

1 Sizer: Beam Mode Tutorial 1 – Determine Beam Size based on given Loads (US)

1.1 Software Version and Standard

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

1.2 Introduction

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

1.3 Defining Beam Parameters

1. Click on the **New Beam Mode File** button on the toolbar.
2. Specify **Span** as **15 (ft)**.
3. Click on **Add**.
4. Repeat steps 2 and 3 for two additional spans of **15 (ft)** and **5.5 (ft)**.
5. Specify **Right** from the **Cantilevers** drop-down list.
6. Specify **Timber-soft** from the **Material** drop-down list.
7. Specify **D.Fir-L** from the **Species** drop-down list.

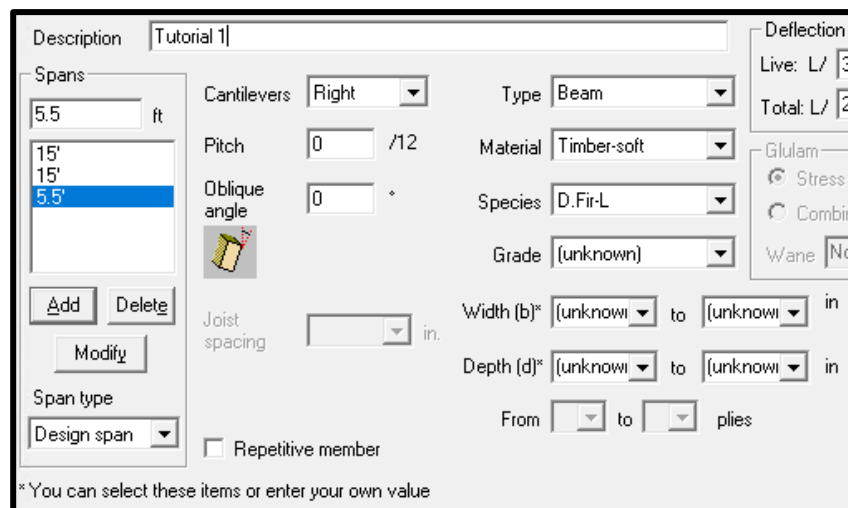


Figure 1: Sizer: Beam Mode – Tutorial 1 – Defining Beam Length and Material

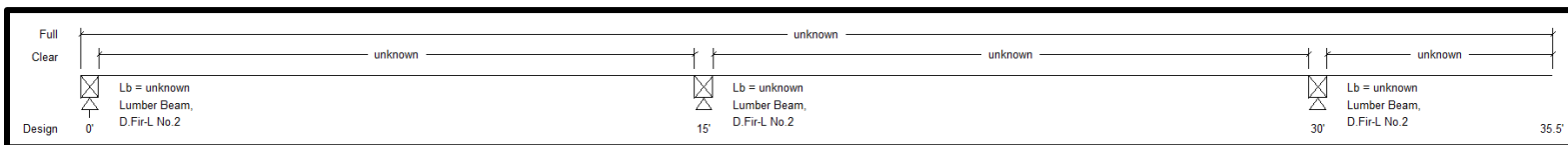


Figure 2: Sizer: Beam Mode – Tutorial 1 – Beam Diagram

8. Under the **Supports for bearing design** section, select **All supports** from the **Applies to** drop-down list.
9. Specify **Beam** from the **Type** drop-down list.
10. Specify **Timber-soft** from the **Material** drop-down list.
11. Specify **D.Fir-L** from the **Species** drop-down list.
12. Specify **No.2** from the **Grade** drop-down list.
13. Specify **5-1/2 (in)** from the **Bearing length*** drop-down list.
14. Specify **Same as beam** from the **Bearing width*** drop-down list.

Figure 3: Sizer: Beam Mode – Tutorial 1 – Specifying Bearing Details

1.4 Loading the Beam

1. Click on the **Loads View** button on the toolbar.
2. Select **Dead** from the **Type** drop-down list.
3. Specify **Full Uniform Line** from the **Distribution** drop-down list.
4. In the **Magnitude** field enter a value of **100 (plf)**.
5. Click **Add**.

