

3 Sizer: Column Mode Tutorial 3 – Determine Column Size Based on given Loads (US)

3.1 Software Version and Standard

This tutorial was completed using WoodWorks® US 2019, and NDS 2018.

3.2 Introduction

Click [here](#) to download the Sizer file (.wwc) created from going through this tutorial.

3.3 Defining Column Parameters

1. Click on the **New Column Mode File** button on the toolbar.
2. Specify **Height** as **9 (ft)**.

The screenshot displays the Sizer software interface for defining column parameters. The main panel includes the following fields:

- Description: Tutorial 3
- Height: 9 ft
- Type: Column
- Material: Timber-soft
- Species: (unknown)
- Grade: (unknown)
- Width (b): (unknown) to (unknown) in
- Depth (d): (unknown) to (unknown) in
- Stud spacing*: (unknown) in

Additional options and settings are shown in sub-panels:

- Built-up members:** From [] to [] plies, Connection []
- Glulam lay-up:** Stress class, Combination
- Wane:** None
- Non edge-bonded laminations
- Use member width for CV factor
- Lamination width: [] in
- Deflection limits:** Live: L/ [120], Total: L/ [120], and <= [1.00] in

Figure 1: Sizer: Column Mode – Tutorial 3 – Defining Height of Column

3. Under the **Lateral support** section, specify **continuous (in)** as **Spacing*** under the **width (b)** section.
4. Under the **Lateral support** section, specify **At ends (in)** as **Spacing*** under the **depth (d)** section.

Lateral support			End conditions	
Surface:	Width b	Depth d	Base	Top
Spacing*	Continuous <input type="text"/> in	At ends <input type="text"/> in	<input checked="" type="radio"/> Pinned	<input checked="" type="radio"/> Pinned
Factor K_e	<input type="text" value="1"/>	<input type="text" value="1"/>	<input type="radio"/> Fixed	<input type="radio"/> Free

Figure 2: Sizer: Column Mode – Tutorial 3 – Specifying Lateral Support

3.4 Loading the Column

1. Click on the **Loads View** button on the toolbar.
2. Select **Dead** from the **Type** drop-down list.
3. Specify **Axial** from the **Distribution** drop-down list.
4. In the **Magnitude** field enter a value of **5600 (lbs)**.
5. Click **Add**.

Name	Type	Distribution	Magnitude lbs	Location from left (in.)
	Dead	Axial	5600	Auto
Load1	Dead	Axial	5600 lbs	Auto

Apply auto-eccentricity
% from Design Settings

Combine loads of same type in drawing

Self-weight

Automatically included in loads analysis

Must be manually input as load

Load duration factor CD

<input type="text" value="0.9"/>	Permanent Dead
<input type="text" value="1"/>	Ten years Live (Occupancy)
<input type="text" value="1.15"/>	Two months Snow
<input type="text" value="1.25"/>	Seven days Construction
<input type="text" value="1.6"/>	Ten minutes Wind/Seismic
<input type="text" value="2"/>	Impact

Load face (all loads)

Width (b) Depth (d)

Load types and combinations

All live loads are construction loads

All roof live loads are construction loads

IBC deflection factors (Table 1604.3)

Use L+0.5D for deflection (Note d)

.7W for C&C wind loads (Note f)

Long-term deflection (NDS 3.5.2)

Include creep factor Kcr:

Total = dead + live (all others)

Figure 3: Sizer: Column Mode – Tutorial 3 – Loading Column

6. Repeat steps 2-5 for a **Snow** load type with **Magnitude of 8400 (lbs)** and a **Live** load type with **Magnitude of 6750 (lbs)**.
7. Select **Wind** from the **Type** drop-down list.
8. Specify **Full Uniform Line** from the **Distribution** drop-down list.
9. In the **Magnitude** field enter a value of **150 (plf)**.
10. Click **Add**.

