WoodWorks®

Design Office

Sizer* | *Shearwalls* | *Connections* | *Database Editor

2017 User Guide – Canadian Sizer Tutorial Instructions

For Canadian Design Office 9

Canadian Wood Council

American Wood Council

Developed by

Acronym Software Inc.

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As always, the engineer is ultimately responsible for his or her design.

Refer to Read Me for further information.

1 Beam Mode Tutorial 1 - Determine beam size based on given Loads (CDN)

The Sizer file (.wwb) created from going through this tutorial can be downloaded by clicking here.

1.1 Defining the Parameters

1. Start the program in Beam mode.
2. Select the ***Span*** field and enter a span of ***3 m***.
3. Click ***Add***.
4. Repeat steps 2 and 3 for two additional spans of ***3 m*** and ***1 m***.
5. Choose ***Right*** from the ***Cantilever*** drop-down list.
6. Although you can try different ***Materials***, select ***Timber*** for this example.
7. Select species type ***D.Fir-L***.

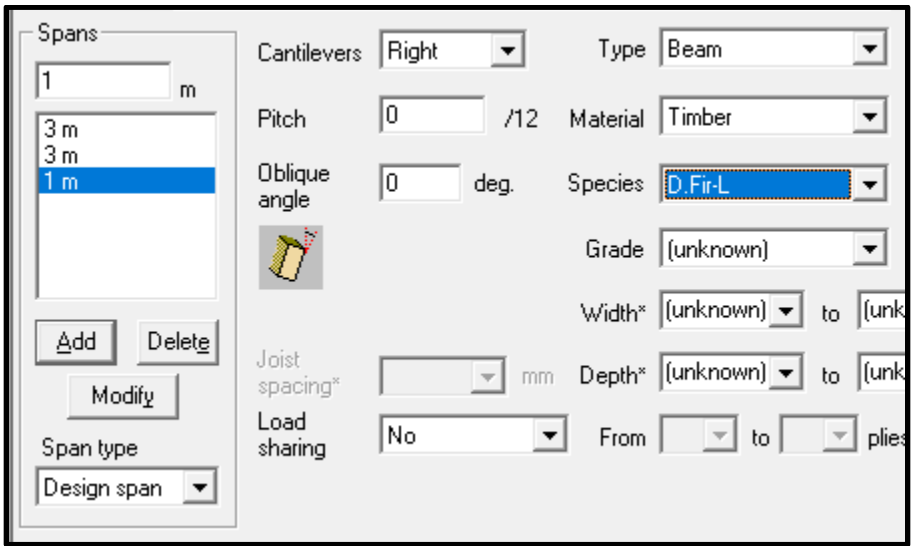

Figure 1: *Tutorial 1 – Defining length of Beam and Materials*

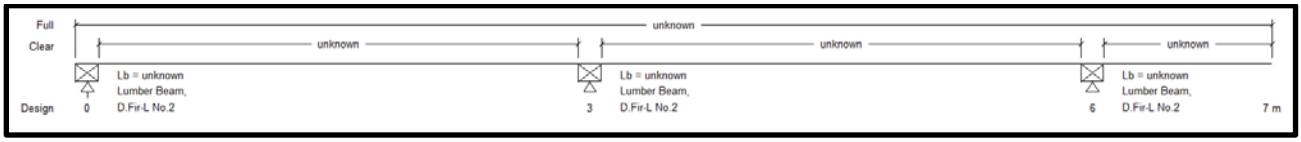

Figure 2: *Tutorial 1 – Beam Length*

8. Input ***Supports for Bearing Design*** applies to ***All supports***.
9. Select ***Beam*** from ***Type*** list.
10. Select ***Timber*** from ***Material*** list.
11. Select ***D.Fir-L Species*** type.
12. Select ***No.2 Grade***.
13. Select ***140 (mm) Bearing length***.
14. Select ***Same as joists*** for ***Bearing width***.

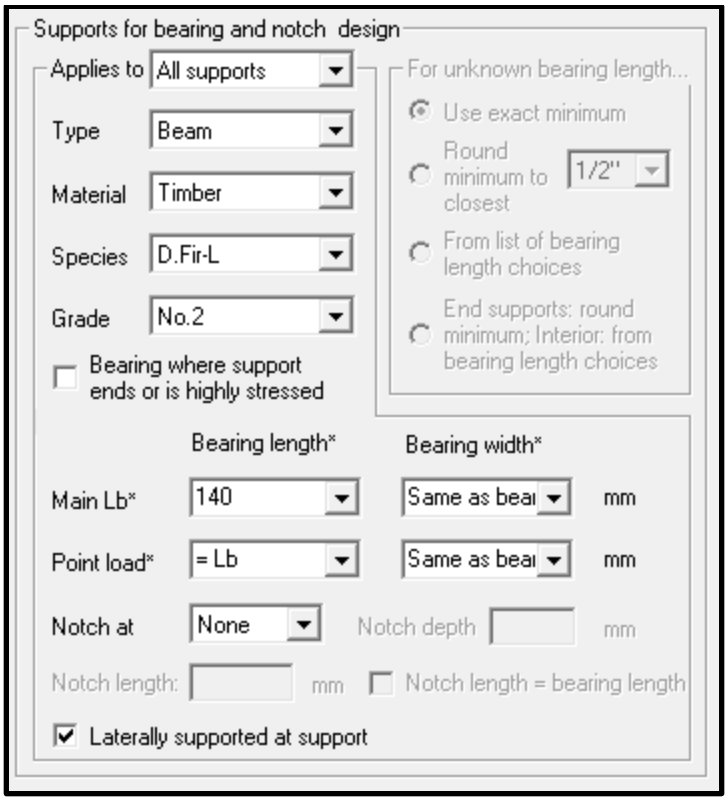

Figure 3: *Tutorial 1 – Specifying Bearing Details*

1.2 Loading the Beam

1. Click the ***loads*** button on the toolbar.
2. Choose ***Dead*** from the ***Type*** drop-down list.
3. Ensuring that the ***Distribution*** field is ***Full Uniform Line***, select the ***Magnitude*** field and enter a value of ***1.5 (kN/m)***.
4. Click ***Add***.

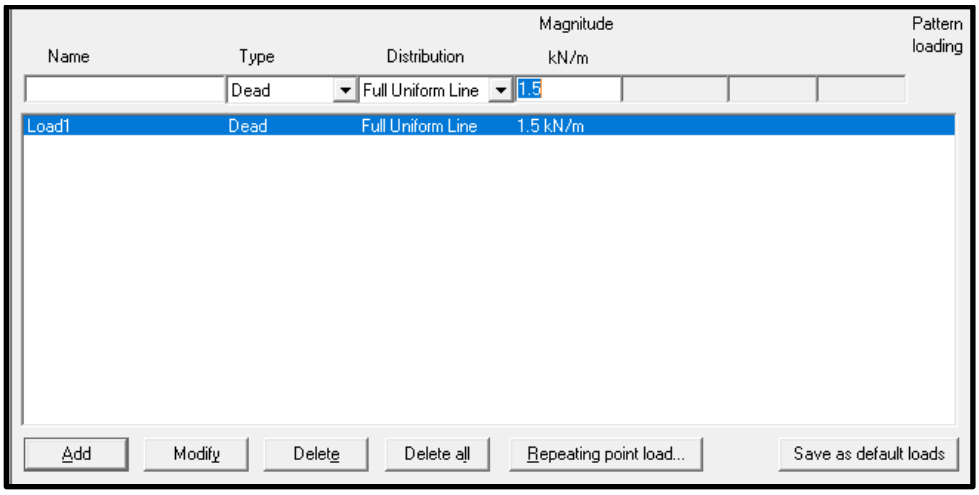

Figure 4: *Tutorial 1 – Loading Beam*

5. Choose ***Live*** from the ***Type*** drop-down list.
6. Ensuring that the distribution field is Full Uniform Line, select the ***Magnitude*** field and enter a magnitude of ***3 (kN/m)***.
7. Ensure that the ***Pattern Loading*** box is checked.
8. Click ***Add***.
9. Changing the ***Distribution*** field to ***Point Load***, select the ***Magnitude*** field and enter a magnitude of ***1.6 (kN)***.
10. Select the ***Location From Left*** field and enter a distance of ***7*** m.
11. Choose ***Live*** from the ***Type*** drop-down list and click the ***Pattern Loading*** checkbox.
12. Click ***Add***.

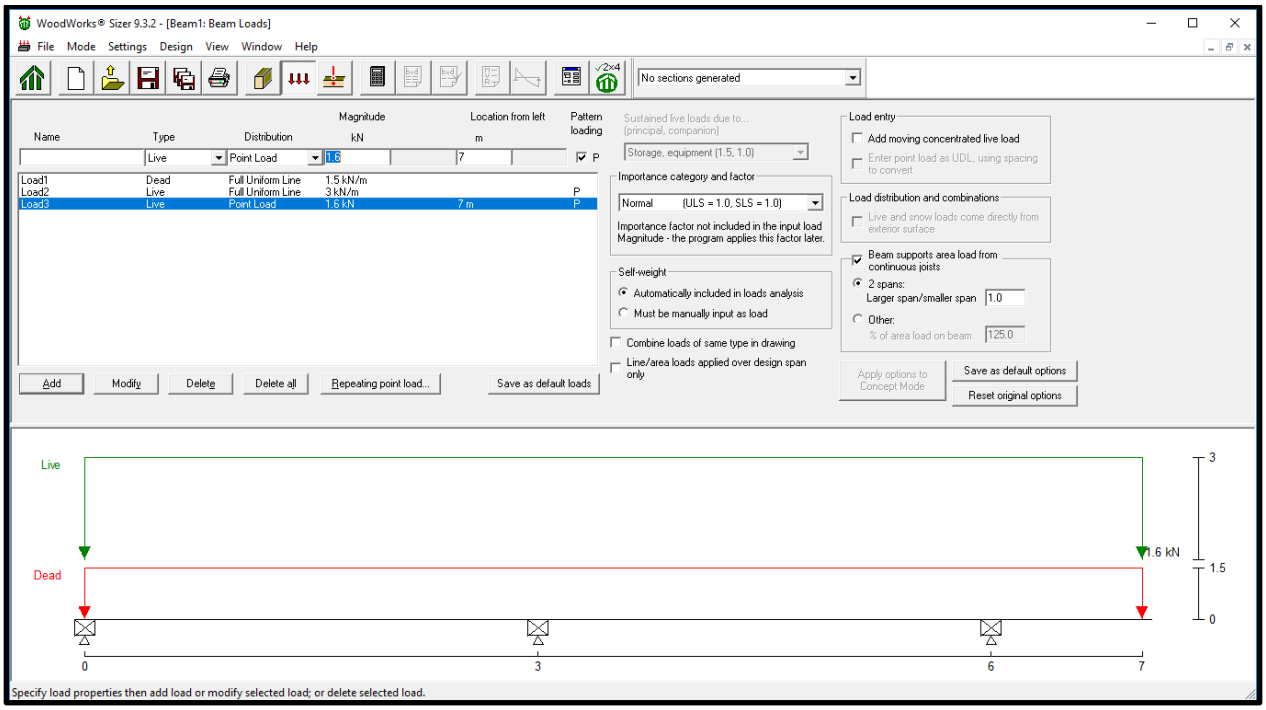

Figure 5: *Tutorial 1 – Loaded Beam*

1.3 Designing the Beam

1. Click the ***Run*** button on the toolbar. *Sizer* automatically designs the member.
2. You will be asked to enter a file name for your project.

1.4 View Design Summary

1. Use the scroll bar to look through the Design Summary output, which includes a list of sections which can resist the applied loads. Click here to download a pdf of the design summary.

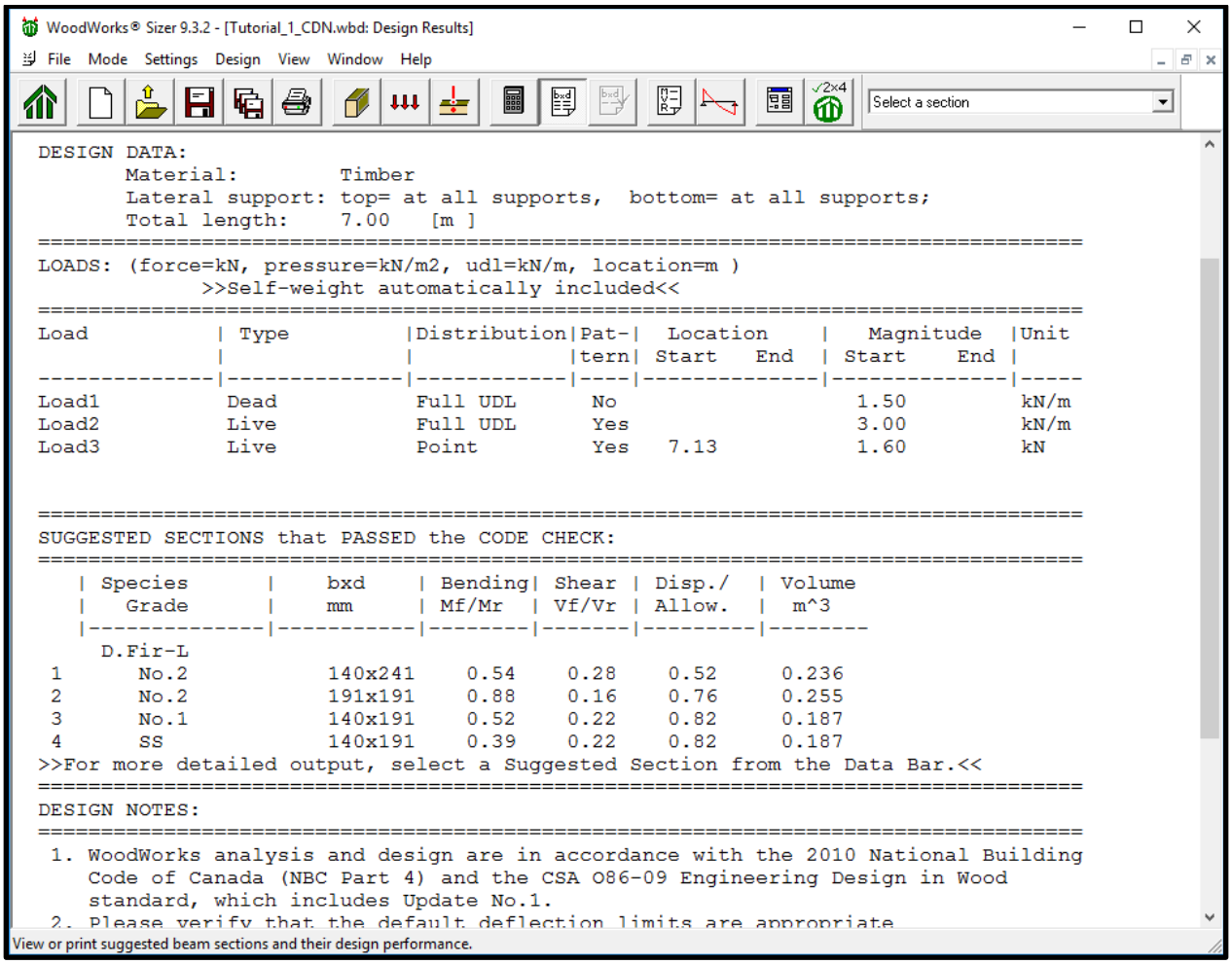

Figure 6: *Tutorial 1 – Design Summary*

1.5 View Analysis Diagrams

Click the ***Diagram*** button on the toolbar to view reactions, shear, bending moments and deflection diagrams. Click here to download a pdf of the Analysis Diagrams.

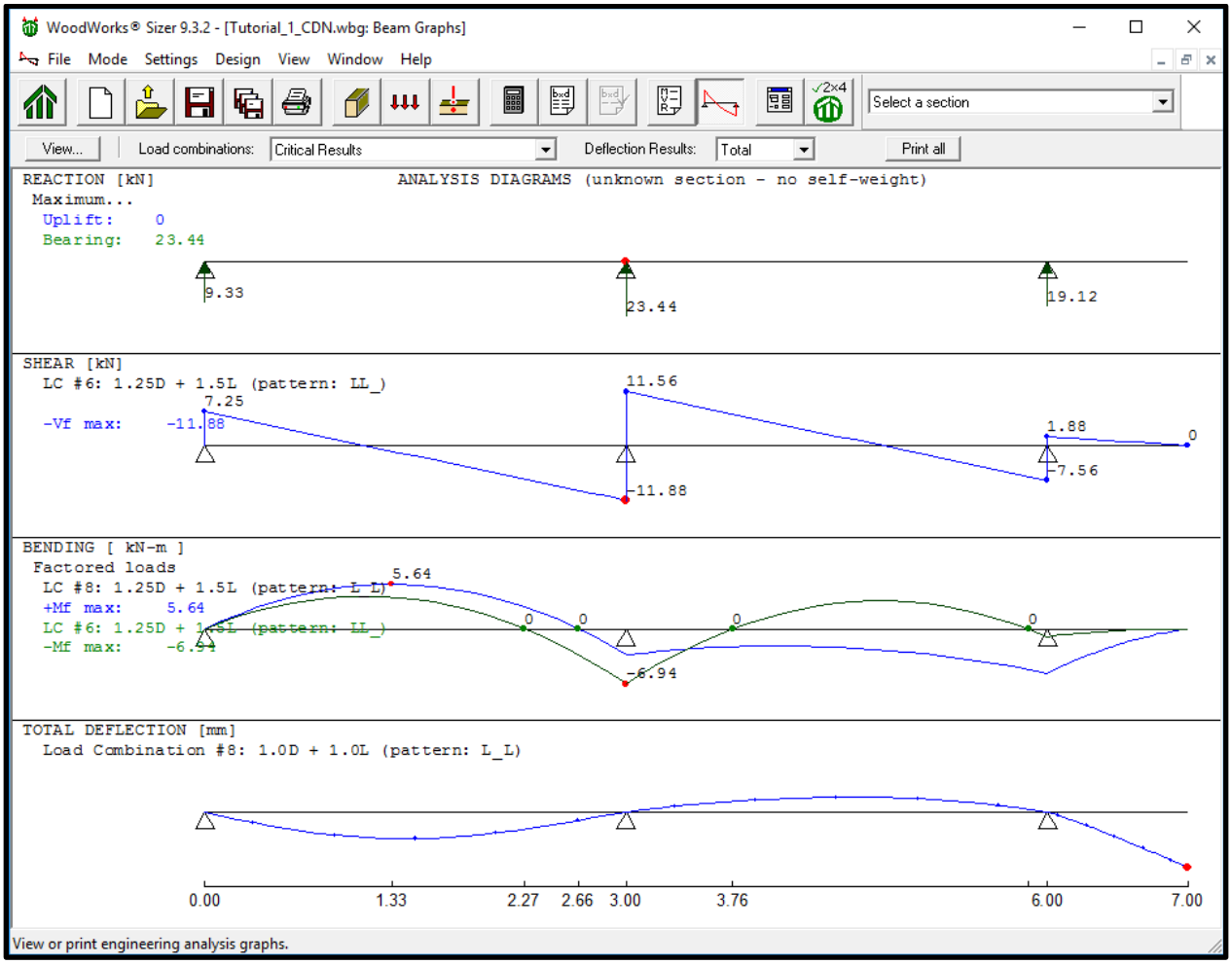

Figure 7: *Tutorial 1 – View Diagrams*

1.6 Perform a Detailed Design on a Specific Section

1. Use the ***Select a section*** drop down list in the toolbar to select a ***D.Fir-L No.2 191x191***
2. *Sizer* will automatically perform a detailed design on the specific section chosen.