Name	Type	Distribution	Magnitude	plf	Pattern loading
Load1	Dead	Full Uniform Line	100		

Buttons: Add, Modify, Delete, Delete all, Repeating point load..., Save as default loads

Figure 4: Sizer: Beam Mode – Tutorial 1 – Loading Beam

6. Select **Live** from the **Type** drop-down list.
7. Specify **Full Uniform Line** from the **Distribution** drop-down list.
8. In the **Magnitude** field enter a value of **200 (plf)**.
9. Click on the **Pattern loading** check box.
10. Click **Add**.
11. Change the **Distribution** field to **Point Load** and enter a magnitude of **350 (lbs)** from the **Magnitude** drop-down list.
12. In the **Location from left bearing point (ft)** field enter a value of **35.5 (ft)**.
13. Choose **Live** from the **Type** drop-down list and click the **Pattern Loading** checkbox.
14. Click **Add**.

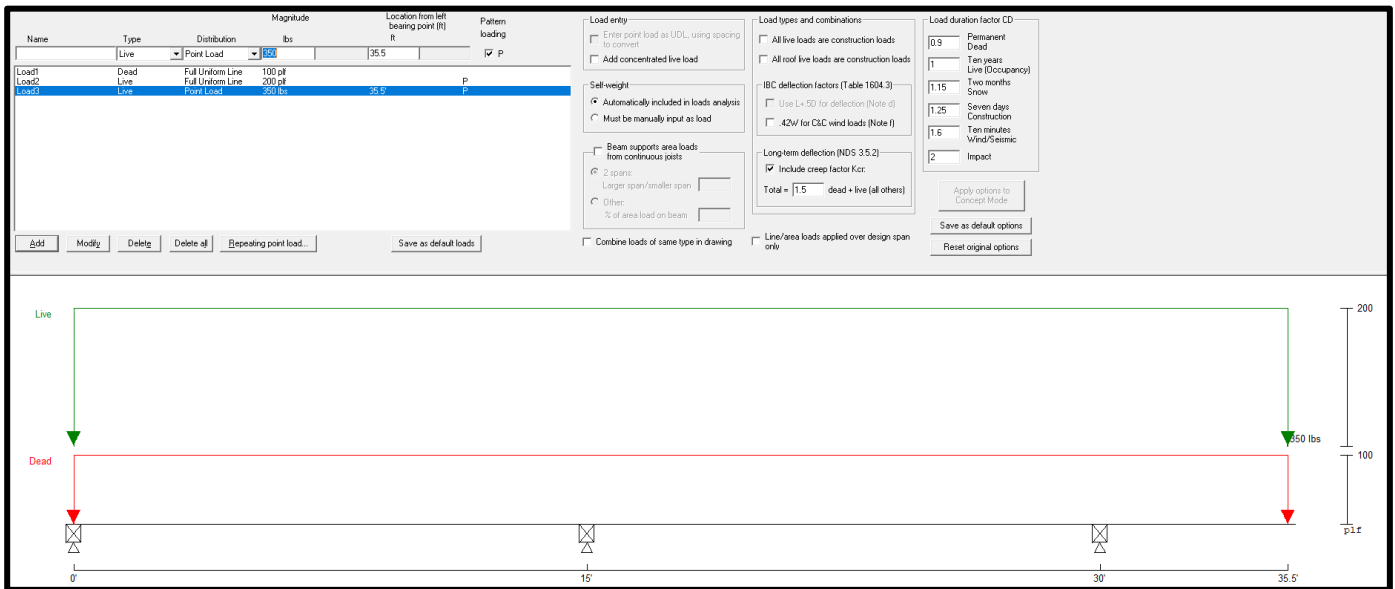


Figure 5: Sizer: Beam Mode – Tutorial 1 – Loaded Beam

1.5 Designing the Beam

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.

