTICS:

Table B4.1a

	Web	**Flange**
Flexure	Compact	Compact
Compression	Mntx =	6

4. CONSIDERATION OF IMPERFECTIONS - NOTIONAL LOADS:

C2.2(b)

Notional Load:	$Z_i =$	0.428	kip	Eq.	C2-1
Second/First order drift ratio:		2	in		

Is it applied at all levels in all combinations? **YES** Ref. to C.2.3(3)

Reference: GTS
Section *Eq/Fig/Table/Notes*

5. FIRST ORDER ANALYSIS FORCES:

GTS

Ultimate Axial Load, NT	$P_{nt} =$	27.2	kips
Ultimate Moment, NT, x	$M_{ntx} =$	6	kip.ft
Ultimate Moment, NT, y	$M_{nty} =$	0	kip.ft
Ultimate Axial Load, LT	$P_{lt} =$	3.4	kips
Ultimate Moment, LT, y	$Ml_{tx} =$	71	kip.ft
Ultimate Moment, LT, y	$Ml_{tx} =$	0	kip.ft

Total V. load in story	$P_{story} =$	3643.2	kip	
	$P_{mf} =$	607.6	kip	
Story Shear in Direction of	H =	31	kip	
	α =	1		*LRFD*
Lateral Deflection	ΔH =	0.215	in	
Fact. Story Drift Limit	$\Delta H/L$ =	0.0012		

6. MEMBER CAPACITY:

Eq. E3-1

Axial Capacity	$\phi.P_n =$	298.0	ksi		
Flexure Capacity					
Along axis x:	Zone =	2			
	Cb =	1.34			
Flexure Capacity, x	$M_{cx} =$	149.0	kip.ft		
Along axis y:	Fy.Zy =	925		Eq.	F6-1
	1.6Fy.Sy =	976		Eq.	F6-1
Flexure Capacity, y	$M_{cy} =$	832.5	kip.ft		

Reference: AISC 14th
Section *Eq/Fig/Table/Notes*

7. APPROXIMATE SECOND ORDER ANALYSIS:

C

Along axis x: DAM: Use reduced stiffness per C2.3

	τ_b =	1.00		*Apply to all*	C	2.3(2)
Type of Curvature:		Single				
Smaller 1st-O End Mom:	M_1 =	-1				
Larger 1st-O End Mom:	M_2 =	1				
Modif. Coefficient, x:	C_{mx} =	1		App. 8	Eq.	A-8-4
Elastic Buckling Strength, x	P_{ex} =	1612	kip	App. 8	Eq.	A-8-5
Amplification Factor	B_{1x} =	1.0		App. 8	Eq.	A-8-3
Factor Check:		OK		*Check*		

Along axis y:

	τ_b =	1		*Apply to all*	C	2.3(2)
Type of Curvature:		Single				
Smaller 1st-O End Mom:	M_1 =	-1				
Larger 1st-O End Mom:	M_2 =	1				
Modif. Coefficient, y	C_{my} =	1		App. 8	Eq.	A-8-4
Elastic Buckling Strength	P_{ey} =	542	kip	App. 8	Eq.	A-8-5
Amplification Factor	B_{1y} =	1.0		App. 8	Eq.	A-8-3
Factor Check:		OK		*Check*		

Calculate P-Δ Amplification Factor:

Along axis x:

	R_m =	0.97		A-8-8
	$P_{e\text{-}story}$ =	25304.2	kip	A-8-7
	B_{2x} =	1.17		A-8-6
2nd-Order Axial Strength	P_r =	31.2	kip	A-8-2
2nd-Order Mom. Strength	M_{rx} =	0.0	kip.ft	A-8-1

Along axis y:

	R_{my} =	0.97		A-8-8
	$P_{e\text{-}storyY}$ =	25304.2	kip	A-8-7
	B_{2y} =	1.00		A-8-6
2nd-Order Axial Strength	P_{ry} =	30.6	kip	A-8-2
2nd-Order Mom. Strength	M_{ry} =	-6.0	kip.ft	A-8-1