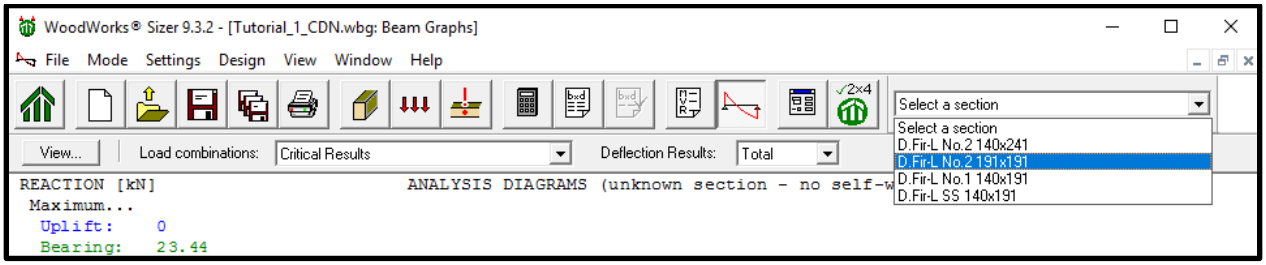

Figure 8: *Tutorial 1 – Selecting Alternative Beams*

3. The results for the specified section are now displayed as shown.

4. You can repeat the above steps to perform a detailed design on any other sections listed in the ***Suggested Beam Sections*** drop-down list. Click here to download a pdf of the Design Results.

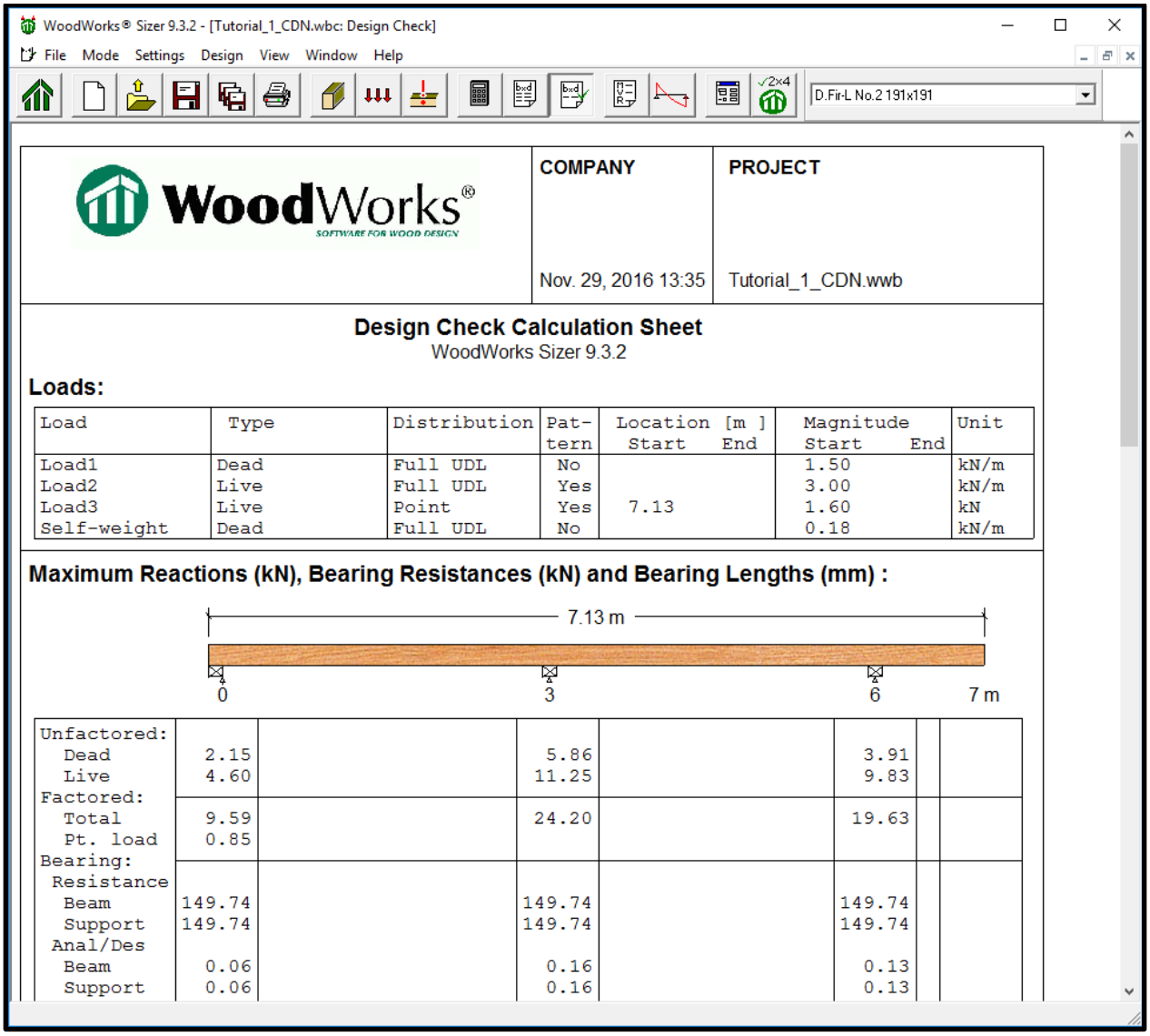

Figure 9: *Tutorial 1 – Design Check*

2 Beam Mode Tutorial 2 - Determine Capacity of a pre-determined Beam Size (CDN)

The Sizer file (.wwb) created from going through this tutorial can be downloaded by clicking here.

2.1 Defining the Parameters

1. Start the program in Beam mode.
2. Select the ***Span*** field and enter a span of ***5 (m)***.
3. From the ***Span type*** drop-down menu select ***Full Span.***
4. Click ***Add***.
5. Select beam type ***Roof joist***.
6. Select material ***Lumber***.
7. Select species type ***S-P-F.***
8. Select grade ***No.1/No.2***.
9. Select ***38 (mm) width and 184 (mm) depth***.
10. Input a roof ***Pitch*** of ***4***/12.
11. Select ***Joist spacing*** of ***600 mm***.

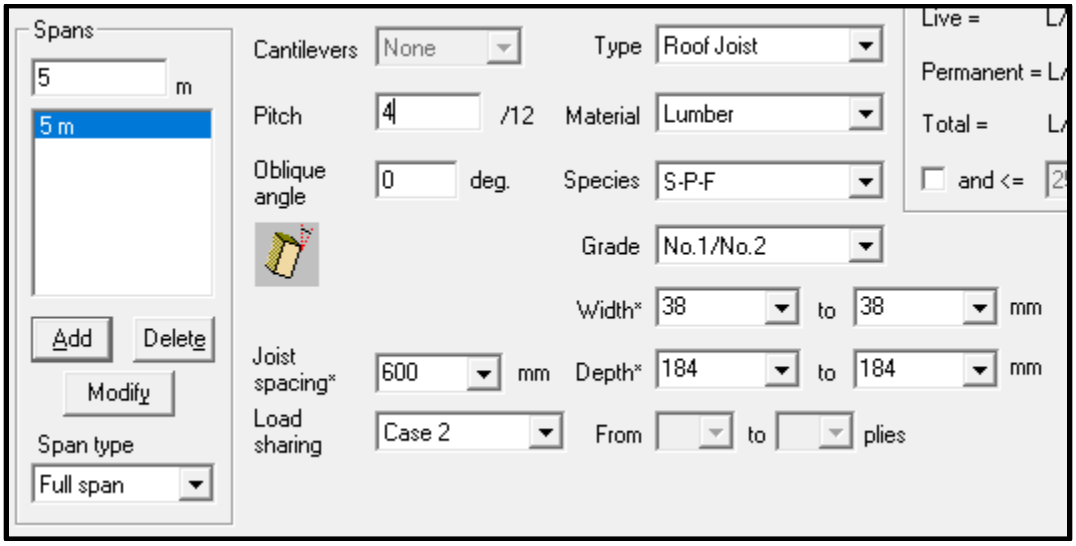

Figure 10: *Tutorial 2 – Defining Length and Materials of Beam*

12. Ensure that ***Full*** Lateral support is provided on the top of the roof joist, lateral support ***At supports*** for the bottom.
13. Input ***Supports for Bearing Design*** applies to ***All supports***.
14. Select ***Wall*** from ***Type*** list.
15. Select ***Lumber*** from ***Material*** list.
16. Select ***S-P-F Species*** type.
17. Select ***No.1/No.2 Grade***.
18. Select ***89 (mm) Bearing length***.
19. Select ***Same as joists*** for ***Bearing width***.

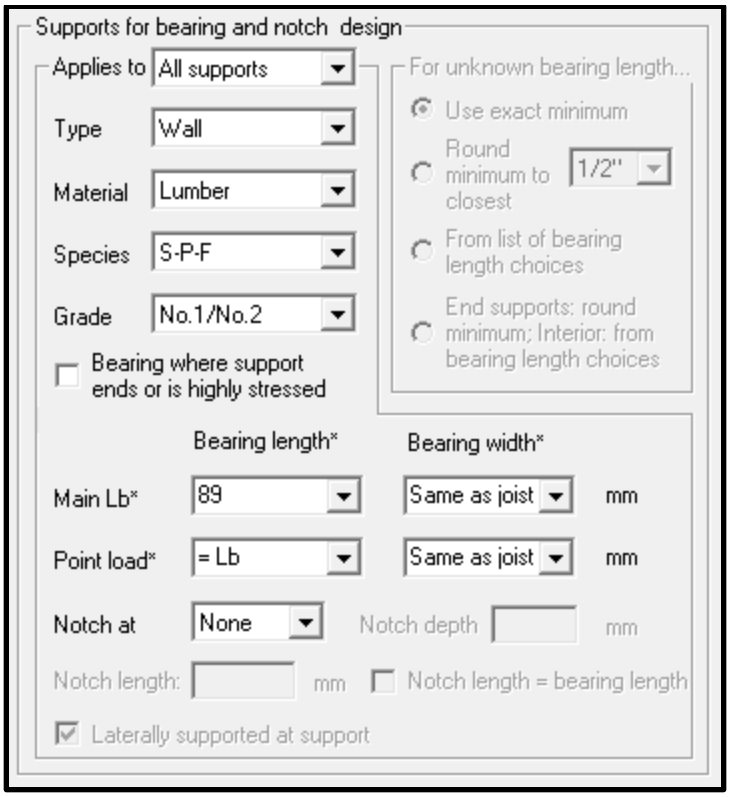

Figure 11: *Tutorial 2 – Bearing Length Parameters*

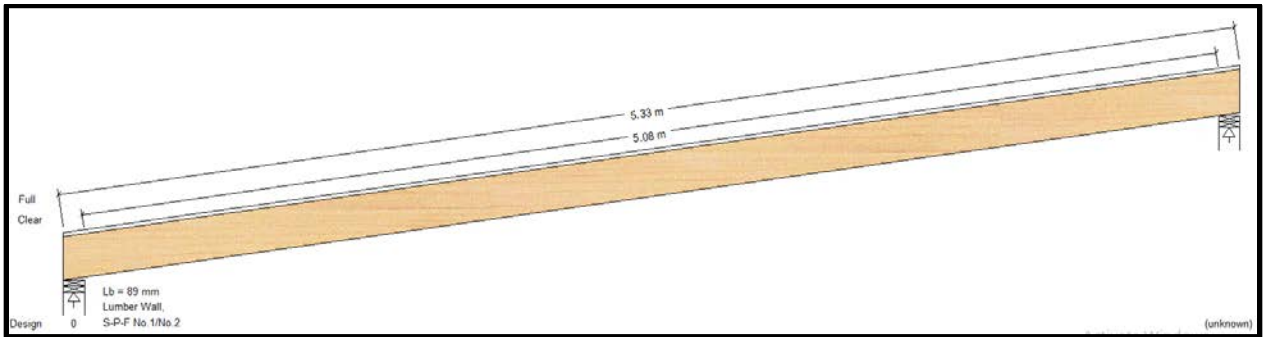

Figure 12: *Tutorial 2 – Beam Display*

2.2 Loading the Beam

1. Click the ***loads*** button on the toolbar.
2. Choose ***Dead*** from the ***Type*** drop-down list.
3. Ensuring that the ***Distribution*** field is ***Full Uniform Area***, select the ***Magnitude*** field and enter a value of ***0.5 (kN/m^2)***.
4. Click ***Add***.
5. Choose ***Snow*** from the ***Type*** drop-down list.
6. Ensuring that the ***Distribution*** field is ***Full Uniform Area***, select the ***Magnitude*** field and enter a value of ***2.0 (kN/m^2)***.
7. Click ***Add***.

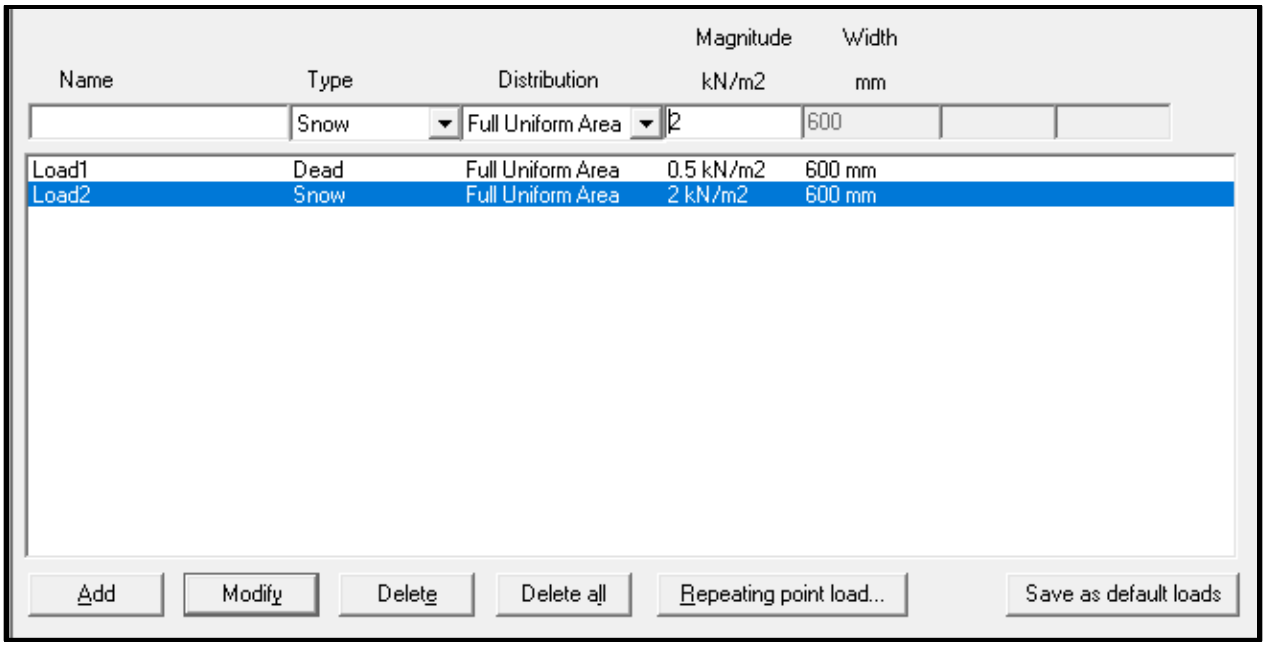

Figure 13: *Tutorial 2 – Load Input*

2.3 Designing the Beam

1. Click the ***Run*** button on the toolbar. *Sizer* automatically designs the member.
2. You will be asked to enter a file name for your project.
3. Click here to download a pdf of the critical analysis diagrams.
4. Click here to download a pdf of the design results.

Lumber, S-P-F, SS, 38x184 mm

Supports: All - Lumber Wall, S-P-F No.1/No.2
Roof joist spaced at 600 mm c/c; Total length: 5.332 m; volume = 0.037 m^3; Pitch: 4/12;
Load sharing: Case 2; Lateral support: top= full, bottom= at supports;

This section FAILS the design check

WARNING: This section violates the following design criteria: Bending and deflection

Force vs. Resistance and Deflection using CSA-O86-09:

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	Vf @d = 4.74	Vr = 10.57	kN	Vf/Vr = 0.45
Moment(+)	Mf = 6.58	Mr = 5.35	kN-m	Mf/Mr = 1.23
Perm. Defl'n	13.4 = L/380	14.2 = L/360	mm	0.95
Live Defl'n	41.9 = L/122	21.3 = L/240	mm	1.96
Total Defl'n	55.3 = L/92	28.4 = L/180	mm	1.95

Additional Data:

FACTORS:	f/E(MPa)	KD	KH	KZ	KL	KT	KS	KN	LC#
Fv	1.5	1.00	1.40	1.200	-	1.00	1.00	-	#2
Fb+	16.5	1.00	1.40	1.200	1.000	1.00	1.00	-	#2
Fcp	5.3	-	-	1.000	-	1.00	1.00	-	#-
Es	10500	-	-	-	-	1.00	1.00	-	#2

CRITICAL LOAD COMBINATIONS:
Shear : LC #2 = 1.25D + (1.0)1.5S
Moment(+) : LC #2 = 1.25D + (1.0)1.5S
Deflection: LC #1 = 1.0D (permanent)
LC #2 = 1.0D + (0.9)1.0S (live)
LC #2 = 1.0D + (0.9)1.0S (total)
Bearing : Support 1 - LC #2 = 1.25D + (1.0)1.5S
Support 2 - LC #2 = 1.25D + (1.0)1.5S
Load Types: D=dead W=wind S=snow H=earth,groundwater E=earthquake
L=live(use,occupancy) Ls=live(storage,equipment) f=fire
All Load Combinations (LCs) are listed in the Analysis output

CALCULATIONS:
Deflection: EI = 207e06 kN-mm2
"Live" deflection = Deflection from all non-dead loads (live, wind, snow…)
Bearing: Factored compressive resistance at an angle to grain (Nr) calculated for each support as per O86 5.5.8

Figure 14: *Tutorial 2 – Design Check (Failure)*

2.4 View Results

1. Use the scroll bar to look through the Design Results output.
2. The Selected section cannot resist the applied load, and ***fails in bending and deflection***. Many alternative designs are possible. The following two design changes would allow for the beam to resist the applied load:

a) Increase beam depth to 286 mm

Lumber, S-P-F, SS, 38x286 mm

Supports: All - Lumber Wall, S-P-F No.1/No.2
Roof joist spaced at 600 mm c/c; Total length: 5.366 m; volume = 0.058 m^3; Pitch: 4/12;
Load sharing: Case 2; Lateral support: top= full, bottom= at supports;

Force vs. Resistance and Deflection using CSA-O86-09:

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	Vf @d = 4.58	Vr = 13.69	kN	Vf/Vr = 0.33
Moment(+)	Mf = 6.64	Mr = 10.77	kN-m	Mf/Mr = 0.62
Perm. Defl'n	3.8 = <L/999	14.2 = L/360	mm	0.26
Live Defl'n	11.2 = L/458	21.3 = L/240	mm	0.52
Total Defl'n	14.9 = L/343	28.4 = L/180	mm	0.52

Additional Data:

FACTORS:	f/E(MPa)	KD	KH	KZ	KL	KT	KS	KN	LC#
Fv	1.5	1.00	1.40	1.000	-	1.00	1.00	-	#2
Fb+	16.5	1.00	1.40	1.000	1.000	1.00	1.00	-	#2
Fcp	5.3	-	-	1.000	-	1.00	1.00	-	#-
Es	10500	-	-	-	-	1.00	1.00	-	#2