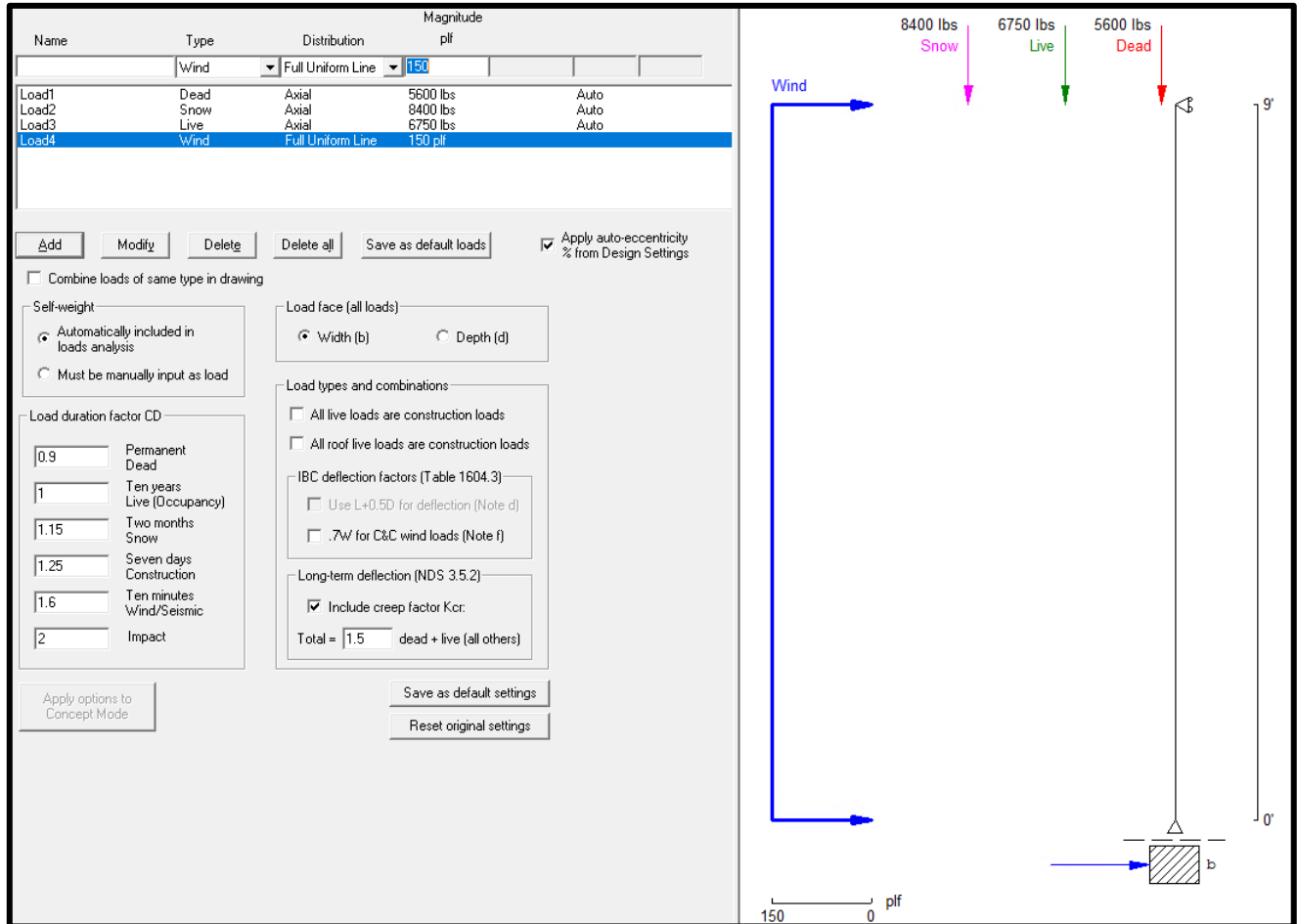


Figure 4: Sizer: Column Mode – Tutorial 3 – Loaded Column

3.5 Designing the Column

1. Click the **Run** button on the toolbar. *Sizer* automatically designs the member.

Note: *Sizer* will prompt you to save the project file.