8. COMBINED FORCES INTERACTION EQUATION: GTS

Check Pr/Pc	P_r/P_c =	0.105			
Pr/Pc ≥ 0,2		1.294	OK	Eq.	H.1-1a
Pr/Pc < 0,2		0.000	OK	Eq.	H.1-1b
Design Check			OK	Eq.	H.1-1a

COLUMN-CAPACITY

Member Ref:	26
Frame:	Moment
Floor:	Roof
Member:	Interior Beam
Ref. 2:	2-M

ASSUMPTIONS:

No transverse loads are applied to the member (Per section 7)

1. MATERIAL PROPERTIES:

Modulus of Elasticity:	$E =$	29000	ksi
	$G =$	11200	ksi
Yield Strength:	$F_{y} =$	50	ksi

2. MEMBER GEOMETRIC INFORMATION:

Beam Length	$L =$	24	ft	24	*Project Information*

Column Slenderness Parameters:

Unbraced Length, x:	$L_{bx} =$	24	ft	Global or Local System?
Unbraced Length, y:	$L_{by} =$	24	ft	
Unbraced Length, z:	$L_{bz} =$	24	ft	
Eff. Length Factor, x:	$K_{x} =$	1		
Eff. Length Factor, y:	$K_{y} =$	1		
Eff. Length Factor, z:	$K_{z} =$	1		

Reference: Excel

	Section	*Eq/Fig/Table/Notes*
3. SECTION PROPERTIES	Information	

Section:	W	**W18X35**					
Member is in:		Compression					
Moment of Inertia, x:	$I_{xw\,=}$	510	in^4	Depth:	d =	17.7	in
Moment of Inertia, y	$I_{yw\,=}$	15.3	in^4	Width:	$b_{f\,=}$	6	in
Polar Moment of Inertia:	$J_{w\,=}$	0.506	in^4	Flange Thickness:	$t_{f\,=}$	0.425	in
Radius of Gyration, x:	$r_{xw\,=}$	7.04	in	Web Thickness:	$t_{w\,=}$	0.3	in
Radius of Gyration, y	ryw =	1.22	in	Area:	A =	10.3	in^2
Section Modulus:	$S_{x\,=}$	57.6	in^3	r_{ts}	$r_{ts\,=}$	2.81	in
Plastic Section Modulus, x:	Z =	66.5	in^3	Distance flange/centro	$h_{0\,=}$	11.60	in
T	T =	0	in	Warping Constant	$C_{w\,=}$	1140	in

3. PRELIMINARY ANALYSIS Eq. E 6-2a/b

Slenderness Ratios:	$(KL/r)_{x\,=}$	40.9			
	$(KL/r)_{y\,=}$	236.1	AISC	Table	3-2
	$(KL)_{z\,=}$	288.0	AISC	Table	3-2
Largest Possible Ratio:		236.1			
Compressive Control:		113.43	E		
Critical Stress, Fcr equation:		**USE E3-3**			

4. LOCAL SLENDERNESS CHECK: Table B4.1a

	Web	**Flange**
Member	**h/tw**	**bf/2t**
	53.5	7.06
Critical	λ_r	λ_r
Case	[case 5]	[case 1]
	35.9	*35.9*
Check	N.G	Nonslender

	Reference:	AISC 14th
	Section	*Eq/Fig/Table/Notes*
5. BUCKLING ANALYSIS:	E	

Euler Buckling Stress:	$F_{e3\,=}$	5.1	ksi	*Eq. E3-4*
Torsional Buckling Stress:	$F_{e4\,=}$	18.3	ksi	*Eq. E4-4*
Controling Euler Stress:	Fe3 =	5.1	ksi	
Critical Buckling Stress:	$F_{cr\,=}$	0.8	ksi	*Eq. E3-2*

6. COLUMN CAPACITY: Eq. E3-1

Compressive Strength:	$P_{n} =$	8.8	ksi	*Eq. E3-1*
Factor:	$\Phi =$	0.9		
Column Capacity:	$\Phi.P_{n} =$	7.9	ksi	

BEAM-COLUMN ANALYSIS

1. MATERIAL PROPERTIES:

Modulus of Elasticity:	E =	29000	ksi
	G =	11200	ksi
Yield Strength:	F_{y} =	50	ksi