CRITICAL LOAD COMBINATIONS:
Shear : LC #2 = 1.25D + (1.0)1.5S
Moment(+) : LC #2 = 1.25D + (1.0)1.5S
Deflection: LC #1 = 1.0D (permanent)
LC #2 = 1.0D + (0.9)1.0S (live)
LC #2 = 1.0D + (0.9)1.0S (total)
Bearing : Support 1 - LC #2 = 1.25D + (1.0)1.5S
Support 2 - LC #2 = 1.25D + (1.0)1.5S
Load Types: D=dead W=wind S=snow H=earth,groundwater E=earthquake
L=live(use,occupancy) Ls=live(storage,equipment) f=fire
All Load Combinations (LCs) are listed in the Analysis output
CALCULATIONS:
Deflection: EI = 778e06 kN-mm2
"Live" deflection = Deflection from all non-dead loads (live, wind, snow…)
Bearing: Factored compressive resistance at an angle to grain (Nr) calculated for each support as per O86 5.5.8

Figure 15: *Tutorial 2 – Design Check (Alternative 1)*

b) Decrease roof joist spacing to 300 mm on center

Lumber, S-P-F, SS, 38x184 mm

Supports: All - Lumber Wall, S-P-F No.1/No.2
Roof joist spaced at 300 mm c/c; Total length: 5.332 m; volume = 0.037 m^3; Pitch: 4/12;
Load sharing: Case 2; Lateral support: top= full, bottom= at supports;

Force vs. Resistance and Deflection using CSA-O86-09:

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	Vf @d = 2.41	Vr = 10.57	kN	Vf/Vr = 0.23
Moment(+)	Mf = 3.32	Mr = 5.35	kN-m	Mf/Mr = 0.62
Perm. Defl'n	7.2 = L/707	14.2 = L/360	mm	0.51
Live Defl'n	20.7 = L/246	21.3 = L/240	mm	0.97
Total Defl'n	27.9 = L/182	28.3 = L/180	mm	0.98

Additional Data:

FACTORS:	f/E(MPa)	KD	KH	KZ	KL	KT	KS	KN	LC#
Fv	1.5	1.00	1.40	1.200	-	1.00	1.00	-	#2
Fb+	16.5	1.00	1.40	1.200	1.000	1.00	1.00	-	#2
Fcp	5.3	-	-	1.000	-	1.00	1.00	-	#-
Es	10500	-	-	-	-	1.00	1.00	-	#2

CRITICAL LOAD COMBINATIONS:
Shear : LC #2 = 1.25D + (1.0)1.5S
Moment(+) : LC #2 = 1.25D + (1.0)1.5S
Deflection: LC #1 = 1.0D (permanent)
LC #2 = 1.0D + (0.9)1.0S (live)
LC #2 = 1.0D + (0.9)1.0S (total)
Bearing : Support 1 - LC #2 = 1.25D + (1.0)1.5S
Support 2 - LC #2 = 1.25D + (1.0)1.5S
Load Types: D=dead W=wind S=snow H=earth,groundwater E=earthquake
L=live(use,occupancy) Ls=live(storage,equipment) f=fire
All Load Combinations (LCs) are listed in the Analysis output
CALCULATIONS:
Deflection: EI = 207e06 kN-mm2
"Live" deflection = Deflection from all non-dead loads (live, wind, snow…)
Bearing: Factored compressive resistance at an angle to grain (Nr) calculated for each support as per O86 5.5.8

Figure 16: *Tutorial 2 – Design Check (Alternative 2)*

3 Column Mode Tutorial 3 – Determine Column Size Based on Given Loads (CDN)

The Sizer file (.wwc) created from going through this tutorial can be downloaded by clicking here.

3.1 Defining the Parameters

1. Start the program in Column mode.
2. Select the ***Height*** field and enter a height of **3** ***(m)***.

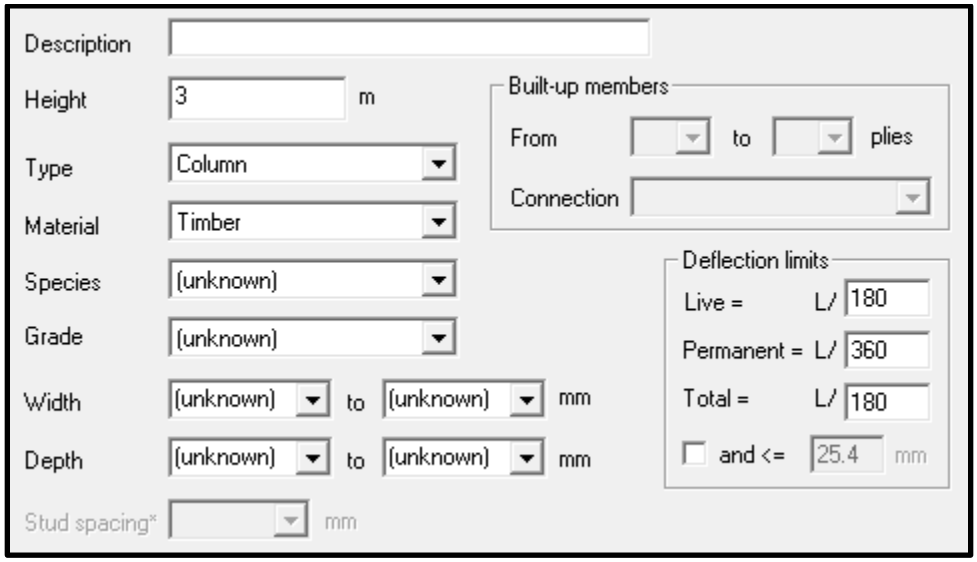

Figure 17: *Tutorial 3 – Defining Length of Column*

3. Under ***Lateral Support Spacing for KeL,*** select ***Width (b)*** field and enter ***1000 (mm)*** for the unbraced length in the narrow direction.

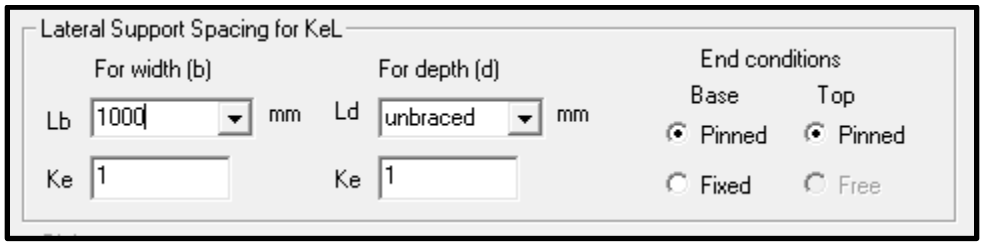

Figure 18: *Tutorial 3 – Specifying Lateral Support*

3.2 Loading the Column

1. Click ***load*** on the toolbar.
2. Choose ***Dead*** from the ***Type*** drop-down list.
3. Specify ***Axial*** as the load ***Distribution***.
4. Select the ***Magnitude*** field and enter a magnitude of ***25 (kN)***.
5. Click ***Add***.

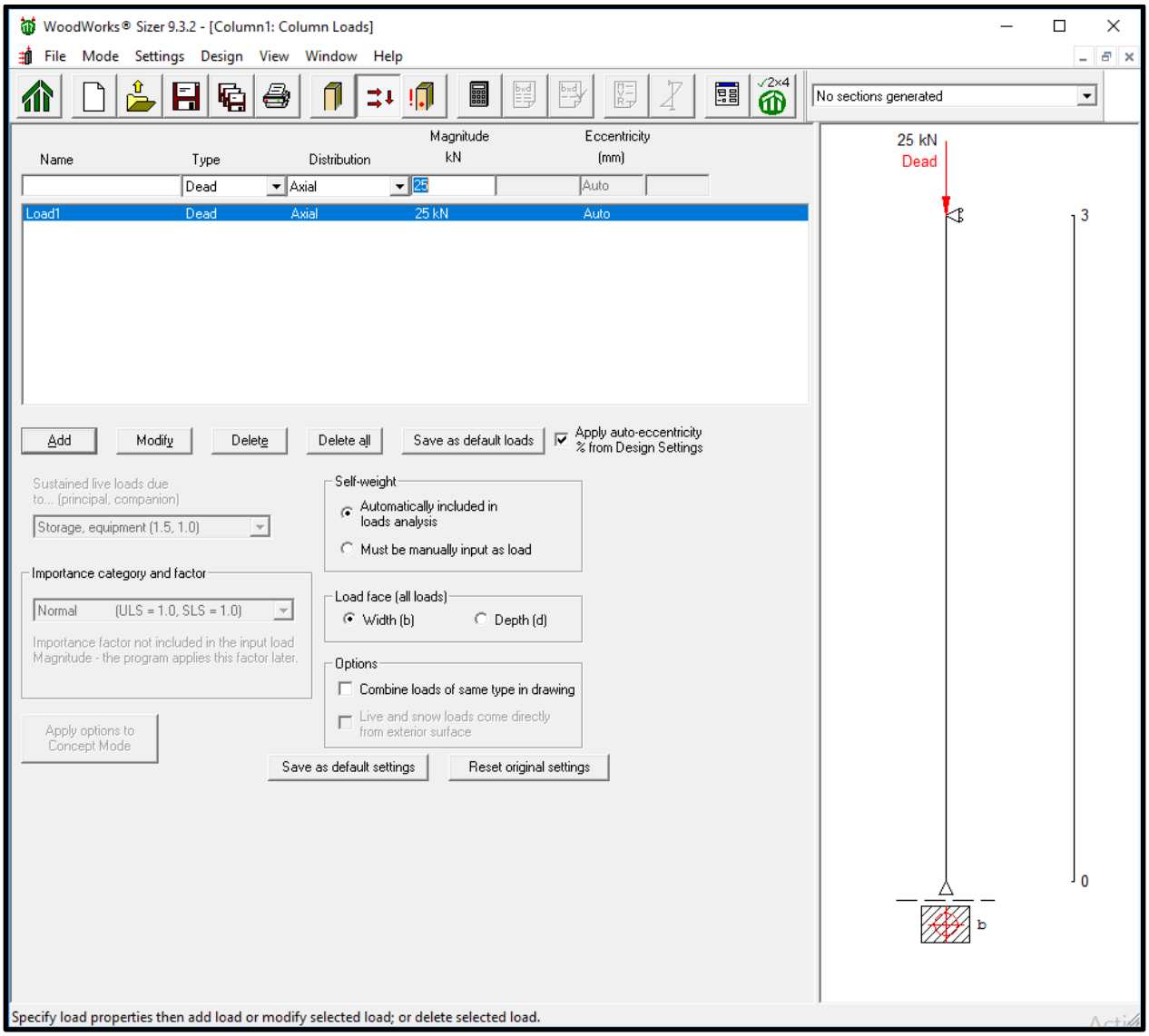

Figure 19: *Tutorial 3 – Loading Column*

6. Repeat steps 2 to 5 for the following:

   Snow, 37 (kN)

   Live, 30 (kN)

7. Choose ***Full Uniform Line*** from the ***Distribution*** pull-down.
8. Select the ***Magnitude*** field and enter a magnitude of ***2.2 (kN/m)***.
9. Choose ***Wind*** from the ***Type*** drop-down list.
10. Click ***Add***.

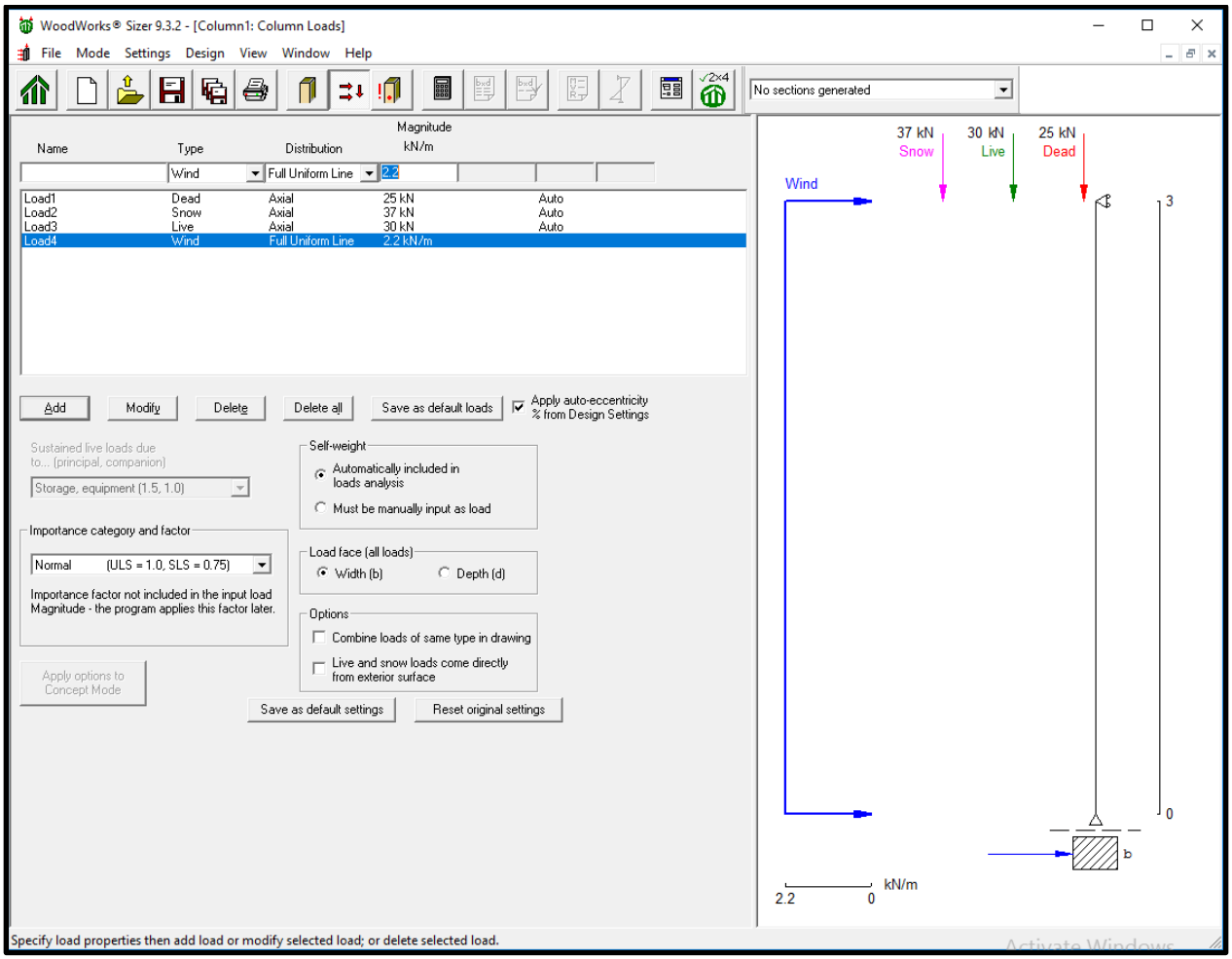

Figure 20: *Tutorial 3 – Loaded Column*

3.3 Designing the Column

1. Click the ***Run*** button on the toolbar. *Sizer* automatically designs the member.
2. You will be asked to enter a file name for your project.

3.4 View Design Summary

c) Use the scroll bar to look through the results. Click here to download a pdf of the design summary.

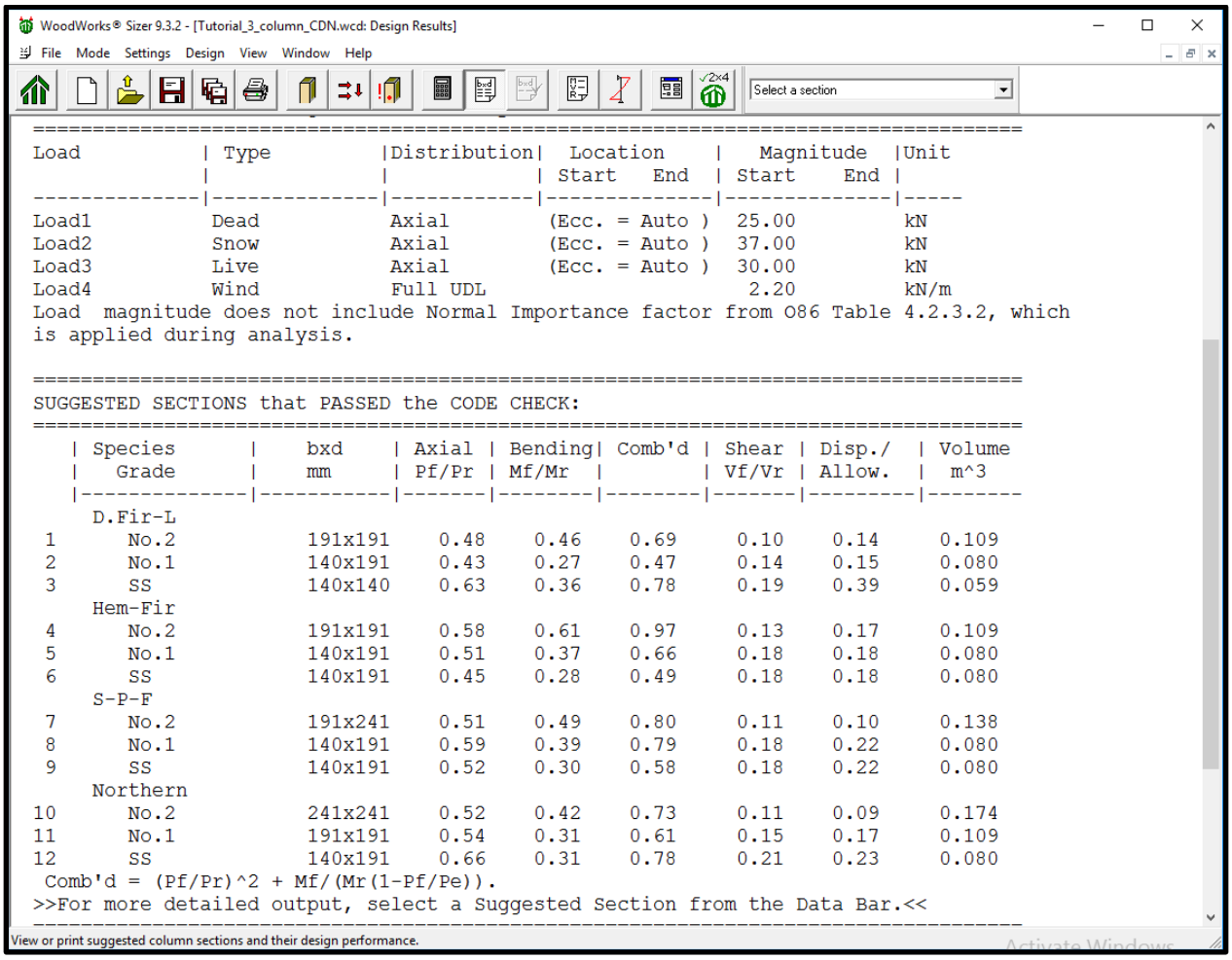

Figure 21: *Tutorial 3 – Design Summary*

3.5 View Analysis Diagrams

1. Click ***diagram*** in the toolbar to view reactions, shear, bending moments and deflection diagrams. Click here to download a pdf of the critical analysis diagrams.