Sizer will complete the design, and will automatically generate the **Design Summary, Analysis Results,** and **Analysis Diagrams.** These buttons are displayed on the toolbar



Figure 5: *Sizer: Column Mode – Tutorial 3 – Column Design*

3.6 View Design Summary

The **Design Summary** includes a list of sections which can resist the applied loads.

Click [here](#) to download a PDF of the design summary.

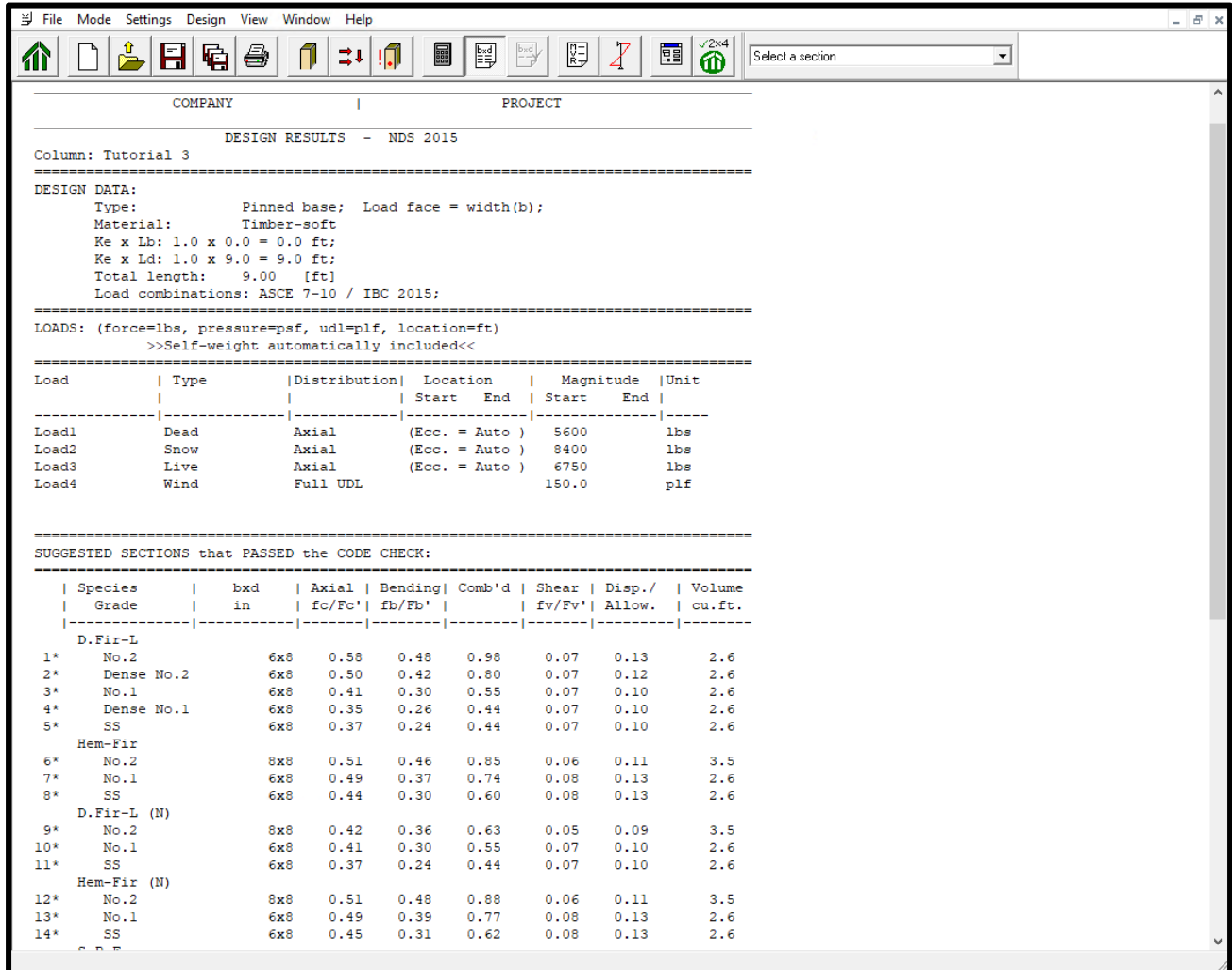


Figure 6: Sizer: Column Mode – Tutorial 3 – Design Summary

3.7 View Analysis Results

Click the **Analysis Results** button on the toolbar to view the applied loads, load combinations, shear and bending values and vertical reactions.