2. MEMBER GEOMETRIC INFORMATION:

Beam Length	L =	24	ft	*Project Information*
Column Slenderness Parameters:				
Unbraced Length, x:	L_{bx} =	24	ft	*Global or Local System?*
Unbraced Length, y:	L_{by} =	24	ft	
Unbraced Length, z:	L_{bz} =	24	ft	
Eff. Length Factor Check:		**K>1**		*Check for values below*
Eff. Length Factor, x:	K_{x} =	1.25		
Eff. Length Factor, y:	K_{y} =	1.25		
Eff. Length Factor, z:	K_{z} =	1		
Plastic Zones Lengths and Info:				
Full plastic yield Length:	L_{p} =	4.31	ft	
LTB Length:	L_{r} =	12.3	ft	
	$\phi_b BF$ =	12.3	kips	
	$\phi_b M_{px}$ =	249	kip.ft	

Reference: Section Information | Excel *Eq/Fig/Table/Notes*

3. SECTION PROPERTIES

Section:	W	**W18X35**					
Member is in:		Compression					
Moment of Inertia, x:	I_{xw} =	510	in^4	Depth:	d =	17.7	in
Moment of Inertia, y	I_{yw} =	15.3	in^4	Width:	b_f =	6	in
Polar Moment of Inertia:	J_w =	0.506	in^4	Flange Thickness:	t_f =	0.425	in
Radius of Gyration, x:	r_{xw} =	7.04	in	Web Thickness:	t_w =	0.3	in
Radius of Gyration, y	ryw =	1.22	in	Area:	A =	10.3	in^2
Section Modulus:	S_x =	57.6	in^3	r_{ts}	r_{ts} =	2.81	in
Plastic Section Modulus, x:	Z =	66.5	in^3	Distance flange/centro	h_0 =	11.60	in
Plastic Section Modulus, y:	Z_y =	8.06	in	Warping Constant	C_w =	1140	in
T	T =	0	in	Section Modulus:	S_y =	5.12	in^3

3. SLENDERNESS CHARACTERISTICS:
Table B4.1a

	Web	**Flange**
Flexure	Compact	Compact
Compression	Mntx =	3.5

4. CONSIDERATION OF IMPERFECTIONS - NOTIONAL LOADS:
C2.2(b)

Notional Load:	Z_i =	0.94	kip	Eq.	C2-1
Second/First order drift ratio:		2	in		

Is it applied at all levels in all combinations? **YES** Ref. to C.2.3(3)

Reference: GTS
Section *Eq/Fig/Table/Notes*

5. FIRST ORDER ANALYSIS FORCES:
GTS

Ultimate Axial Load, NT	P_{nt} =	5.3	kips	
Ultimate Moment, NT, x	M_{ntx} =	3.5	kip.ft	
Ultimate Moment, NT, y	M_{nty} =	0	kip.ft	
Ultimate Axial Load, LT	P_{lt} =	1	kips	
Ultimate Moment, LT, y	Ml_{tx} =	10.4	kip.ft	
Ultimate Moment, LT, y	Ml_{tx} =	0	kip.ft	
Total V. load in story	P_{story} =	622.1	kip	
	P_{mf} =	607.6	kip	
Story Shear in Direction of	H =	31	kip	
	α =	1		*LRFD*
Lateral Deflection	ΔH =	0.215	in	
Fact. Story Drift Limit	$\Delta H/L$ =	0.0007		

6. MEMBER CAPACITY:
Eq. E3-1

Axial Capacity	$\phi.P_n$ =	7.9	ksi		
Flexure Capacity					
Along axis x:	Zone =	3			
	Cb =	1.34			
Flexure Capacity, x	M_{cx} =	249.0	kip.ft		
Along axis y:	Fy.Zy =	925		Eq.	F6-1
	1.6Fy.Sy =	976		Eq.	F6-1
Flexure Capacity, y	M_{cy} =	832.5	kip.ft		