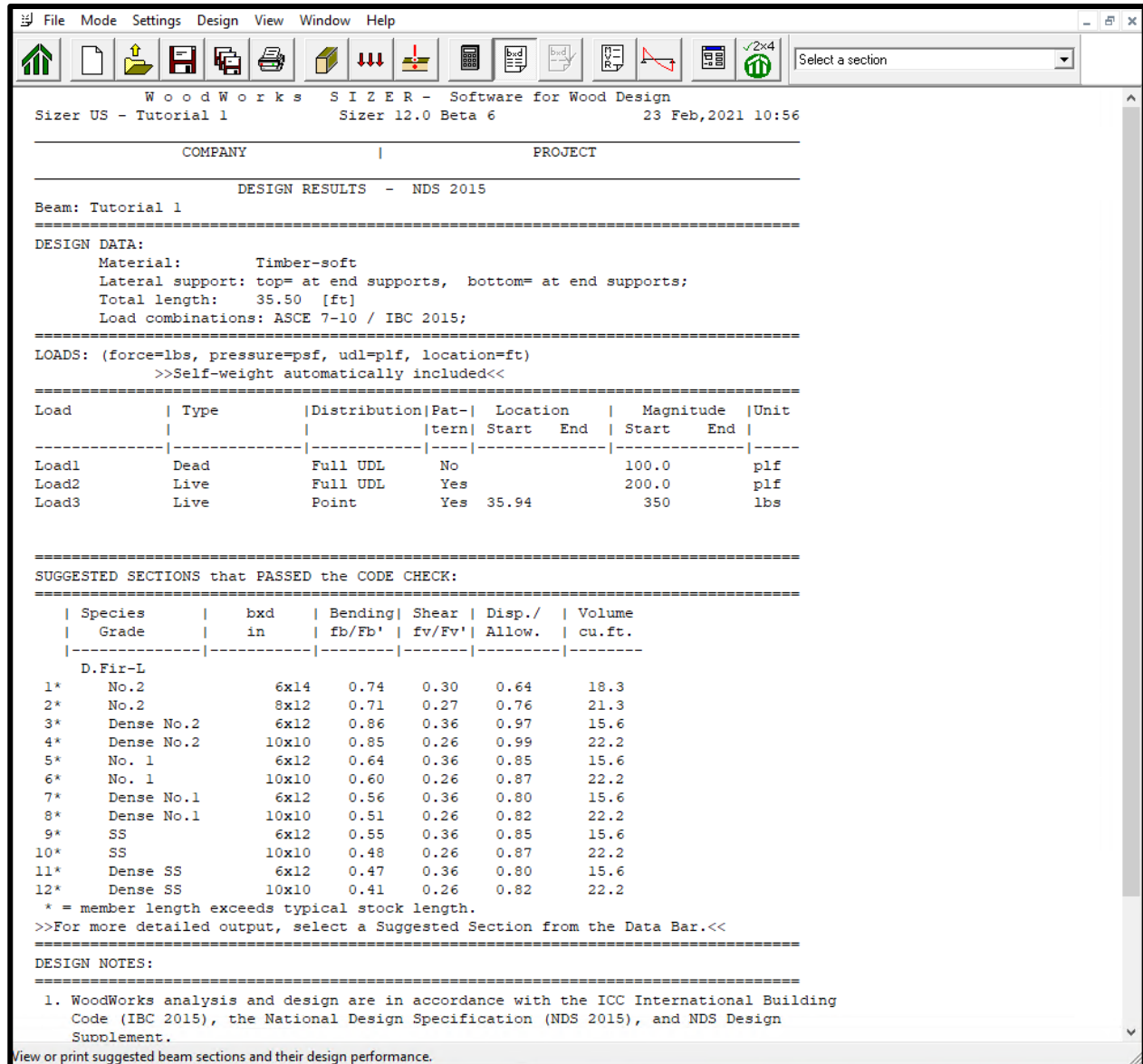


Figure 6: *Sizer: Beam Mode – Tutorial 1 – Beam Design*

1.6 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.



WoodWorks SIZER - Software for Wood Design
Sizer US - Tutorial 1 Sizer 12.0 Beta 6 23 Feb, 2021 10:56

COMPANY	PROJECT

DESIGN RESULTS - NDS 2015

Beam: Tutorial 1

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DESIGN DATA:

Material: Timber-soft
Lateral support: top= at end supports, bottom= at end supports;
Total length: 35.50 [ft]
Load combinations: ASCE 7-10 / IBC 2015;

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LOADS: (force=lbs, pressure=psf, udl=plf, location=ft)
>>Self-weight automatically included<<

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Load	Type	Distribution	Pat-tern	Location Start End	Magnitude Start End	Unit
Load1	Dead	Full UDL	No		100.0	plf
Load2	Live	Full UDL	Yes		200.0	plf
Load3	Live	Point	Yes	35.94	350	lbs