Click [here](#) to download a PDF of the analysis results.

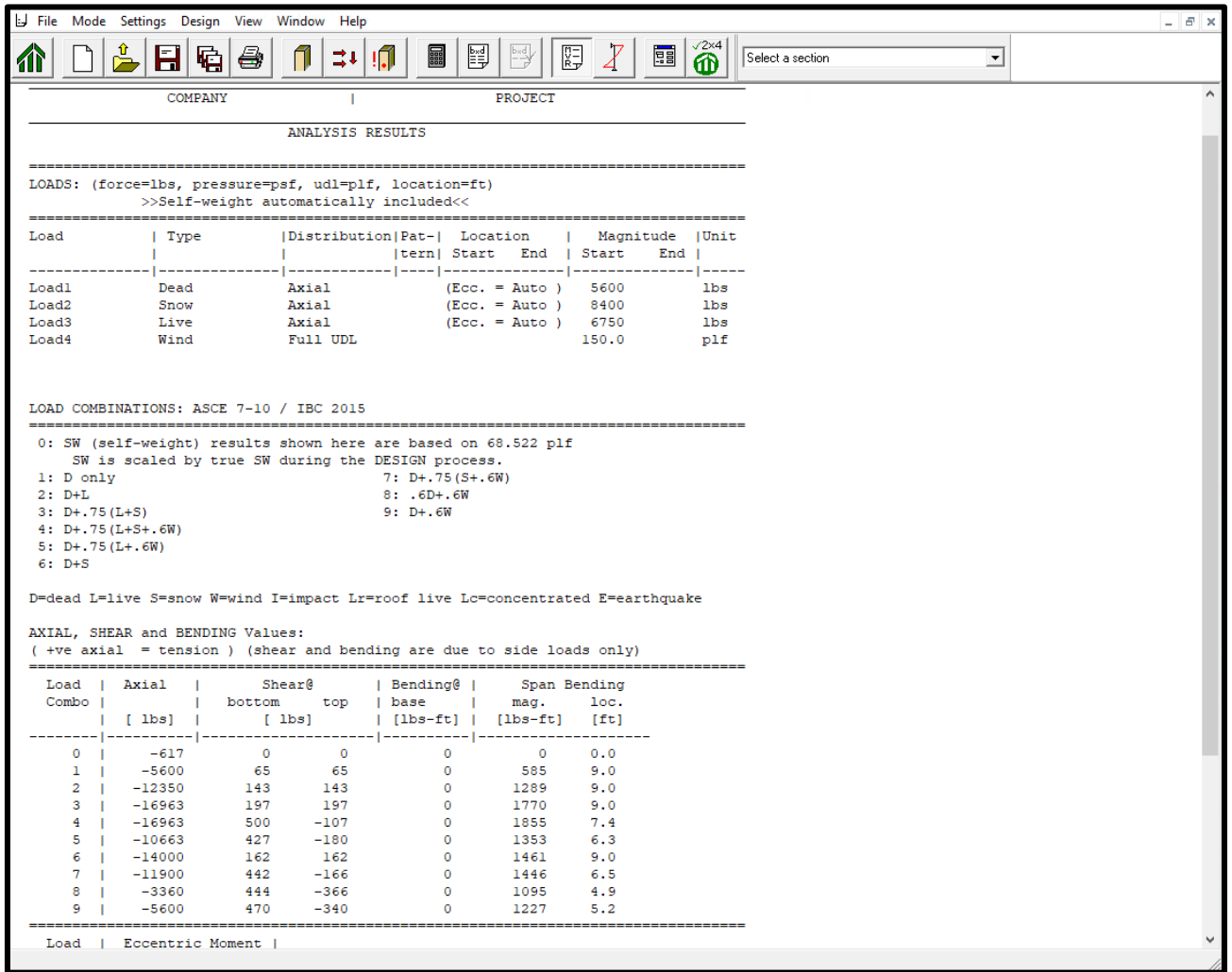


Figure 7: Sizer: Column Mode – Tutorial 3 – Analysis Results

3.8 View Analysis Diagrams

Click the **Analysis Diagram** button on the toolbar to view reactions, shear, bending moments and deflection diagrams.

Click [here](#) to download a PDF of the analysis diagrams.