Reference: AISC 14th
Section *Eq/Fig/Table/Notes*

7. APPROXIMATE SECOND ORDER ANALYSIS:
C

Along axis x: DAM: Use reduced stiffness per C2.3

	τ_b =	1.00		*Apply to all*	C	2.3(2)
Type of Curvature:		Single				
Smaller 1st-O End Mom:	M_1 =	-1				
Larger 1st-O End Mom:	M_2 =	1				
Modif. Coefficient, x:	C_{mx} =	1		App. 8	Eq.	A-8-4
Elastic Buckling Strength, x	P_{ex} =	1612	kip	App. 8	Eq.	A-8-5
Amplification Factor	B_{1x} =	1.0		App. 8	Eq.	A-8-3
Factor Check:		OK		*Check*		

Along axis y:

	τ_b =	1		*Apply to all*	C	2.3(2)
Type of Curvature:		Single				
Smaller 1st-O End Mom:	M_1 =	-1				
Larger 1st-O End Mom:	M_2 =	1				
Modif. Coefficient, y	C_{my} =	1		App. 8	Eq.	A-8-4
Elastic Buckling Strength	P_{ey} =	542	kip	App. 8	Eq.	A-8-5
Amplification Factor	B_{1y} =	1.0		App. 8	Eq.	A-8-3
Factor Check:		OK		*Check*		

Calculate P-Δ Amplification Factor:

Along axis x:

	R_m =	0.85		A-8-8
	$P_{e\text{-}story}$ =	35441.9	kip	A-8-7
	B_{2x} =	1.02		A-8-6
2nd-Order Axial Strength	P_r =	6.3	kip	A-8-2
2nd-Order Mom. Strength	M_{rx} =	0.0	kip.ft	A-8-1

Along axis y:

	R_{my} =	0.85		A-8-8
	$P_{e\text{-}storyY}$ =	35441.9	kip	A-8-7
	B_{2y} =	1.00		A-8-6
2nd-Order Axial Strength	P_{ry} =	6.3	kip	A-8-2
2nd-Order Mom. Strength	M_{ry} =	-3.5	kip.ft	A-8-1

8. COMBINED FORCES INTERACTION EQUATION: GTS

Check Pr/Pc	P_r/P_c =	0.802			
Pr/Pc ≥ 0,2		1.294	OK	Eq.	H.1-1a
Pr/Pc < 0,2		0.000	OK	Eq.	H.1-1b
Design Check			OK	Eq.	H.1-1a

COLUMN-CAPACITY

Member Ref:	29
Frame:	Moment
Floor:	First
Member:	Interior Beam
Ref. 2:	1-M

ASSUMPTIONS:

No transverse loads are applied to the member (Per section 7)

1. MATERIAL PROPERTIES:

Modulus of Elasticity:	$E =$	29000	ksi
	$G =$	11200	ksi
Yield Strength:	$F_{y} =$	50	ksi

2. MEMBER GEOMETRIC INFORMATION:

Beam Length	$L =$	24	ft	24	*Project Information*

Column Slenderness Parameters:

Unbraced Length, x:	$L_{bx} =$	24	ft	Global or Local System?
Unbraced Length, y:	$L_{by} =$	24	ft	
Unbraced Length, z:	$L_{bz} =$	24	ft	
Eff. Length Factor, x:	$K_{x} =$	1		
Eff. Length Factor, y:	$K_{y} =$	1		
Eff. Length Factor, z:	$K_{z} =$	1		

Reference: Excel

		Section	*Eq/Fig/Table/Notes*
3. SECTION PROPERTIES		Information	

Section: W **W21X44**
Member is in: Compression

Moment of Inertia, x:	$I_{xw} =$	843	in^4	Depth:	d =	20.7	in
Moment of Inertia, y	$I_{yw} =$	20.7	in^4	Width:	$b_f =$	6.5	in
Polar Moment of Inertia:	$J_w =$	0.77	in^4	Flange Thickness:	$t_f =$	0.45	in
Radius of Gyration, x:	$r_{xw} =$	8.06	in	Web Thickness:	$t_w =$	0.35	in
Radius of Gyration, y	ryw =	1.26	in	Area:	A =	13	in^2
Section Modulus:	$S_x =$	81.6	in^3	r_{ts}	$r_{ts} =$	2.81	in
Plastic Section Modulus, x:	Z =	95.4	in^3	Distance flange/centro	$h_0 =$	11.60	in
T	T =	0	in	Warping Constant	$C_w =$	2110	in