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SUGGESTED SECTIONS that PASSED the CODE CHECK:

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	Species Grade	bxd in	Bending fb/Fb'	Shear fv/Fv'	Disp./ Allow.	Volume cu.ft.
D.Fir-L						
1*	No.2	6x14	0.74	0.30	0.64	18.3
2*	No.2	8x12	0.71	0.27	0.76	21.3
3*	Dense No.2	6x12	0.86	0.36	0.97	15.6
4*	Dense No.2	10x10	0.85	0.26	0.99	22.2
5*	No. 1	6x12	0.64	0.36	0.85	15.6
6*	No. 1	10x10	0.60	0.26	0.87	22.2
7*	Dense No.1	6x12	0.56	0.36	0.80	15.6
8*	Dense No.1	10x10	0.51	0.26	0.82	22.2
9*	SS	6x12	0.55	0.36	0.85	15.6
10*	SS	10x10	0.48	0.26	0.87	22.2
11*	Dense SS	6x12	0.47	0.36	0.80	15.6
12*	Dense SS	10x10	0.41	0.26	0.82	22.2

* = member length exceeds typical stock length.
>>For more detailed output, select a Suggested Section from the Data Bar.<<

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DESIGN NOTES:

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1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2015), the National Design Specification (NDS 2015), and NDS Design Supplement.

View or print suggested beam sections and their design performance.

Figure 7: Sizer: Beam Mode – Tutorial 1 – Design Summary

1.7 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.