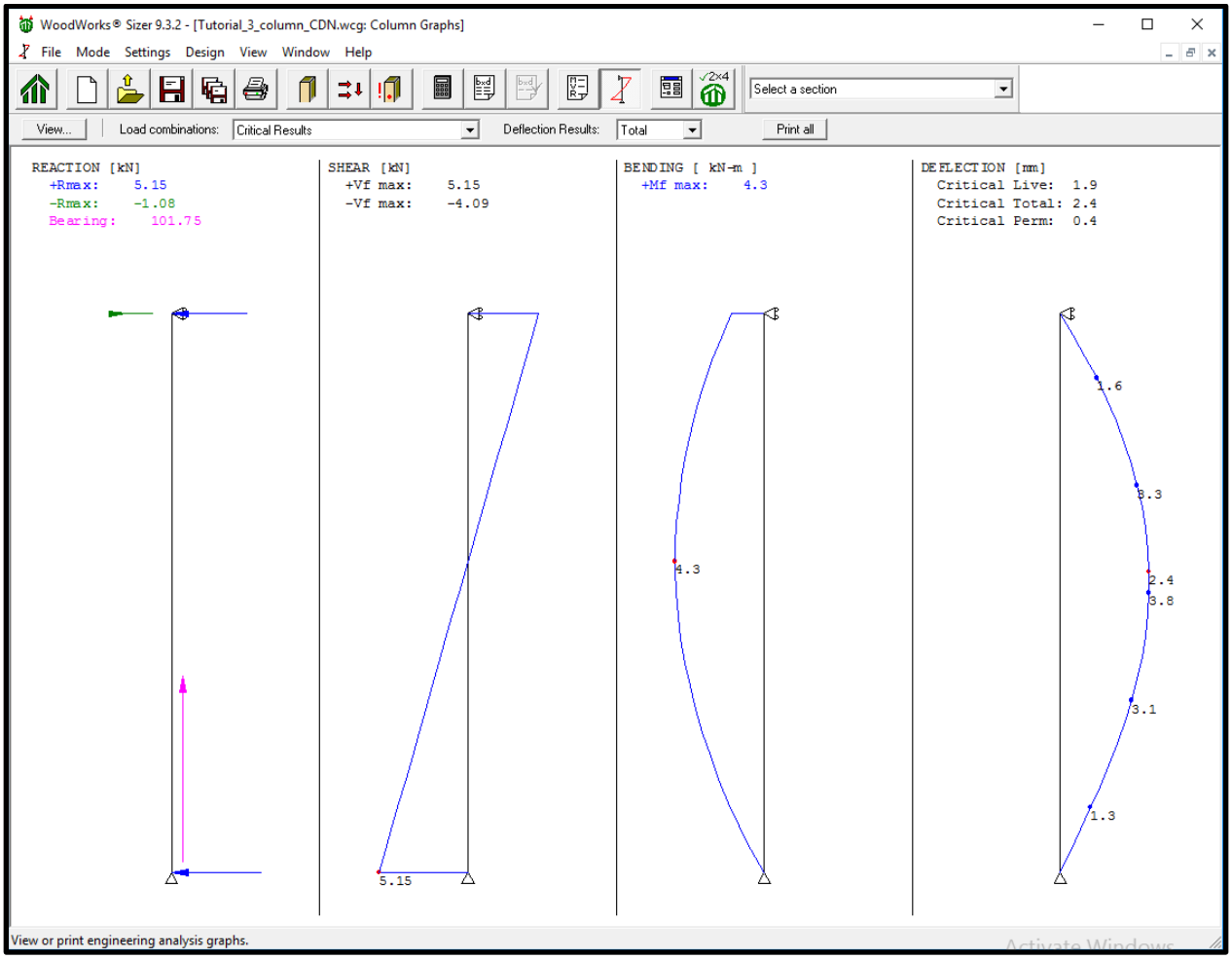

Figure 22: *Tutorial 3 – View Diagrams*

3.6 Perform a Detailed Design on a Specific Section

1. Choose ***D.Fir-L SS 140x140*** from the ***Suggested Sections*** drop-down list on the status bar. *Sizer* automatically performs a detailed design for this section.

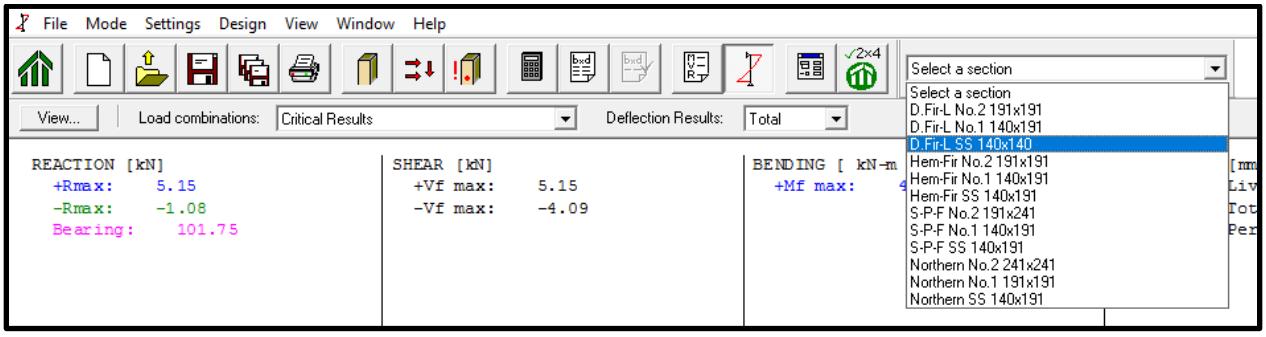

Figure 23: *Tutorial 3 – Selecting Alternative Columns*

2. Use the scroll bar to look through the results.
3. Repeat step 1 to perform a detailed design on any other section listed in the ***Suggested sections*** drop-down list. Click here to download a pdf of the Design Results.

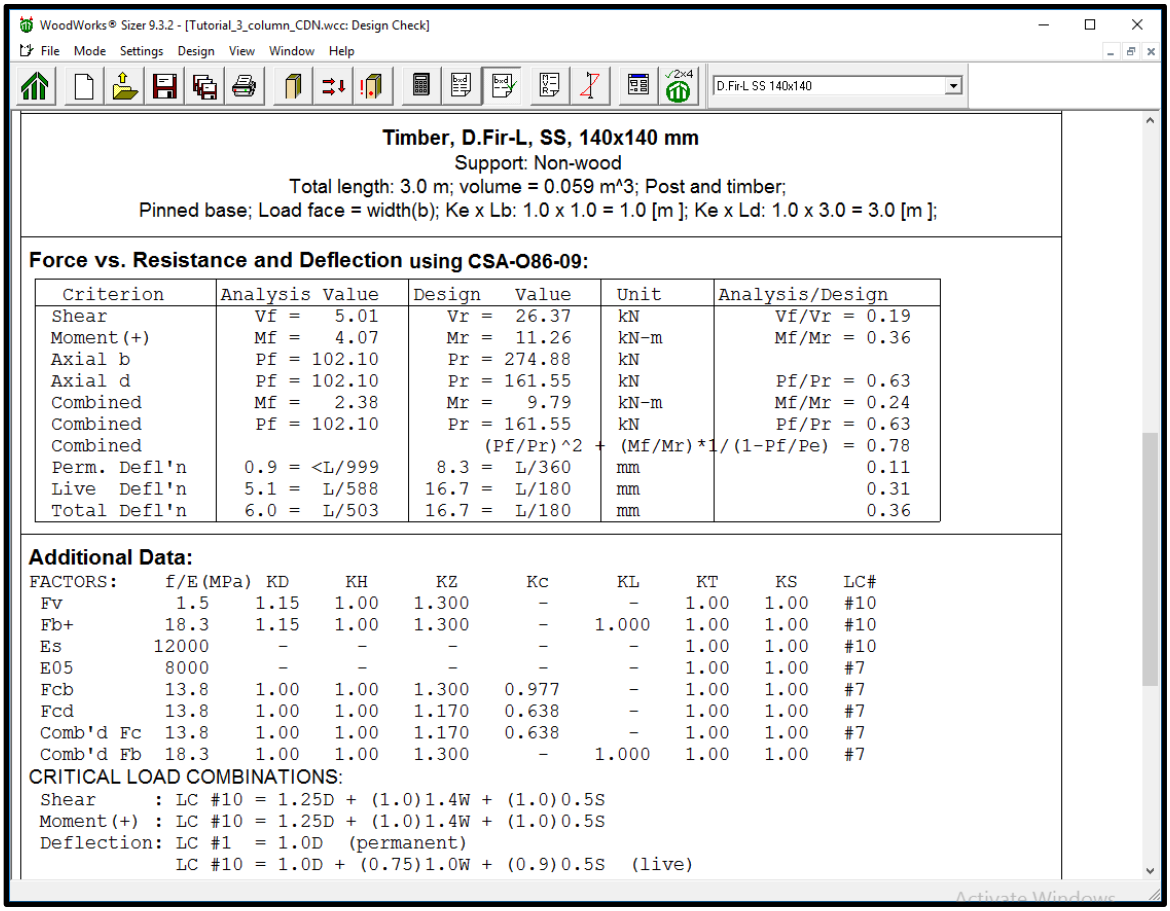

Figure 24: *Tutorial 3 – Design Check*

4 Column Mode Tutorial 4 - Solid Sawn Column Check (CDN)

This is the same problem of Example 3 on page 118 of the Wood Design Manual 2015. To recreate the example it will be necessary to run the design using the CSA O86-14. Go to the settings design tab to ensure you are running the model using the correct design standard. The Sizer file (.wwc) created from going through this tutorial can be downloaded by clicking here.

4.1 Defining the Parameters

1. Start the program in Column mode.
2. Select the ***Height*** field and enter a height of ***7 (m)***.
3. Select ***Column*** from the ***Type*** list.
4. Select ***Glulam-c*** from the ***Material*** list.
5. Select ***Spruce-Pine*** from the ***Species*** list.
6. Select ***No.1*** from the ***Grade*** list.
7. Select ***175 (mm)*** for the ***width*** and ***228 (mm)*** for the ***depth*** of the column.

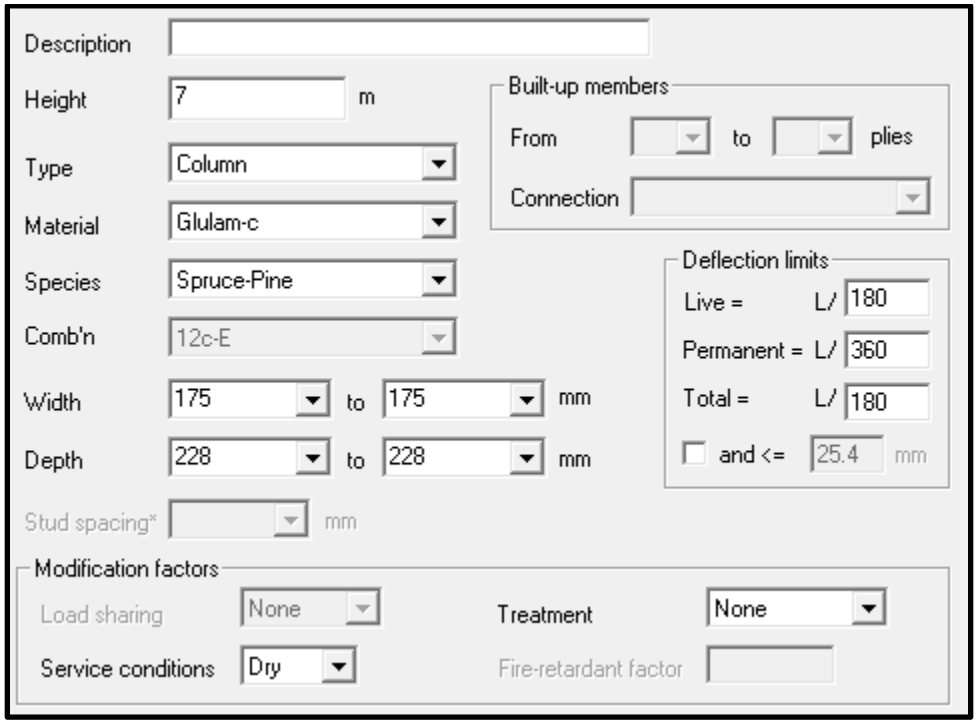

Figure 25: *Tutorial 4 – Defining Length of Column*

9. Under Lateral Support for ***KeL***, ensure that the spacing for the width and depth are both specified as ***unbraced***, and that the end-conditions are specified as ***Pinned-Pinned***.
10. Under ***Lateral Support Spacing for KeL,*** select ***Width (b)*** field and enter ***3500 (mm)*** for the unbraced length in the narrow direction.

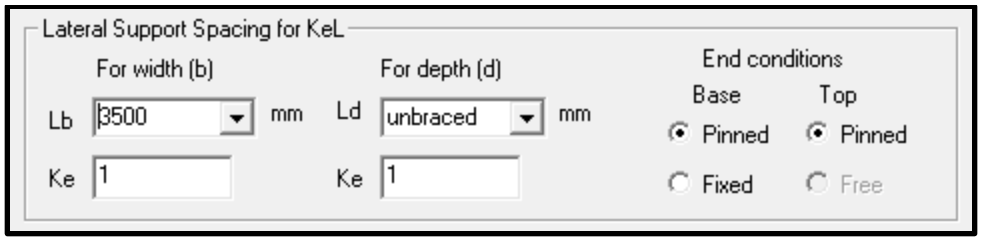

Figure 26: *Tutorial 4 – Lateral Support Input*

4.2 Loading the Column

1. Click ***load*** on the toolbar.
2. Choose ***Dead*** from the ***Type*** drop-down list.
3. Specify ***Axial*** as the load ***Distribution***.
4. Select the ***Magnitude*** field and enter a magnitude of ***45 (kN)***.
5. Click ***Add***.
6. Repeat steps 2 to 5 for the following: ***Snow, 105 (kN)***.
7. In the Self-Weight dialog box select ***must be manually input as load***.
8. Under the load input window, ensure the ***Apply auto-eccentricity % from Design Settings*** is not toggled.

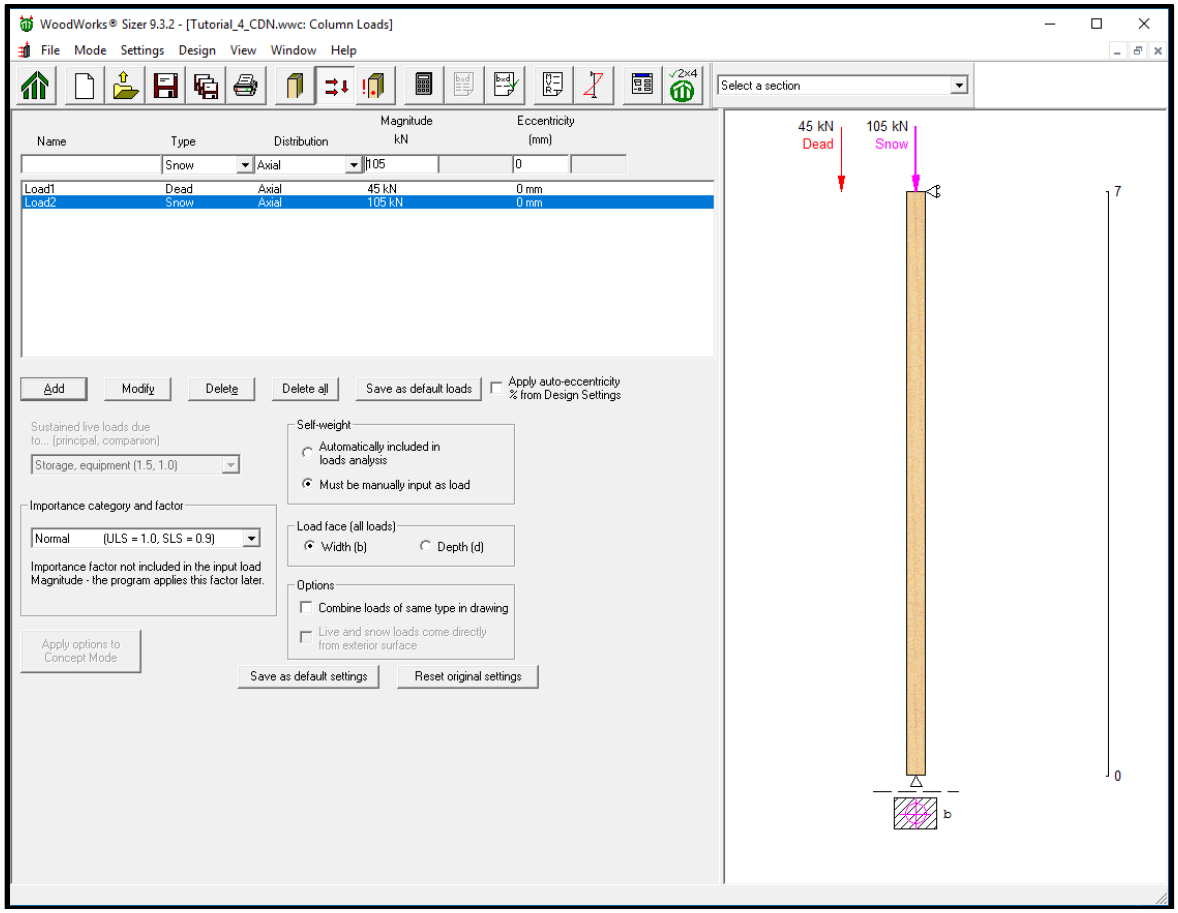

Figure 27: *Tutorial 4 – Loading Column*

4.3 Designing the Column

1. Click the ***Run*** button on the toolbar. *Sizer* automatically designs the member.
2. You will be asked to enter a file name for your project.
3. Click here to download a pdf of the critical analysis diagrams.

4.4 View Results

1. Use the scroll bar to look through the results.
2. To print these results, click the ***print*** button on the toolbar. Click here to download a pdf of the design results.