3. PRELIMINARY ANALYSIS Eq. E 6-2a/b

Slenderness Ratios:	$(KL/r)_x =$	35.7			
	$(KL/r)_y =$	228.6	AISC	Table	3-2
	$(KL)_z =$	288.0	AISC	Table	3-2
Largest Possible Ratio:		228.6			
Compressive Control:		113.43	E		
Critical Stress, Fcr equation:		**USE E3-3**			

4. LOCAL SLENDERNESS CHECK: Table B4.1a

	Web	**Flange**
Member	**h/tw**	**bf/2t**
	53.6	7.22
Critical	λ_r	λ_r
Case	[case 5]	[case 1]
	35.9	*35.9*
Check	N.G	Nonslender

Reference: AISC 14th
Section *Eq/Fig/Table/Notes*

5. BUCKLING ANALYSIS: E

Euler Buckling Stress:	$F_{e3} =$	5.5	ksi	*Eq. E3-4*
Torsional Buckling Stress:	$F_{e4} =$	18.4	ksi	*Eq. E4-4*
Controling Euler Stress:	Fe3 =	5.5	ksi	
Critical Buckling Stress:	$F_{cr} =$	1.1	ksi	*Eq. E3-2*

6. COLUMN CAPACITY: Eq. E3-1

Compressive Strength:	P_{n} =	14.3	ksi	*Eq. E3-1*
Factor:	Φ =	0.9		
Column Capacity:	$\Phi.P_{n}$ =	12.8	ksi	

BEAM-COLUMN ANALYSIS

1. MATERIAL PROPERTIES:

Modulus of Elasticity:	$E =$	29000	ksi
	$G =$	11200	ksi
Yield Strength:	$F_{y} =$	50	ksi

2. MEMBER GEOMETRIC INFORMATION:

Beam Length	$L =$	24	ft	*Project Information*
Column Slenderness Parameters:				
Unbraced Length, x:	$L_{bx} =$	24	ft	*Global or Local System?*
Unbraced Length, y:	$L_{by} =$	24	ft	
Unbraced Length, z:	$L_{bz} =$	24	ft	
Eff. Length Factor Check:		**K>1**		*Check for values below*
Eff. Length Factor, x:	$K_{x} =$	1.28		
Eff. Length Factor, y:	$K_{y} =$	1.28		
Eff. Length Factor, z:	$K_{z} =$	1		
Plastic Zones Lengths and Info:				
Full plastic yield Length:	$L_{p} =$	4.45	ft	
LTB Length:	$L_{r} =$	13	ft	
	$\phi_b BF =$	16.8	kips	
	$\phi_b M_{px} =$	358	kip.ft	

Reference:	Excel
Section Information	*Eq/Fig/Table/Notes*

3. SECTION PROPERTIES

Section:	W	**W21X44**					
Member is in:		Compression					
Moment of Inertia, x:	$I_{xw} =$	843	in^4	Depth:	$d =$	20.7	in
Moment of Inertia, y	$I_{yw} =$	20.7	in^4	Width:	$b_{f} =$	6.5	in
Polar Moment of Inertia:	$J_{w} =$	0.77	in^4	Flange Thickness:	$t_{f} =$	0.45	in
Radius of Gyration, x:	$r_{xw} =$	8.06	in	Web Thickness:	$t_{w} =$	0.35	in
Radius of Gyration, y	$ryw =$	1.26	in	Area:	$A =$	13	in^2
Section Modulus:	$S_{x} =$	81.6	in^3	r_{ts}	$r_{ts} =$	2.81	in
Plastic Section Modulus, x:	$Z =$	95.4	in^3	Distance flange/centro	$h_{0} =$	11.60	in
Plastic Section Modulus, y:	$Z_{y} =$	10.2	in	Warping Constant	$C_{w} =$	2110	in
T	$T =$	0	in	Section Modulus:	$S_{y} =$	6.37	in^3

3. SLENDERNESS CHARACTERISTICS:

Table B4.1a

	Web	Flange
Flexure	Compact	Compact
Compression	Mntx =	20

4. CONSIDERATION OF IMPERFECTIONS - NOTIONAL LOADS:

C2.2(b)