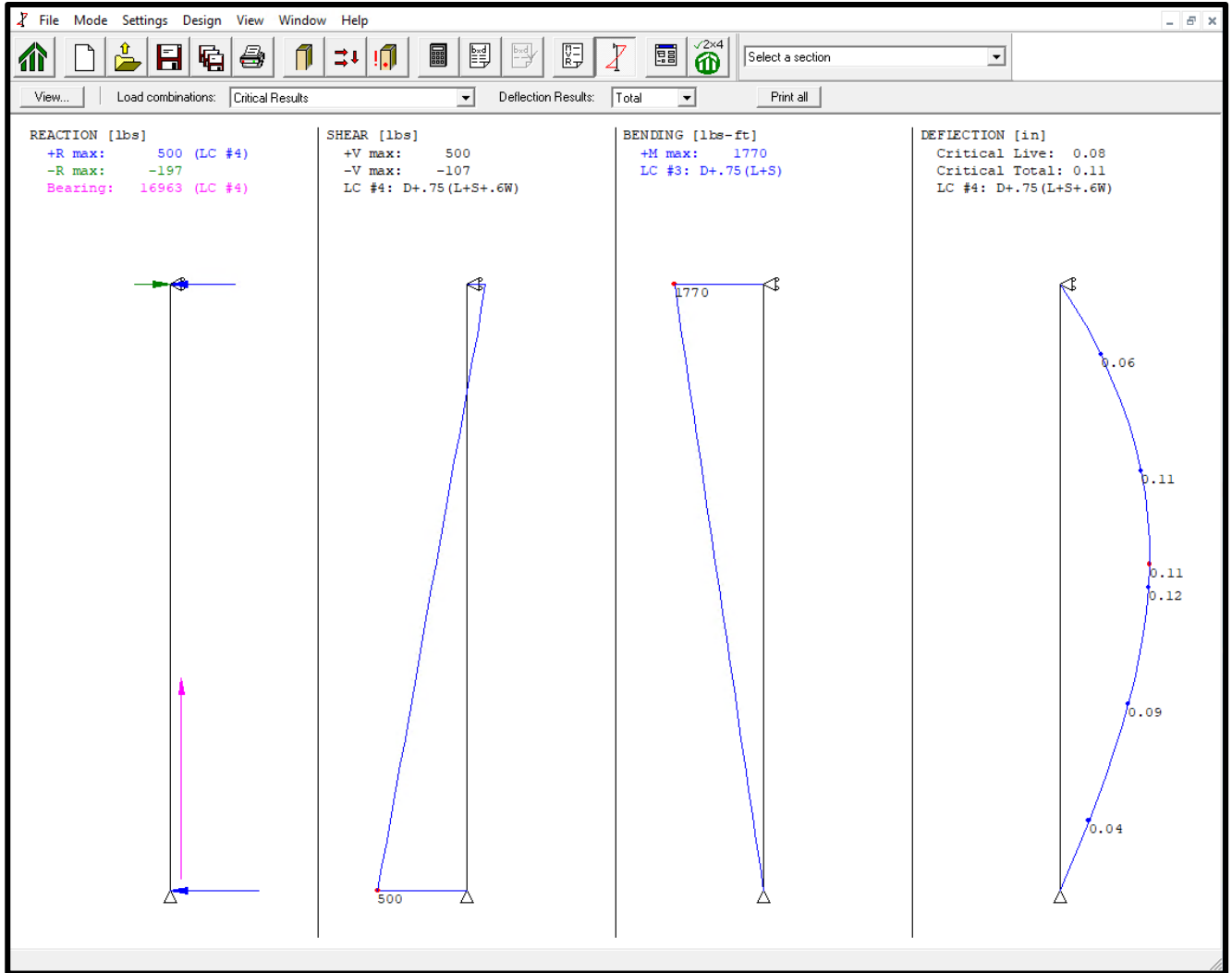


Figure 8: Sizer: Column Mode – Tutorial 3 – Analysis Diagrams

3.9 Perform a Detailed Design on a Specific Section

1. From the **Select a section** drop-down list in the toolbar, select **D.Fir-L No.2 6x8**.

Sizer will complete a detailed design, and will automatically generate the **Design Summary**, **Design Check Calculation Sheet**, **Analysis Results**, and **Analysis Diagrams** for this specific section.

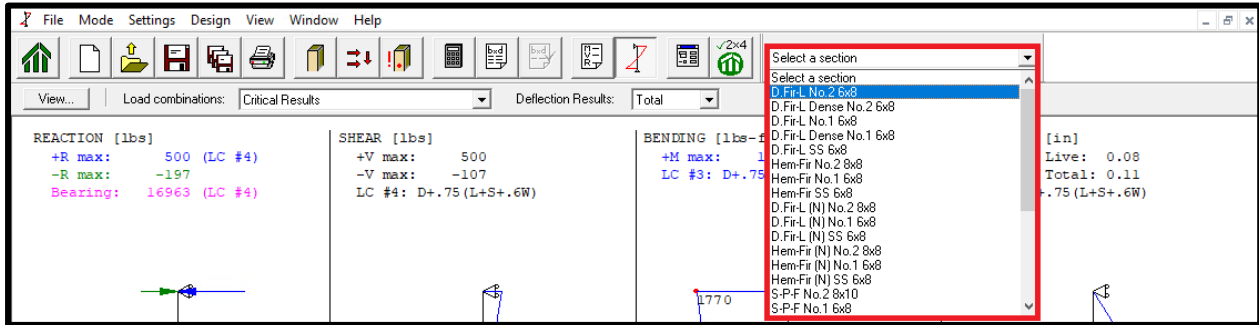


Figure 9: Sizer: Column Mode – Tutorial 3 – Select a Specific Section

- Repeat step 1 to perform a detailed design on any other sections listed in the **Select a section** drop-down list.

Click [here](#) to download a PDF of the design check calculation sheet.

WoodWorks
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Design Check Calculation Sheet