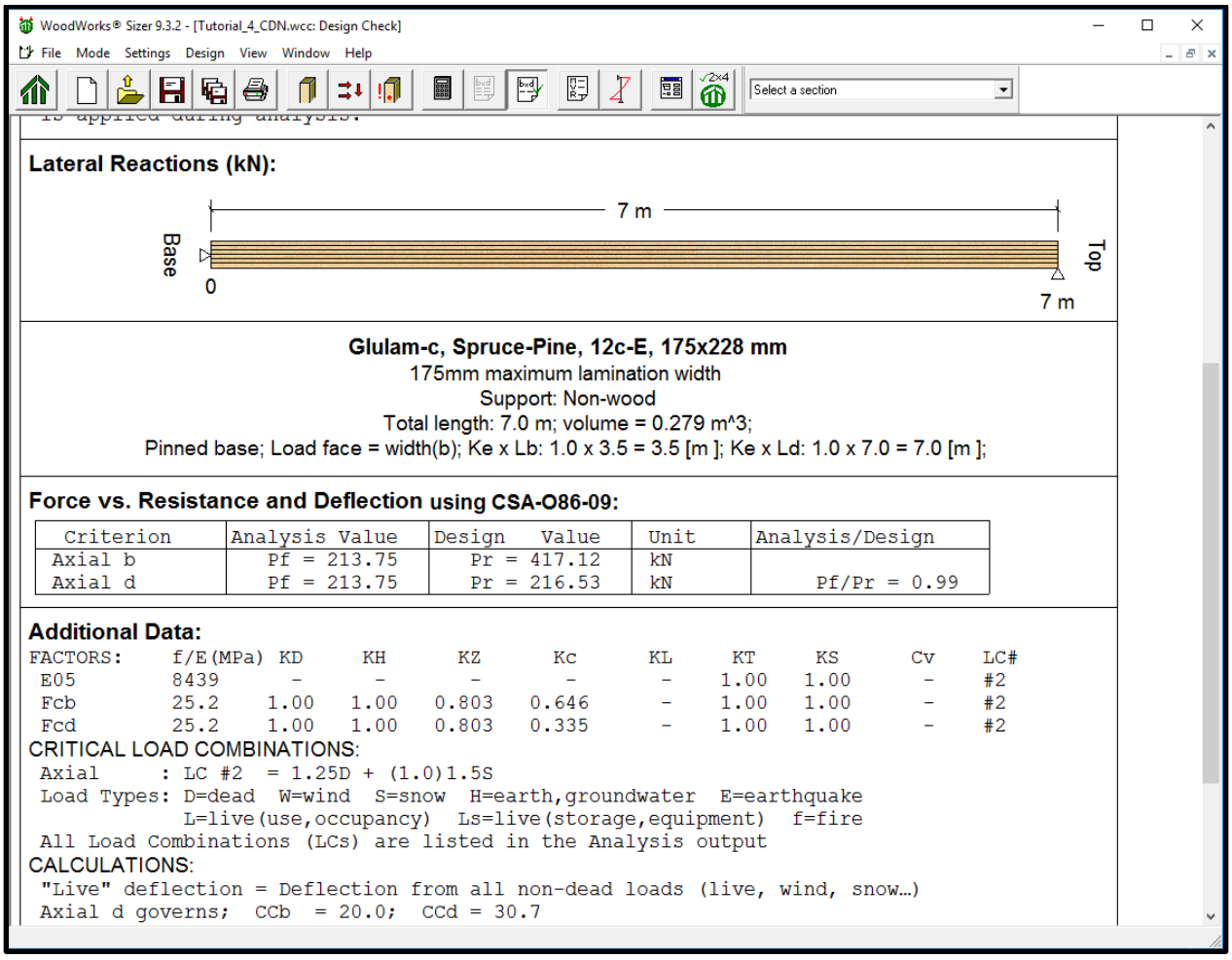

Figure 28: *Tutorial 4 – Design Check*

5 Concept Mode Tutorial 5 – Two Storey House (CDN)

The Sizer file (.wwa) created from going through this tutorial can be downloaded by clicking here.

5.1 Introduction

In this tutorial you will create and design a commercial two-story wood-frame structure with a pitched roof as shown (in cross-section) below.

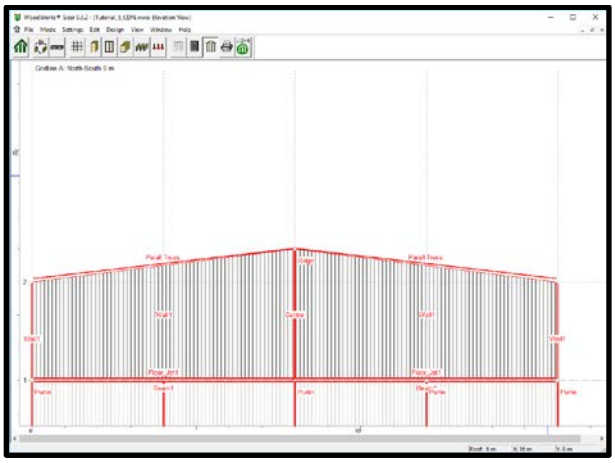

Figure 29: *Concept Mode Tutorial 5 – Side View*

To begin, ensure that you are in the Concept mode by selecting ***Concept*** from the ***Mode*** menu.

5.2 Company Information

1. Click ***Settings*** to open the settings window.
2. Navigate to the Company Information tab and enter relevant company information.

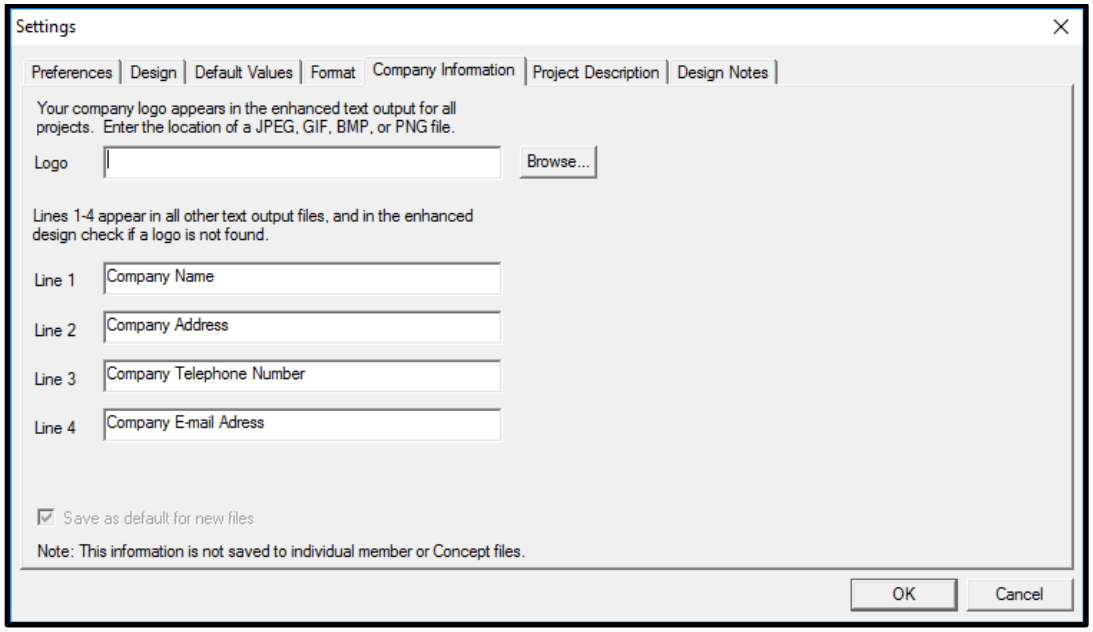

Figure 30: *Concept Mode Tutorial 5 – Company Information*

5.3 Project Description

1. Now click on the ***Project Description*** tab.
2. Enter relevant project information.

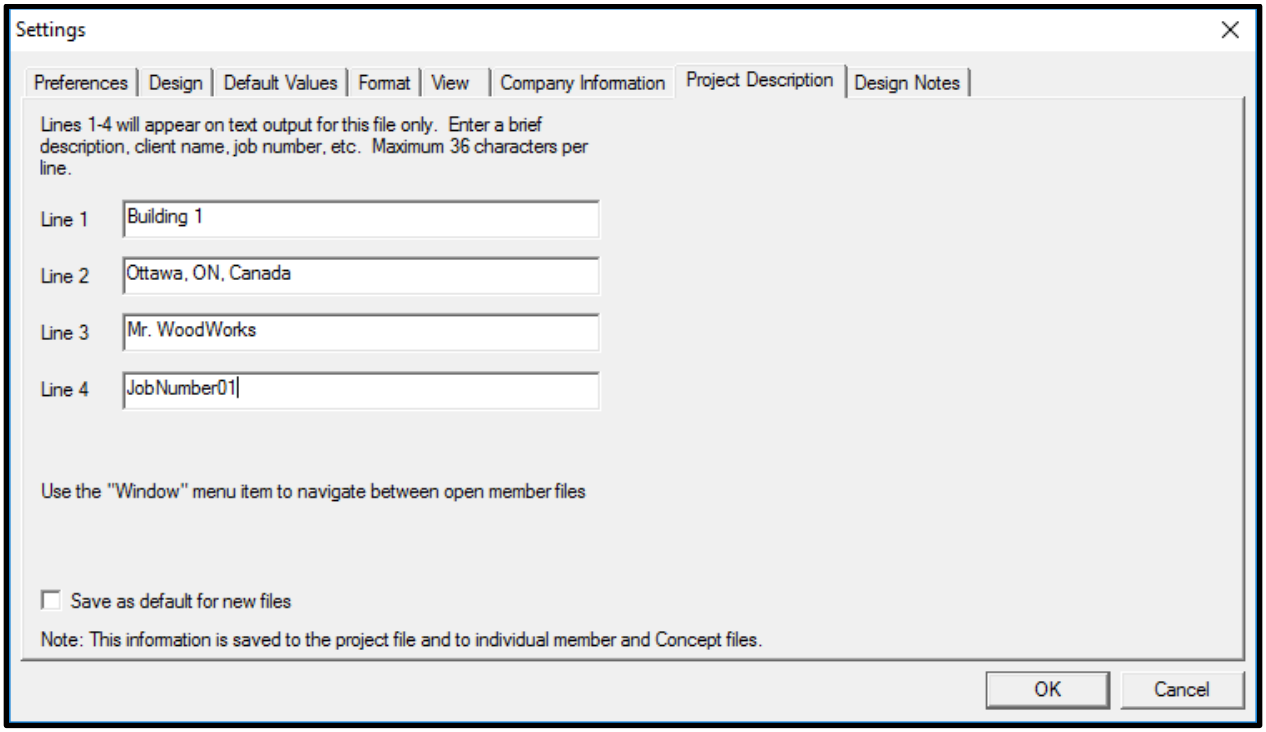

Figure 31: *Concept Mode Tutorial 5 – Company Information*

5.4 Snap Increment and Display Options

1. Click on the ***View*** tab.
2. In the ***Viewing Area*** field, increase the ***North-South*** limit to ***20 (m)*** and the ***East-West*** limit to ***32 (m)***.
3. Enter ***North-South*** and ***East-West Snap Increments*** of **400** ***(cm)***.
4. Switch the ***Display... Group Names*** option to on, so that an '✓' appears in this field.

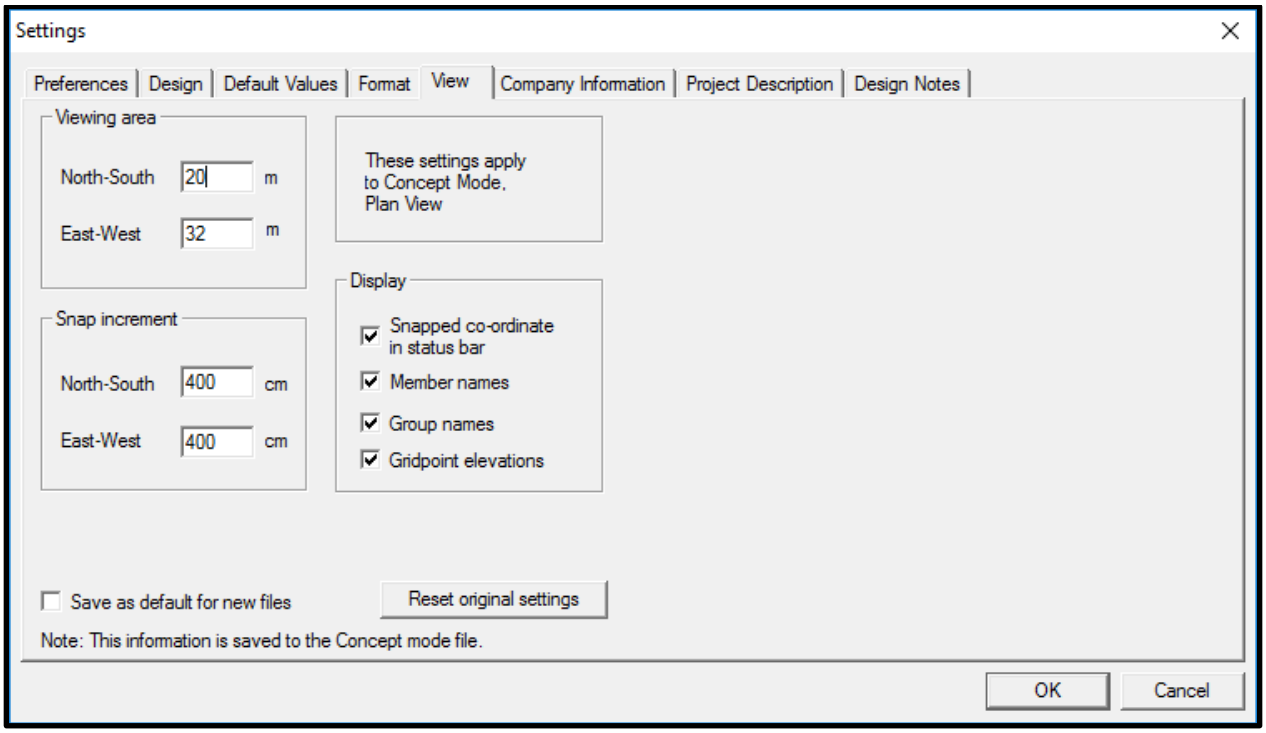

Figure 32: *Concept Mode – Tutorial 5 View Settings*

5. Click ***OK***.
6. (Optional) To save these settings as default settings, select ***Save New Settings*** under the ***Settings*** menu.

5.5 Levels Above Grade

1. Click on the ***Levels*** button from the main toolbar.
2. Enter a roof elevation of ***6 (m)***. Click ***Add***. Click ***OK***.
3. Click on ***Floor 1*** so that it is highlighted. Click ***OK***. (This will change the current level to ***Floor 1***).

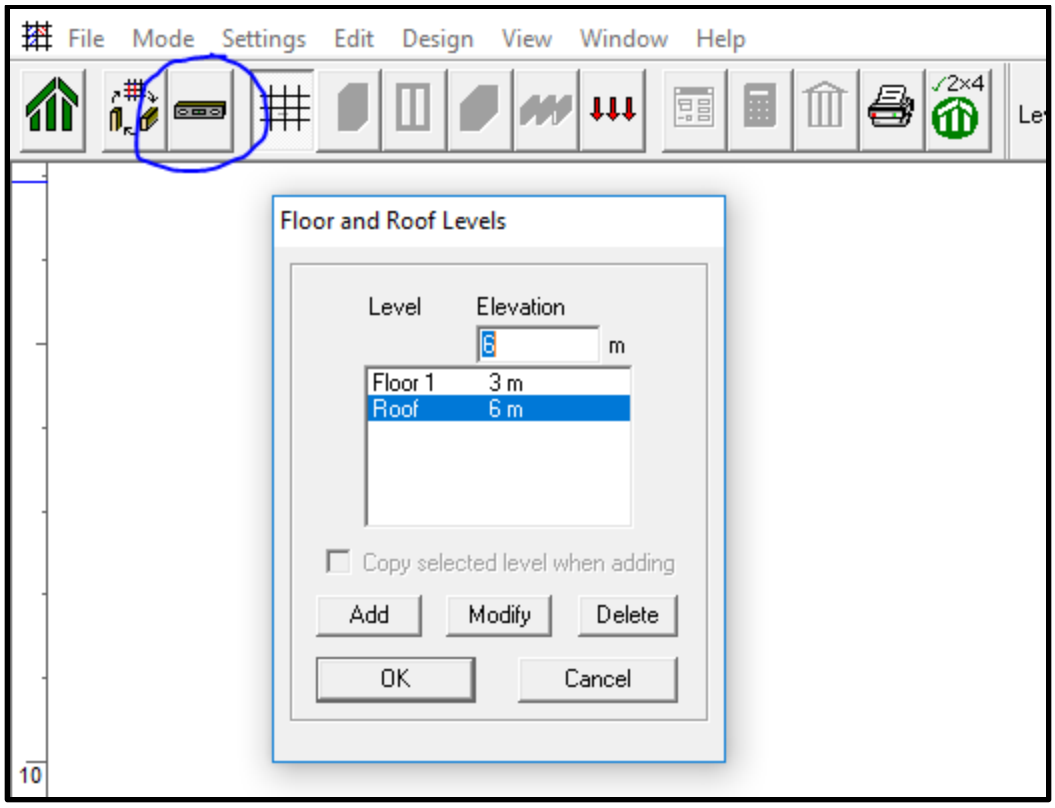

Figure 33: *Concept Mode Tutorial 5 – Floor and Roof Levels*

5.6 Gridlines

1. Click on the ***Grid*** button from the main toolbar.
2. Click at the following ***X*** and ***Y locations*** on the grid:

X = 0 (m)	***Y = 0 (m)***
X = 4 (m)	***Y = 4 (m)***
X = 8 (m)	***Y = 8 (m)***
X = 12 (m)	***Y = 12 (m)***
X = 16 (m)	***Y = 16 (m)***
X = 20 (m)	***Y = near edge of scale***

Note: If you do not get the gridlines in the correct location when clicking, you can modify their locations in the Gridline input window beside the level selection.

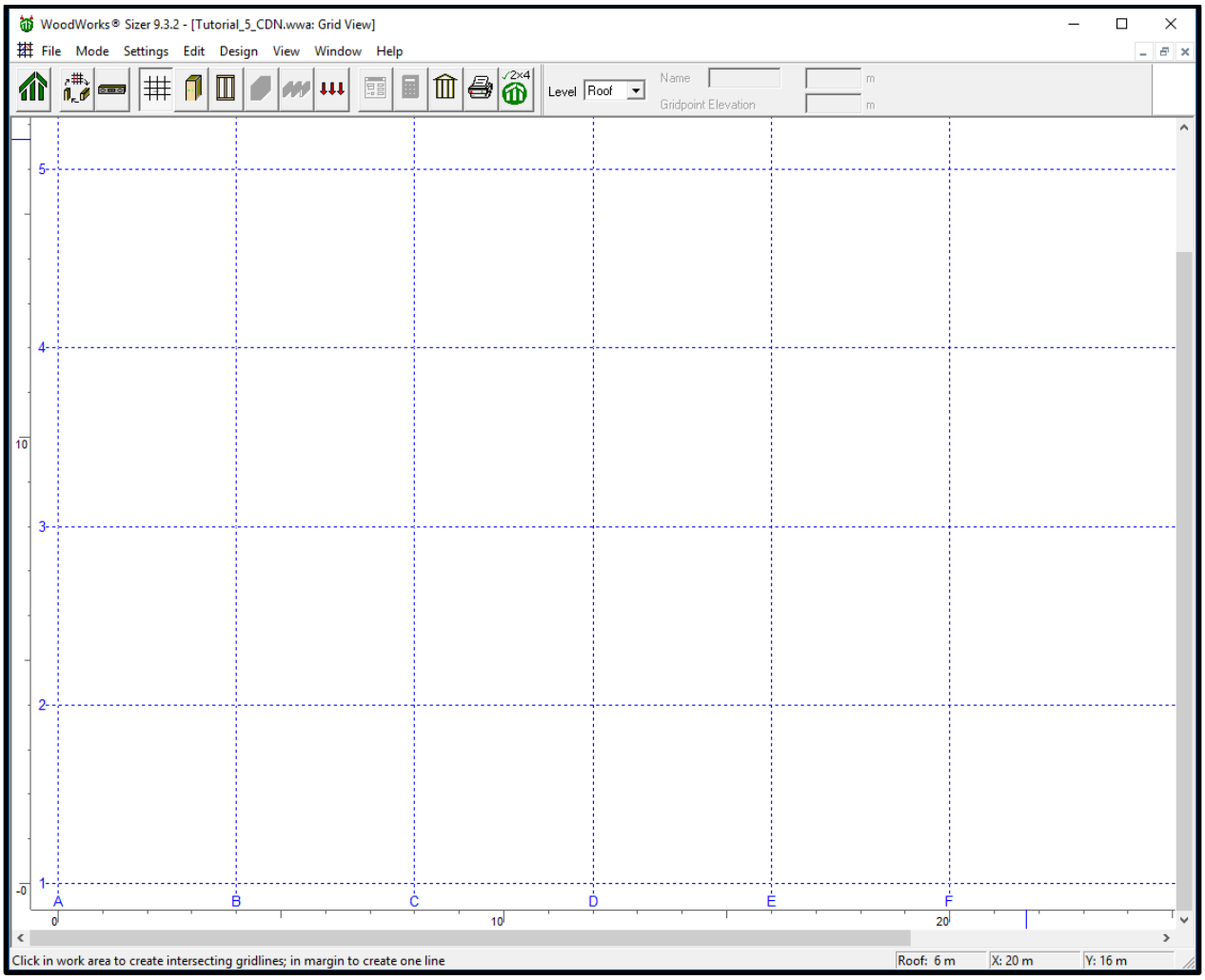

Figure 34: *Concept Mode Tutorial 5 – Gridline Placement*

5.7 Floor Level

5.7.1 Columns

1. Click ***Column*** on the toolbar.
2. Click on the ***Material Design Groups*** Tab to define an additional column group.
3. Enter a new name in the ***Name*** field: ***Centre***.
4. Click ***Add***.
5. Click ***Yes*** in the warning window.
6. Press ***OK*** to exit the Column Design Groups window.