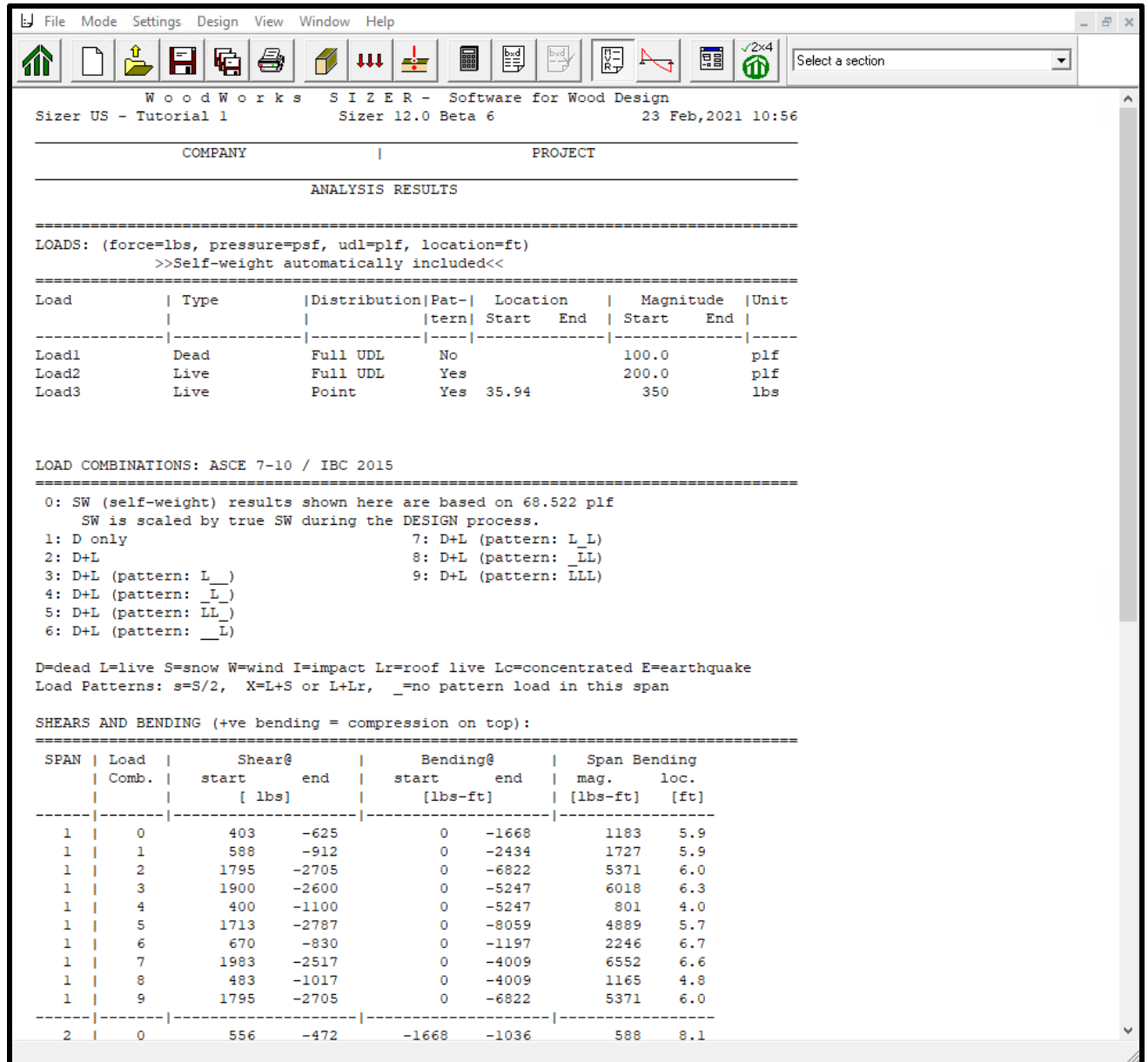


Figure 8: Sizer: Beam Mode – Tutorial 1 – Analysis Results

1.8 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.