WoodWorks Sizer 12.0 Beta 6

Loads:

Load	Type	Distribution	Location [ft]		Magnitude		Unit
			Start	End	Start	End	
Load1	Dead	Axial	(Ecc. = 1.25")		5600		lbs
Load2	Snow	Axial	(Ecc. = 1.25")		8400		lbs
Load3	Live	Axial	(Ecc. = 1.25")		6750		lbs
Load4	Wind	Full UDL			150.0		plf
Self-weight	Dead	Axial			88		lbs

Lateral Reactions (lbs):

Category	Value	Unit
Unfactored:		
Lateral:		
Dead	65	-65
Live	78	-78
Snow	97	-97
Wind	675	675
Axial:		
Dead	5600	5600
Live	6750	6750
Snow	8400	8400
Factored:		
L->R	500	366
Load comb	#4	#8

Tutorial 3
Timber-soft, D.Fir-L, No.2, 6x8 (5-1/2"x7-1/2")
Support: Non-wood
Total length: 9.0'; volume = 2.6 cu.ft.; Post and timber
Pinned base; Load face = width(b); $K_e \times L_b: 1.0 \times 0.0 = 0.0$ ft; $K_e \times L_d: 1.0 \times 9.0 = 9.0$ ft;

Figure 10: Tutorial 3 – Design Check Calculation Sheet