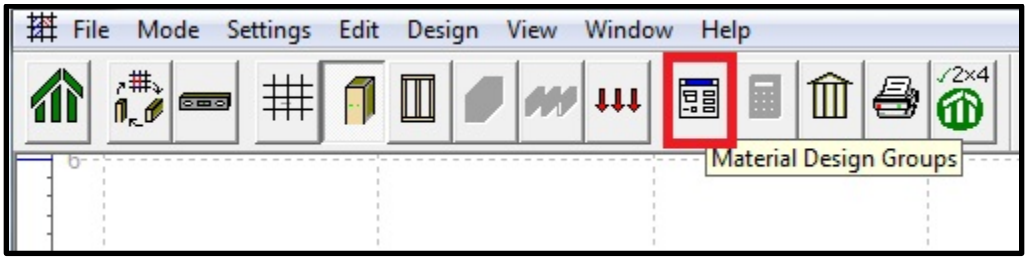

Figure 35: *Concept Mode Tutorial 5 – Material Design Groups*

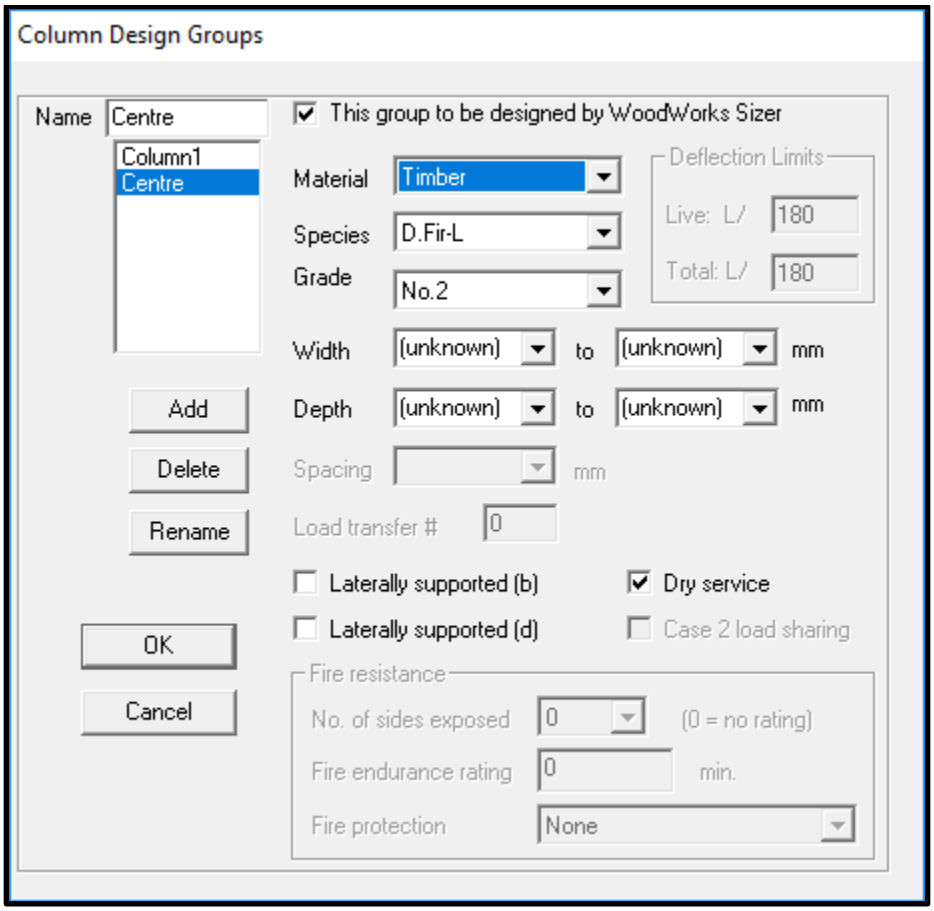

Figure 36: *Concept Mode Tutorial 5 – Column Design Groups*

6. In the main menu, choose ***Centre*** from the ***Groups*** drop-down list on the data bar.
7. Ensure the ***Level*** is set to ***Floor 1***.
8. Click gridpoints ***A-3***, ***B-3***, ***C-3***, ***D-3***, ***E-3***, and ***F-3***.
9. Choose ***Column1*** from the ***Group*** drop-down list on the data bar.
10. Click all remaining gridpoints.

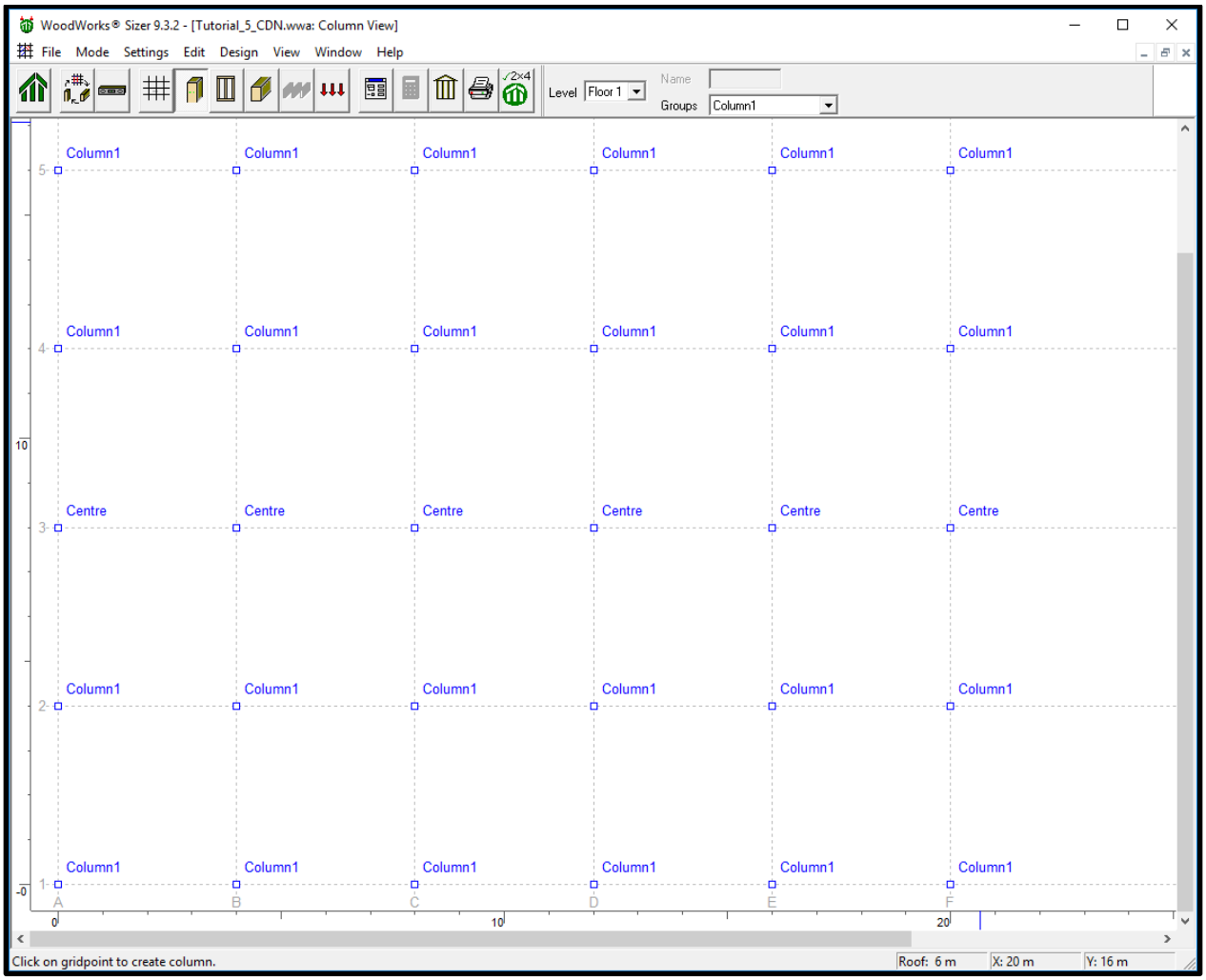

Figure 37: *Concept Mode Tutorial 5 – Column Locations Level 1*

5.7.2 Walls

1. Click ***Walls*** on the toolbar.
2. Click ***Design, Design Groups*** to define an additional wall group.
3. Enter a new name in the ***Name*** field: ***Wall2***.
4. Click ***Add***.
5. Click ***Yes*** in the warning window.
6. Click ***OK*** to exit Wall Design Groups Window.

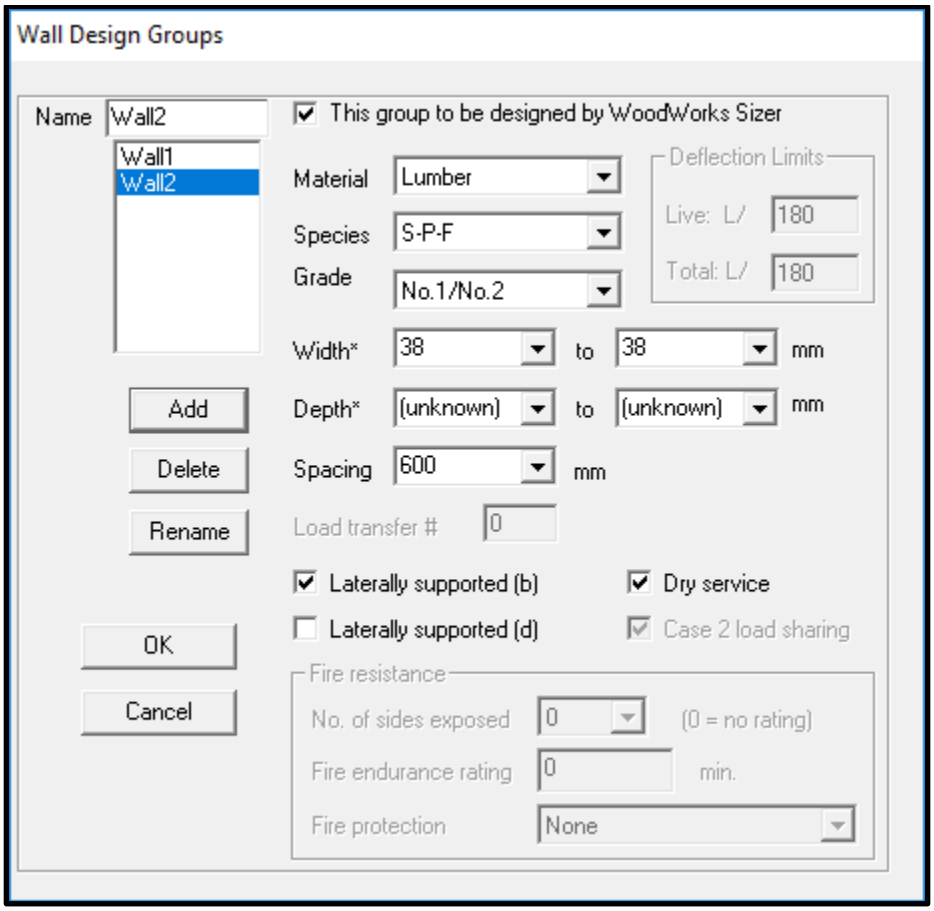

Figure 38: *Concept Mode Tutorial 5 – Wall Design Groups*

7. Choose ***Wall1*** from the ***Group*** drop-down list on the data bar.
8. Point to gridpoint ***F-1***, click and drag a wall to ***F-3***.
9. Choose ***Wall2*** from the ***Group*** drop-down list on the data bar.
10. Point to gridpoint ***F-3***, click and drag a wall to ***F-5***.

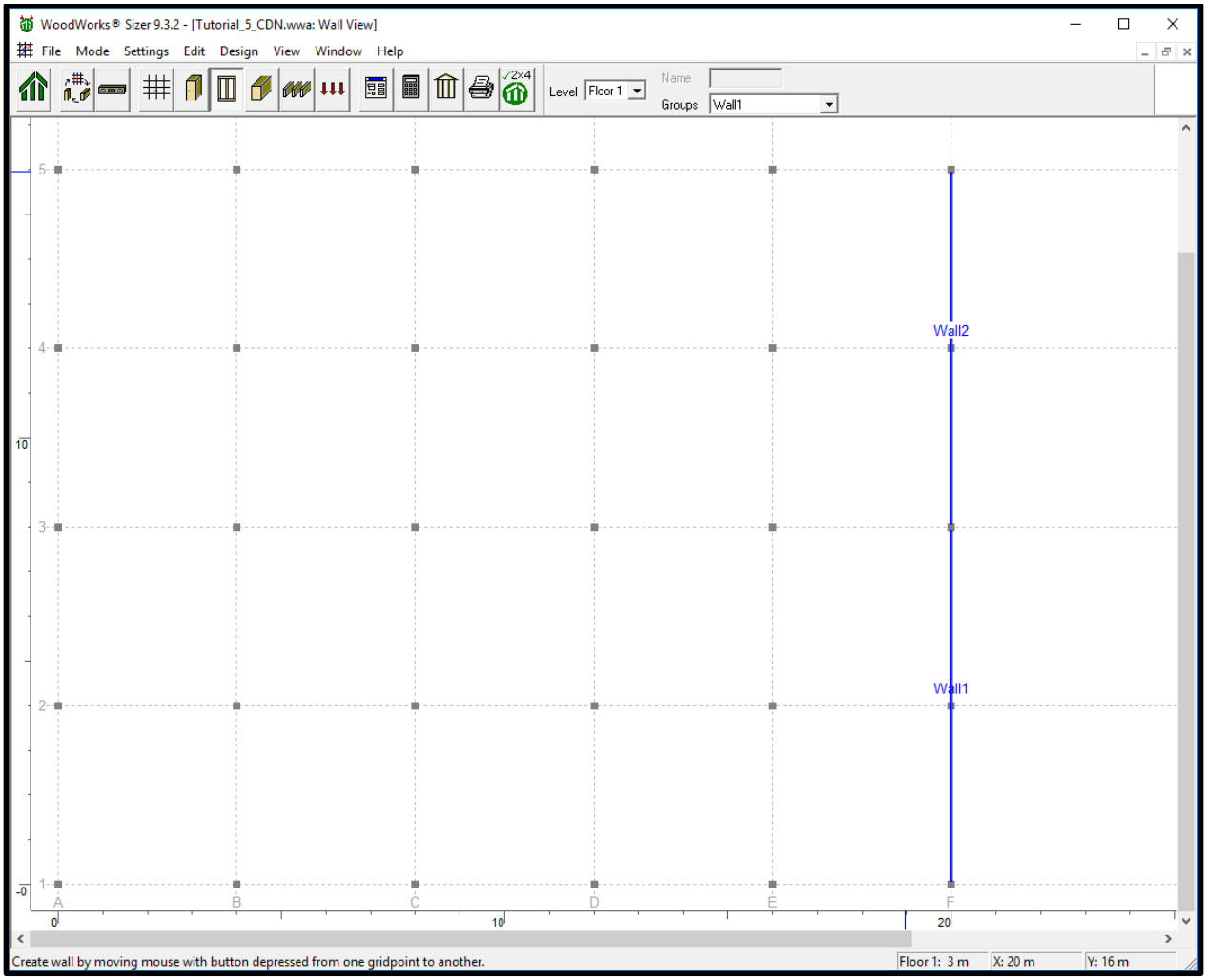

Figure 39: *Concept Mode Tutorial 5 – Wall Locations Level 1*

5.7.3 Beams

1. Click ***Beam*** on the toolbar.
2. Click ***Design Groups*** to add a beam group.
3. Select the ***Glulam-E*** material type in the ***Material*** field.
4. Select the ***Name*** field and enter a new name: ***Purlin***.
5. Enter a value of ***1*** in the ***Load Transfer*** box.
6. Click ***Add***.
7. Click ***Yes*** in the warning window.
8. Click ***OK*** to exit Beam Design Groups Window.

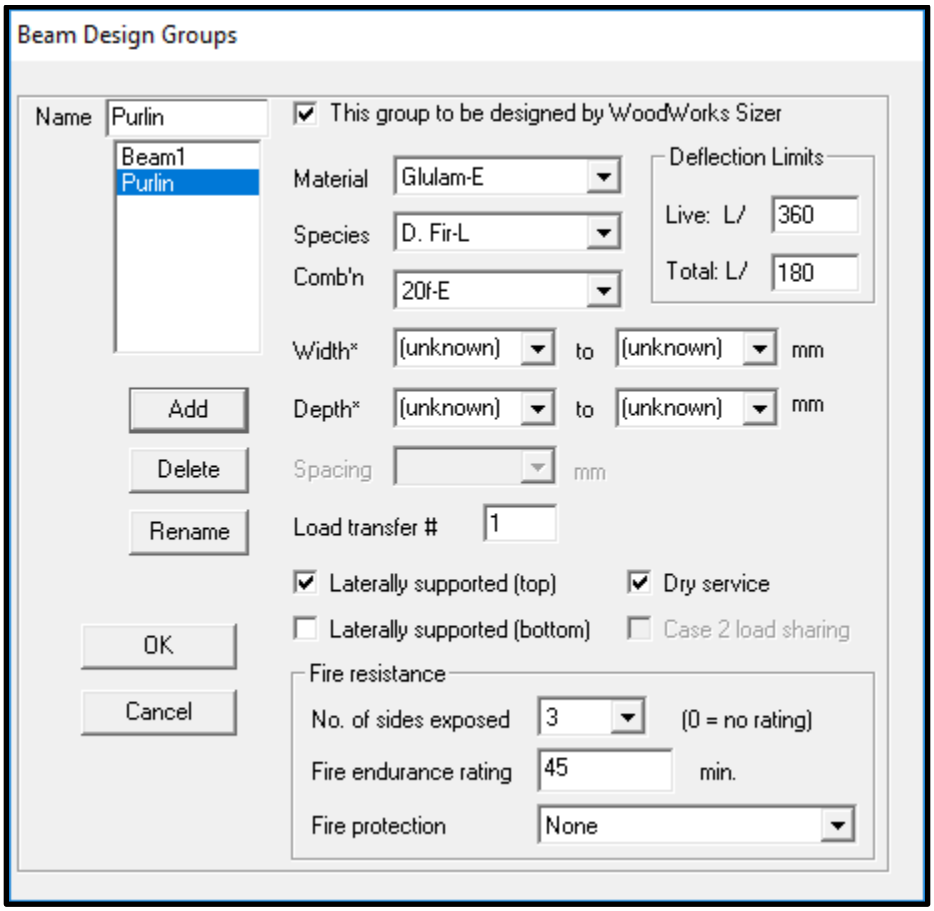

Figure 40: *Concept Mode Tutorial 5 – Beam Design Groups*

9. Click on gridpoint ***A-1***, click and drag a beam to ***A-3***.
10. Repeat step 9 to create beams spanning in the North-South direction as seen below.