Notional Load:	Z_i =	0.428	kip	Eq.	C2-1
Second/First order drift ratio:		2	in		

Is it applied at all levels in all combinations? **YES** Ref. to C.2.3(3)

Reference: GTS
Section *Eq/Fig/Table/Notes*

5. FIRST ORDER ANALYSIS FORCES:

GTS

Ultimate Axial Load, NT	P_{nt} =	6.6	kips
Ultimate Moment, NT, x	M_{ntx} =	20	kip.ft
Ultimate Moment, NT, y	M_{nty} =	0	kip.ft
Ultimate Axial Load, LT	P_{lt} =	2	kips
Ultimate Moment, LT, y	Ml_{tx} =	15	kip.ft
Ultimate Moment, LT, y	Ml_{tx} =	0	kip.ft
Total V. load in story	P_{story} =	3643.2	kip
	P_{mf} =	607.6	kip
Story Shear in Direction of	H =	31	kip
	α =	1	*LRFD*
Lateral Deflection	ΔH =	0.215	in
Fact. Story Drift Limit	ΔH/L =	0.0007	

6. MEMBER CAPACITY:

Eq. E3-1

Axial Capacity	$\phi.P_n$ =	12.8	ksi		
Flexure Capacity					
Along axis x:	Zone =	3			
	Cb =	1.34			
Flexure Capacity, x	M_{cx} =	358.0	kip.ft		
Along axis y:	Fy.Zy =	925		Eq.	F6-1
	1.6Fy.Sy =	976		Eq.	F6-1
Flexure Capacity, y	M_{cy} =	832.5	kip.ft		

Reference: AISC 14th
Section *Eq/Fig/Table/Notes*

7. APPROXIMATE SECOND ORDER ANALYSIS:

C

Along axis x:

DAM: Use reduced stiffness per C2.3

	τ_b =	1.00		*Apply to all*	C	2.3(2)
Type of Curvature:		Single				
Smaller 1st-O End Mom:	M_1 =	-1				
Larger 1st-O End Mom:	M_2 =	1				
Modif. Coefficient, x:	C_{mx} =	1		App. 8	Eq.	A-8-4
Elastic Buckling Strength, x	P_{ex} =	1612	kip	App. 8	Eq.	A-8-5
Amplification Factor	B_{1x} =	1.0		App. 8	Eq.	A-8-3
Factor Check:		OK		*Check*		

Along axis y:

	τ_b =	1		*Apply to all*	C	2.3(2)
Type of Curvature:		Single				
Smaller 1st-O End Mom:	M_1 =	-1				
Larger 1st-O End Mom:	M_2 =	1				
Modif. Coefficient, y	C_{my} =	1		App. 8	Eq.	A-8-4
Elastic Buckling Strength	P_{ey} =	542	kip	App. 8	Eq.	A-8-5
Amplification Factor	B_{1y} =	1.0		App. 8	Eq.	A-8-3
Factor Check:		OK		*Check*		

Calculate P-Δ Amplification Factor:

Along axis x:

	R_m =	0.97		A-8-8
	$P_{e\text{-}story}$ =	40486.8	kip	A-8-7
	B_{2x} =	1.10		A-8-6
2nd-Order Axial Strength	P_r =	8.8	kip	A-8-2
2nd-Order Mom. Strength	M_{rx} =	0.0	kip.ft	A-8-1

Along axis y:

	R_{my} =	0.97		A-8-8
	$P_{e\text{-}storyY}$ =	40486.8	kip	A-8-7
	B_{2y} =	1.00		A-8-6
2nd-Order Axial Strength	P_{ry} =	8.6	kip	A-8-2
2nd-Order Mom. Strength	M_{ry} =	-20.0	kip.ft	A-8-1

8. COMBINED FORCES INTERACTION EQUATION: GTS

Check Pr/Pc	P_r/P_c =	0.686			
Pr/Pc ≥ 0,2		1.294	OK	Eq.	H.1-1a
Pr/Pc < 0,2		0.000	OK	Eq.	H.1-1b
Design Check			OK	Eq.	H.1-1a