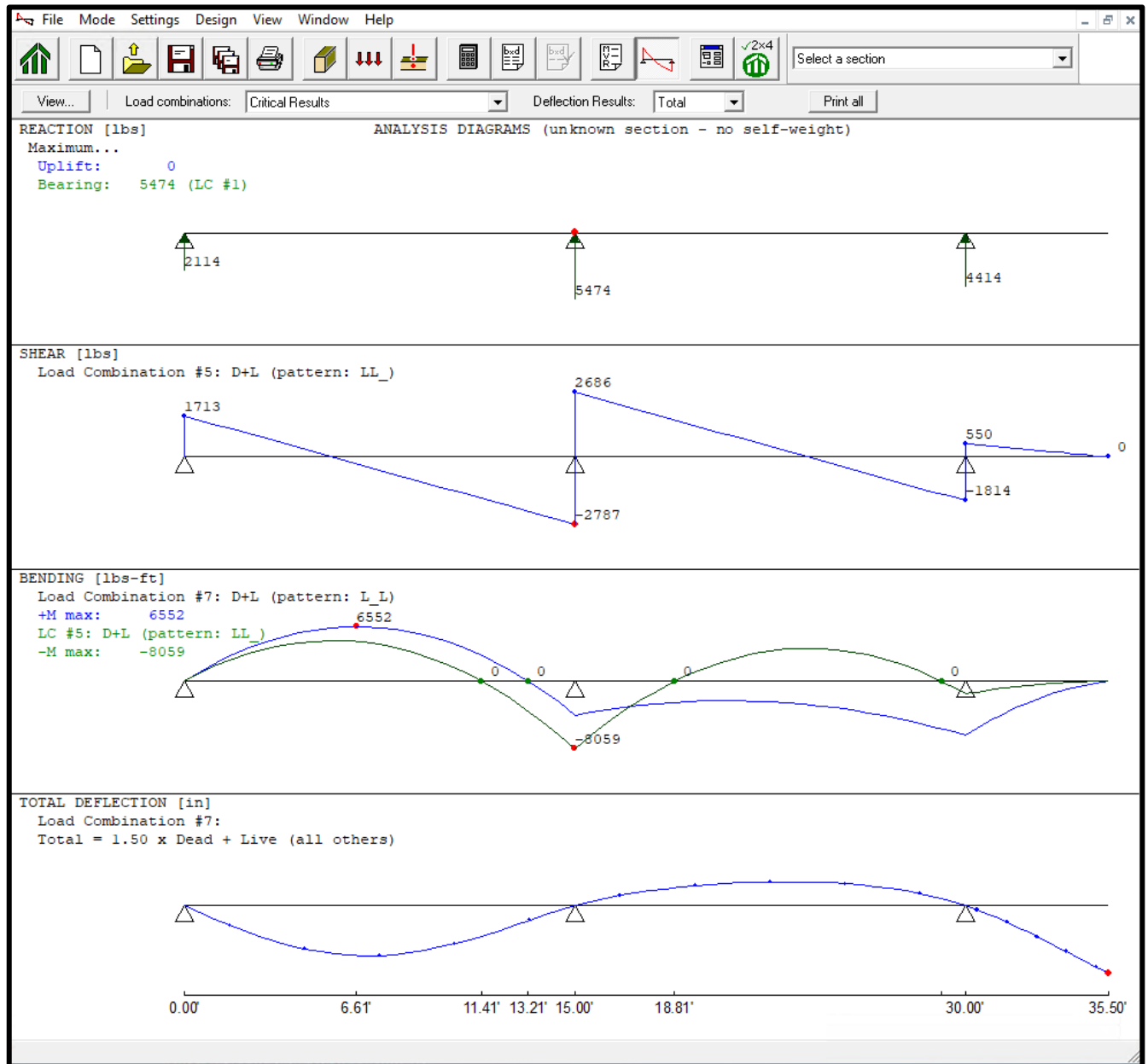


Figure 9: Sizer: Beam Mode – Tutorial 1 – Analysis Diagrams

1.9 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.1 10x10**.

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.

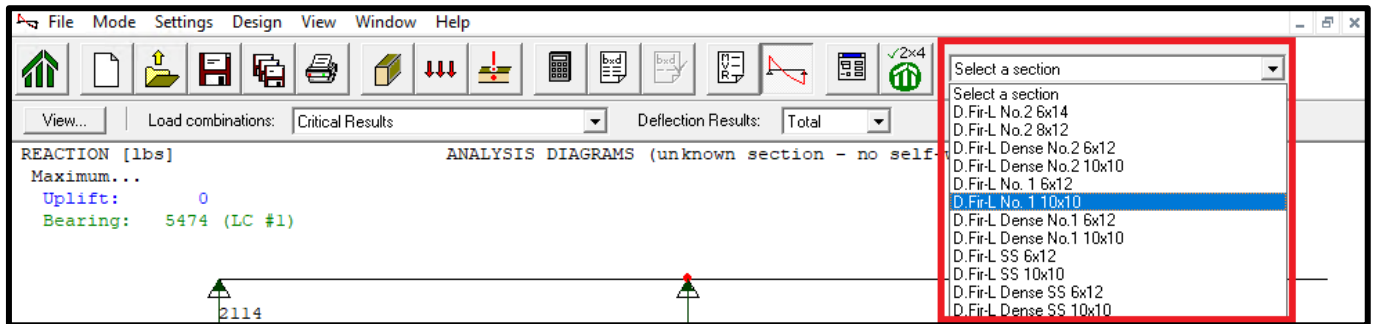


Figure 10: *Sizer: Beam Mode – Tutorial 1 – Selecting a Specific Section*

- 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.

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Design Check Calculation Sheet

WoodWorks Sizer 12.0 Beta 6

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start End	Magnitude Start End	Unit
Load1	Dead	Full UDL	No		100.0	plf
Load2	Live	Full UDL	Yes		200.0	plf
Load3	Live	Point	Yes	35.94	350	lbs
Self-weight	Dead	Full UDL	No		21.4	plf

Maximum Reactions (lbs), Bearing Capacities (lbs) and Bearing Lengths (in) :

Unfactored:					
Dead	757		2093		1504
Live	1483		3750		3175
Factored:					
Total	2240		5843		4679
Bearing:					
Capacity					
Beam	32656		34882		34882
Support	32656		32656		32656
Des ratio					
Beam	0.07		0.17		0.13
Support	0.07		0.18		0.14
Load comb	#7		#5		#8
Length	5.50		5.50		5.50
Min req'd	0.50*		0.98**		0.79**
Cb	1.00		1.07		1.07
Cb min	1.00		1.38		1.48
Cb support	1.00		1.00		1.00
Fcp sup	625		625		625

**Minimum bearing length governed by the required width of the supporting member.
Maximum reaction on at least one support is from a different load combination than the critical one for bearing design, shown here, due to Cd factor. See Analysis results for reaction from critical load combination.

Figure 11: Sizer: Beam Mode – Tutorial 1 – Design Check Calculation Sheet