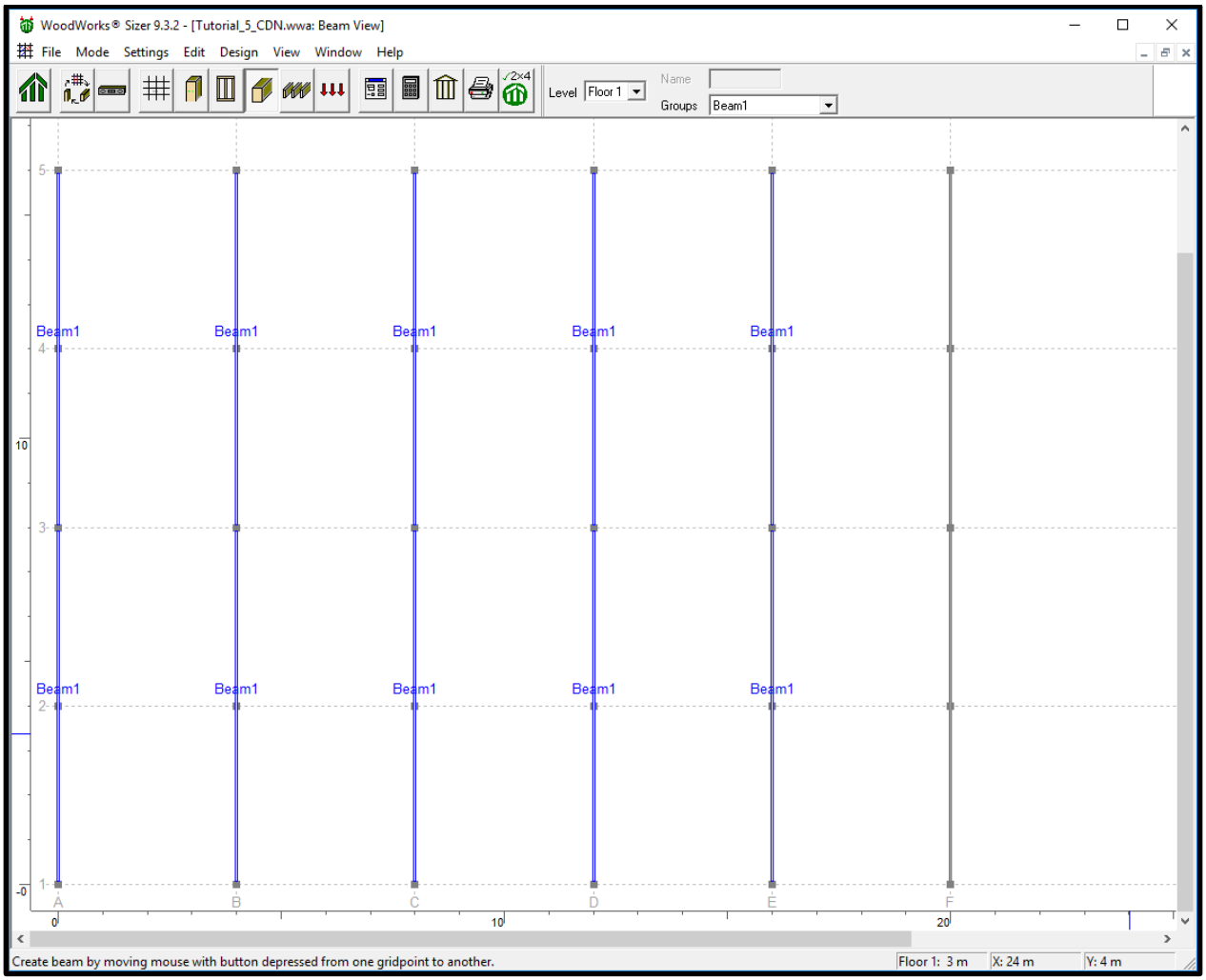

Figure 41: *Concept Mode Tutorial 5 – Beam1 Locations Level 1*

11. Choose ***Purlin*** from the ***Group*** drop-down list on the status bar.
12. Point to gridpoint ***A-1***, click and drag a beam to ***B-1***.
13. Repeat step 11 to create single span beams spanning in the East-West direction as seen below.

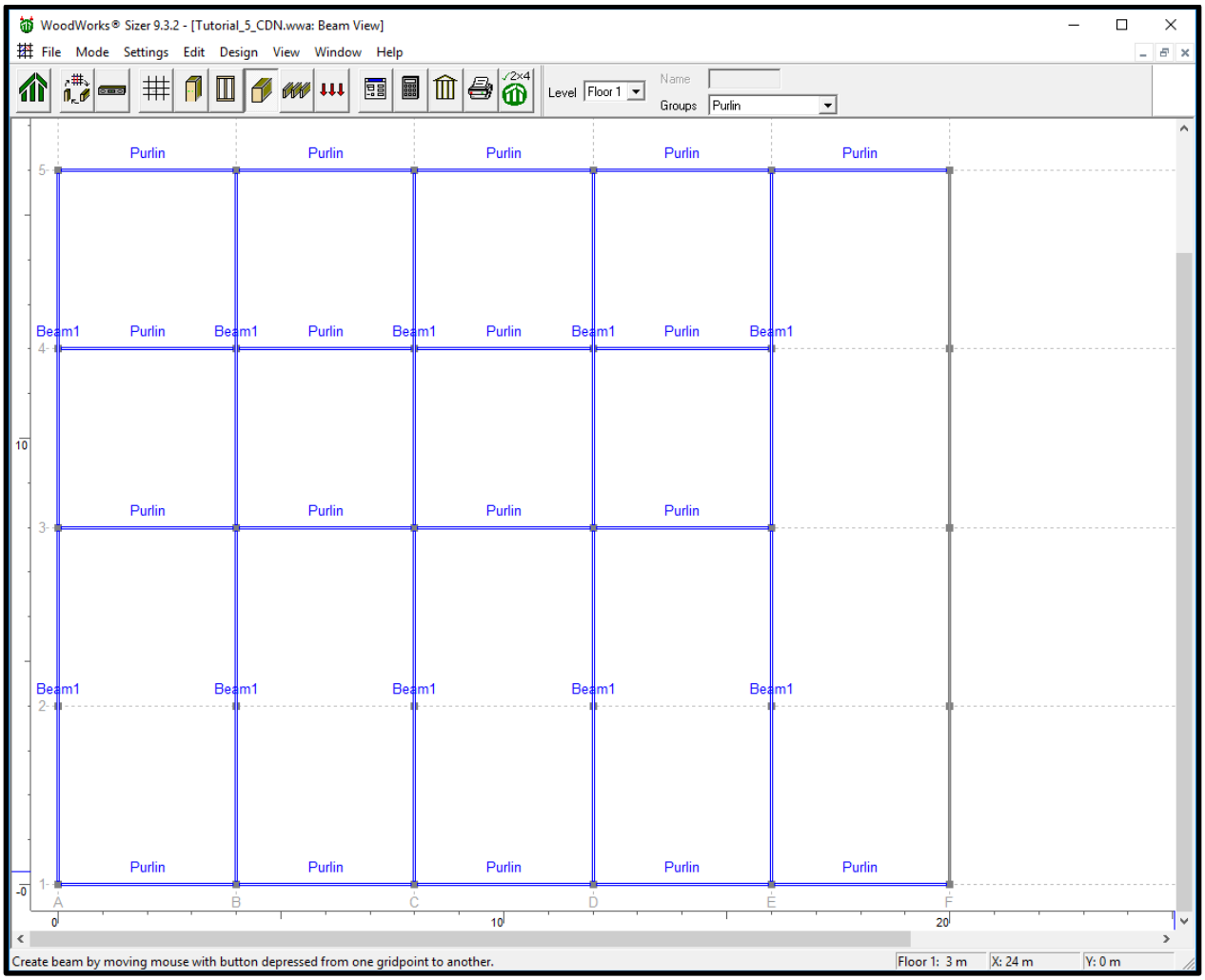

Figure 42: *Concept Mode Tutorial 5 – Purlin Locations Level 1*

5.7.4 Joists

1. Click on the ***Joist*** button.
2. Click gridpoints ***A-1***, ***B-1***, ***B-3*** and ***A-3*** to create the first joist area.
3. Repeat step 2 to create the joist areas as shown above.
4. Click gridpoints ***E-5***, ***E-4***, ***D-4*** and ***D-5***.

Note: In this case, the joists could span either North-South or East-West. You can change the direction you wish the joists to span by highlighting the joist area and then changing the direction indicated in the Direction field of the data bar.

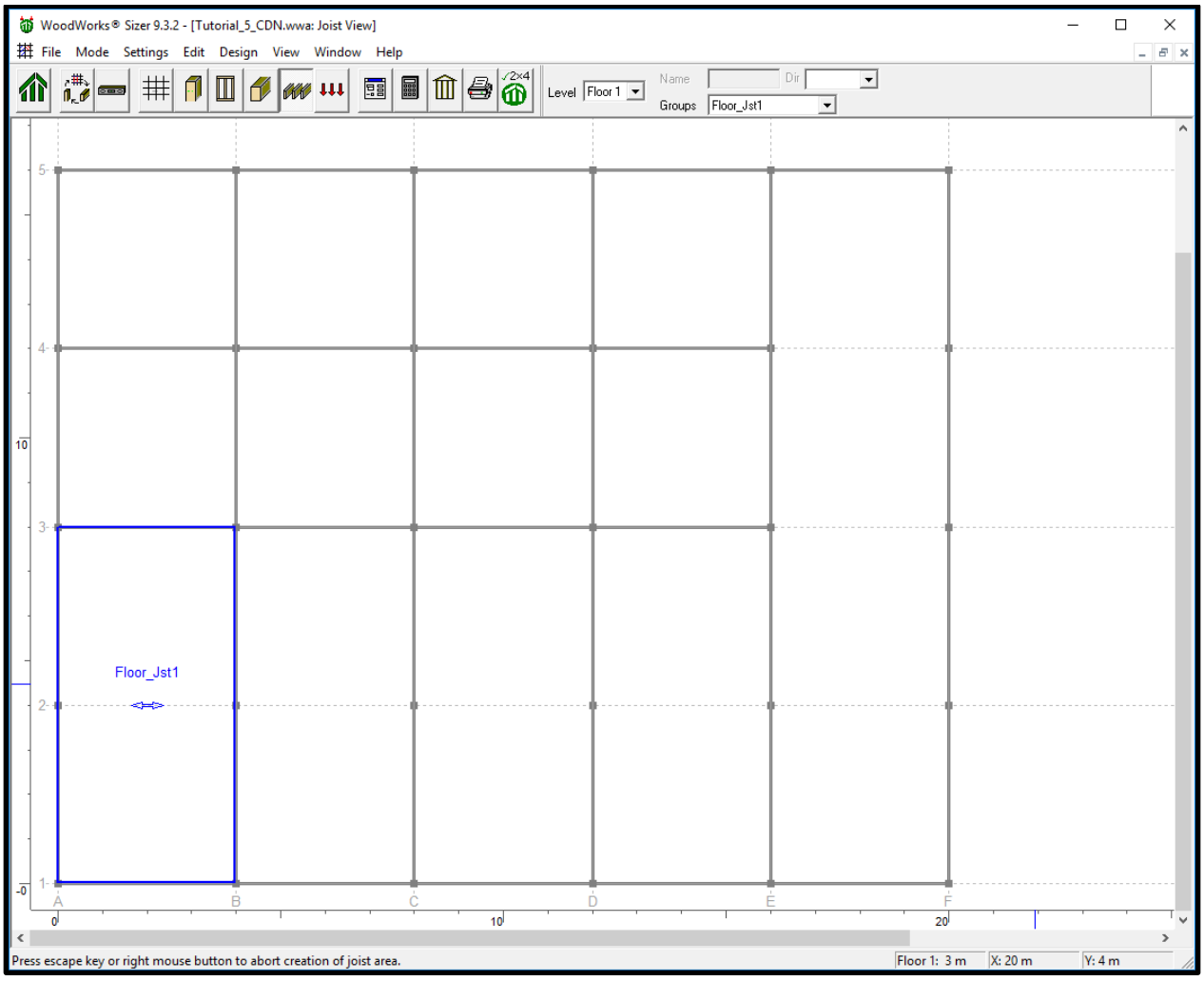

Figure 43: *Concept Mode Tutorial 5 - Placing Floor Joists Level 1*

5. Repeat step 4 to create the remaining joist areas as shown above.

<u>Note</u>: The Concept Mode Data bar can be moved to a different location on screen for ease of use by clicking on the Data Bar and while holding the mouse button down, dragging the Data Bar around the screen.

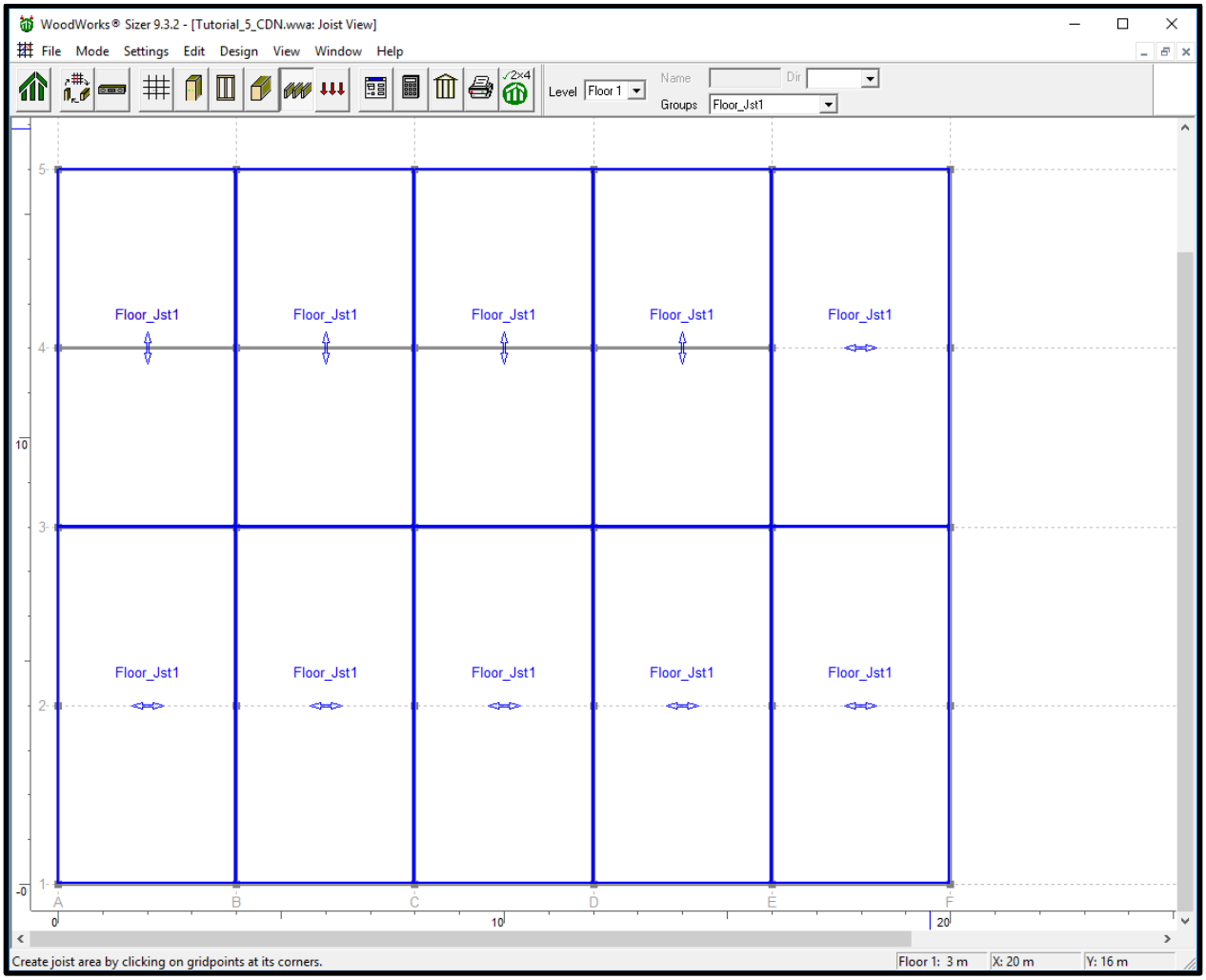

Figure 44: *Concept Mode Tutorial 5 – Floor Joist Locations and Orientations Level 1*

5.8 Loads

1. Click ***Load*** on the toolbar.
2. The ***Load Type*** should be set to ***Dead Area***. Enter a load magnitude of ***1 (kN/m2)*** in the right most field of the data bar.
3. Click gridpoints ***A-1***, ***F-1***, ***F-5***, and ***A-5*** to load the area.

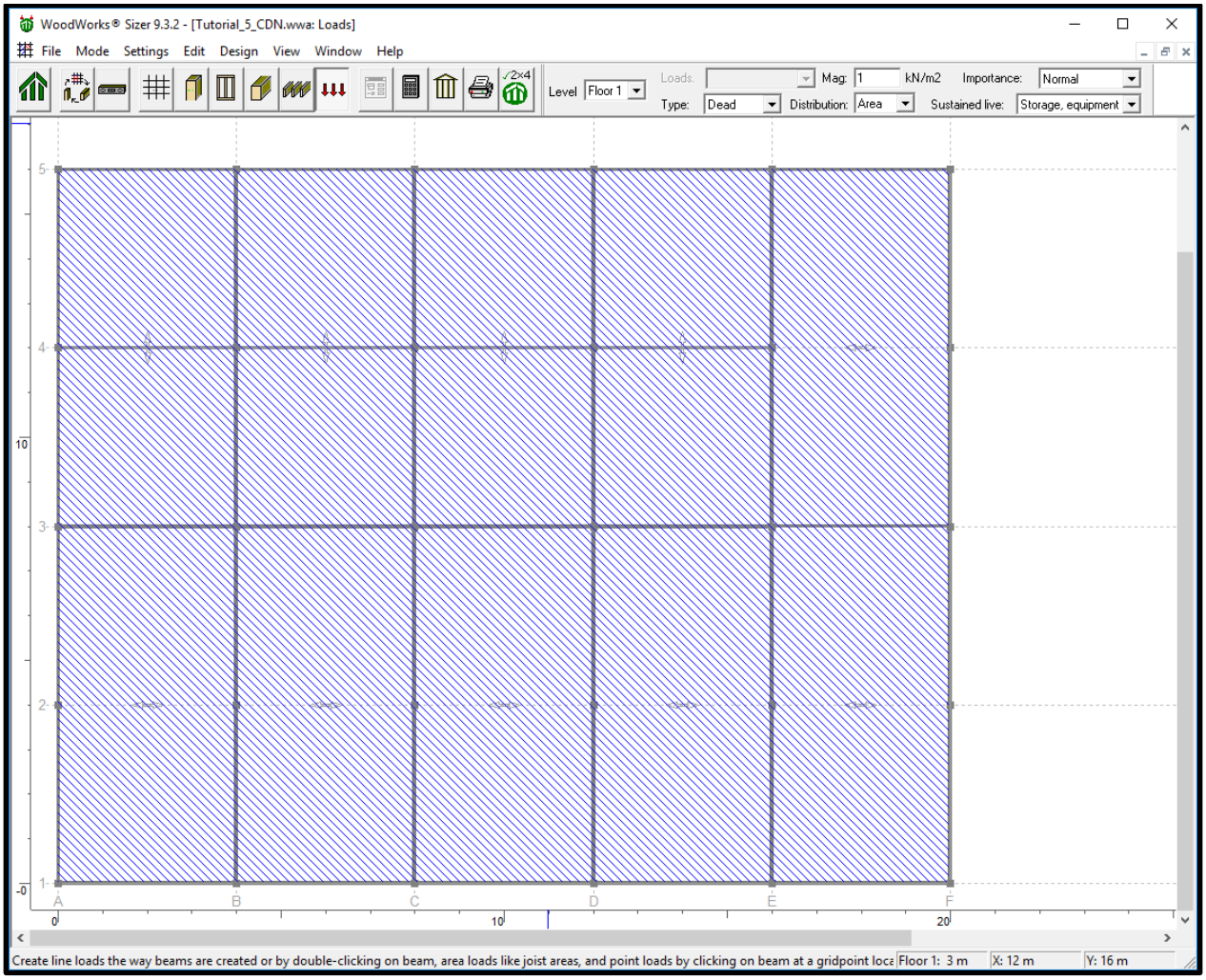

Figure 45: *Concept Mode Tutorial 5 – Applying Dead Load to Level 1*

4. Choose **Live Area** from the **Load Type** drop-down list on the data bar.
5. Enter a load magnitude of ***2.5 (kN/m2)*** in the data bar.
6. Click gridpoints ***A-1***, ***F-1***, ***F-5***, and ***A-5*** to load the area.

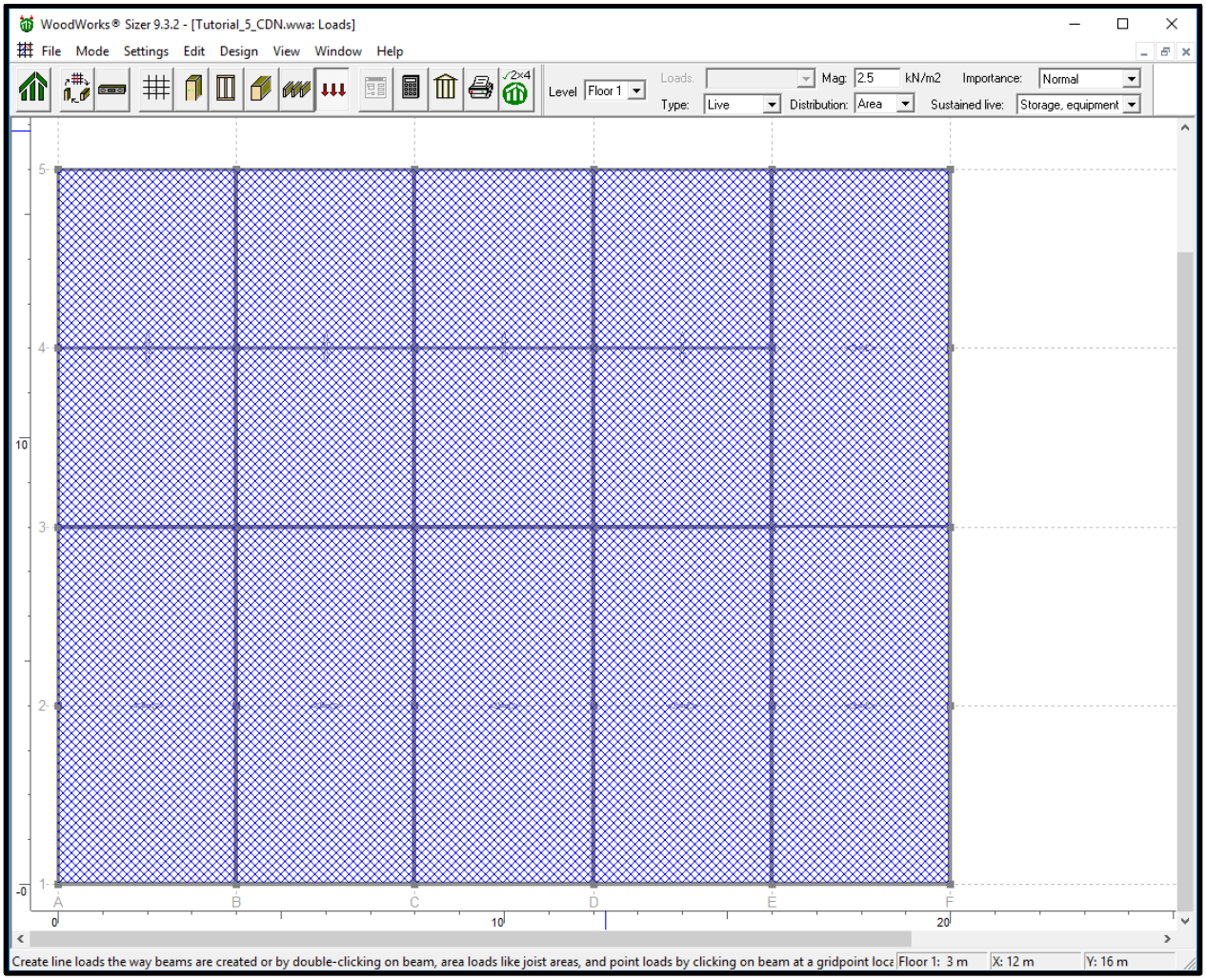

Figure 46: *Concept Mode Tutorial 5 – Applying Live Load to Level 1*

5.9 Roof Level

5.9.1 Gridlines

1. Click the right mouse button. Click on ***Roof*** to change the current level.
2. Press ***OK***.

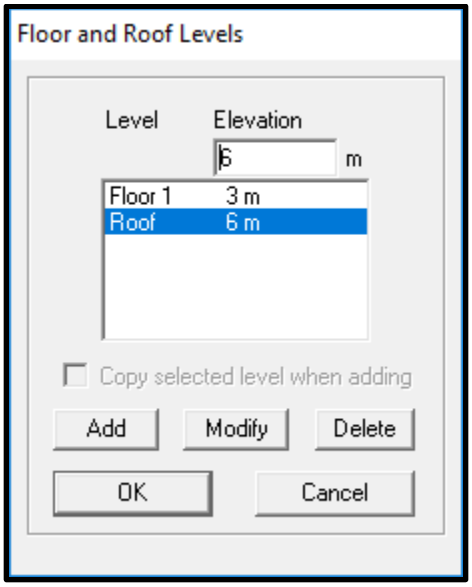

Figure 47: *Concept Mode Tutorial 5 – Roof Level*

3. Click on ***Grid*** from the toolbar.
4. Select gridpoint ***A-3*** so that it is highlighted in red (both gridline ***A*** and ***3*** should appear in red).
5. Select the ***Gridpoint Elevation*** field from the data bar and enter an elevation of ***7 (m)*** and press **Enter**.
6. Press ***OK*** in the warning screen to move the gridpoint to an elevation of 7 m.
7. Create elevations of ***7 m*** at the following locations: ***B-3***, ***C-3***, ***D-3***, ***E-3***, and ***F-3***.

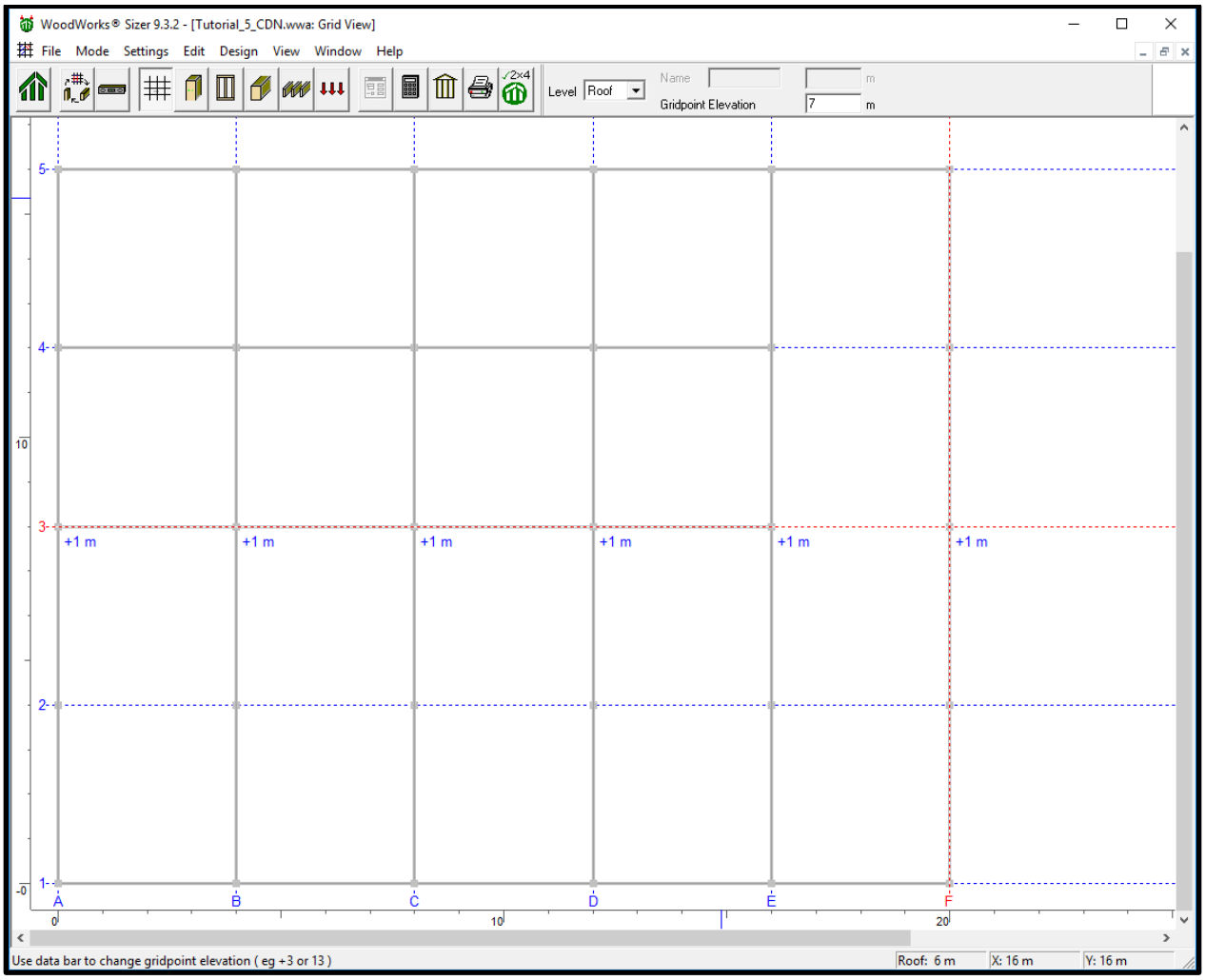

Figure 48: *Concept Mode Tutorial 5 – Adjusting Roof Height*

5.9.2 Columns

1. Click ***Column*** on the toolbar.
2. Choose ***Centre*** from the ***Group*** drop-down list on the data bar.
3. Click gridpoints ***A-3***, ***B-3***, ***C-3***, ***D-3***, ***E-3***, and ***F-3***.

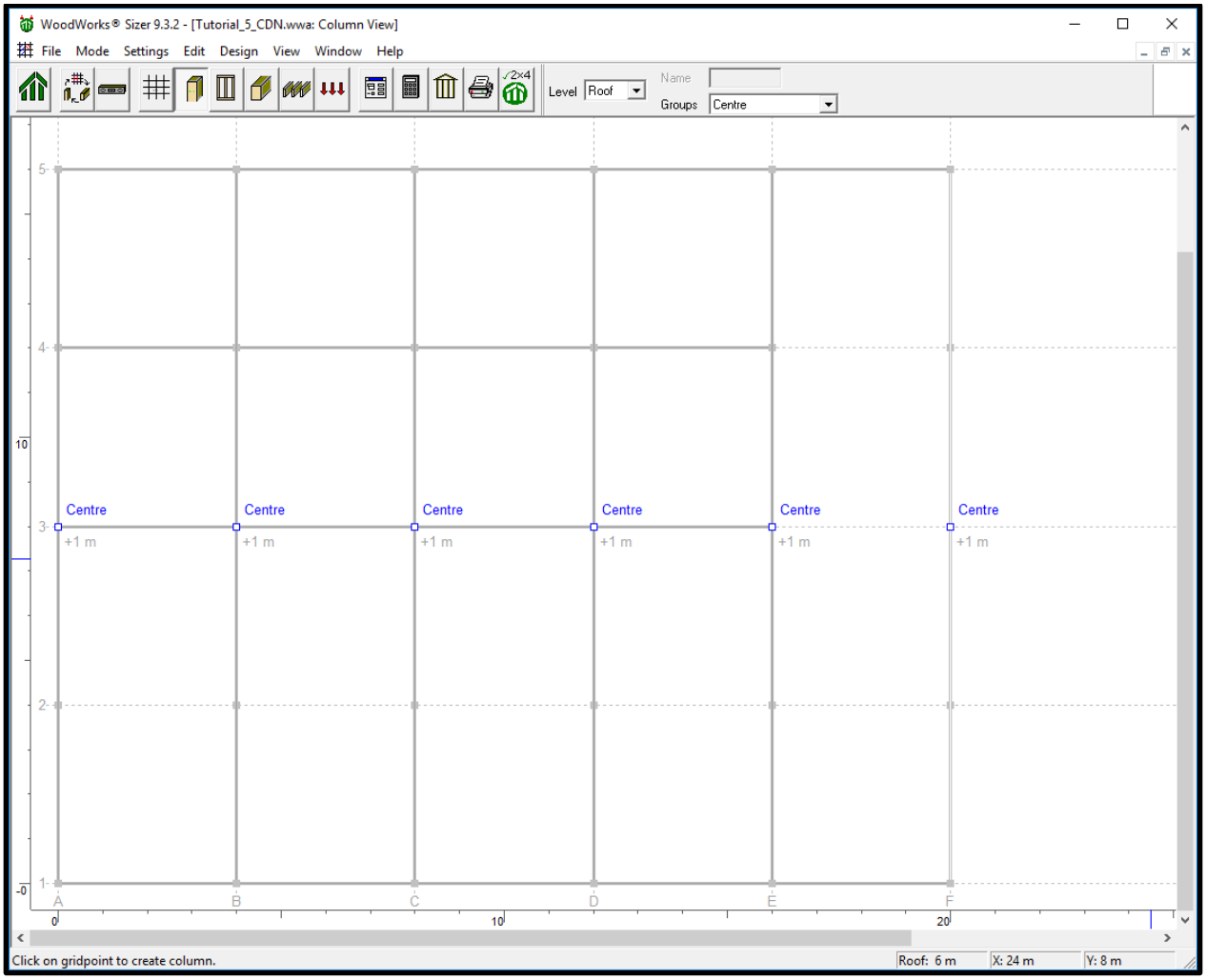

Figure 49: *Concept Mode Tutorial 5 – Placing Columns at Roof level*

5.9.3 Walls

1. Click ***Wall*** on the toolbar.
2. Choose ***Wall1*** from the ***Group*** drop-down list on the data bar.
3. Point to gridpoint ***F-1***, click and drag a wall to gridpoint ***F-3***.
4. In a similar manner, create the remaining walls as shown on the left screen.

<u>Note</u>: You cannot define a continuous stud wall for either the North or South walls since the beams that support these walls from below are not continuous over the columns.

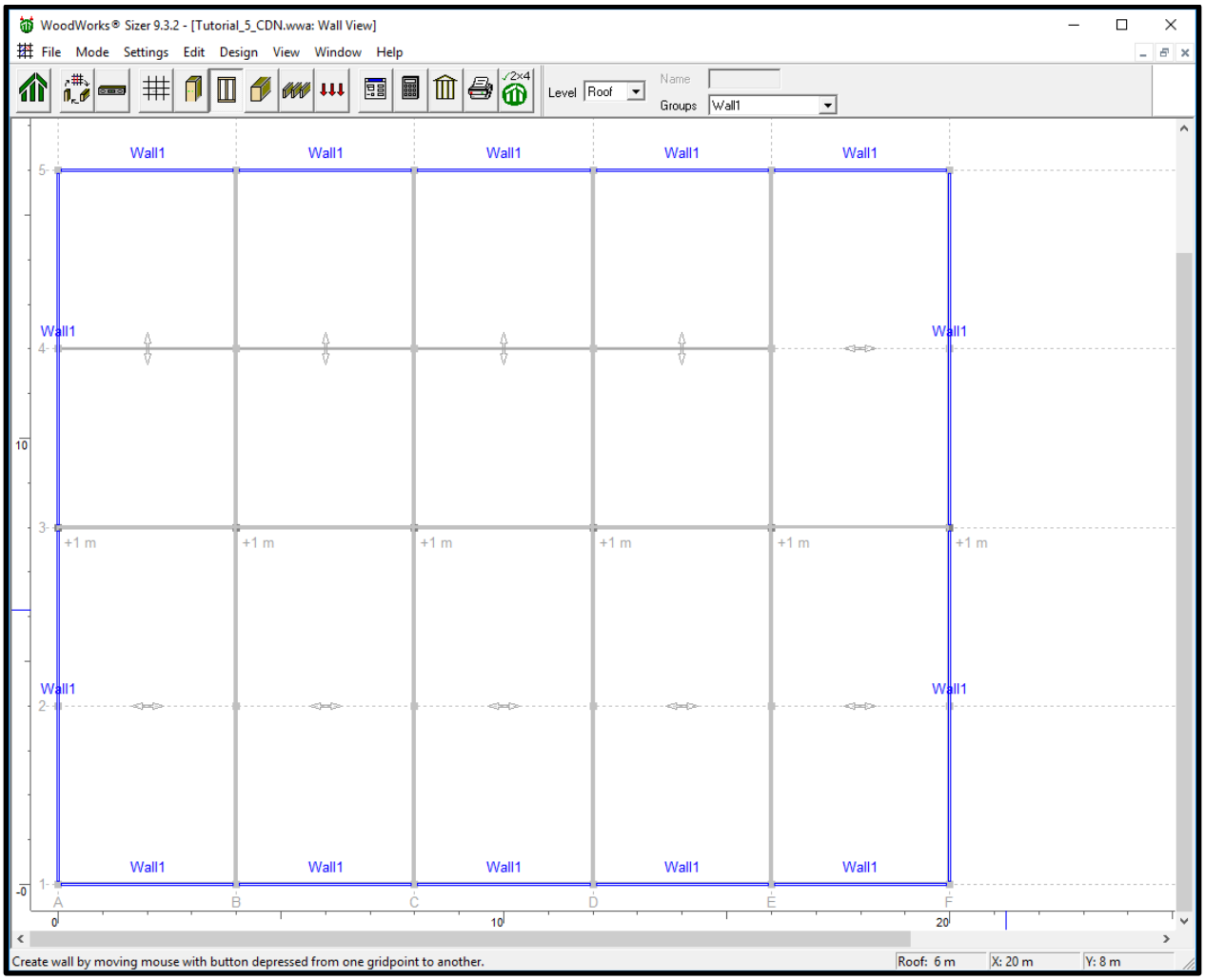

Figure 50: *Concept Mode Tutorial 5 – Placing Walls at Roof*

5.9.4 Beams

1. Click ***Beam*** on the toolbar.
2. Click ***Design Groups*** to define an additional beam group.
3. Select the ***Name*** field and enter a new name: ***Ridge***.
4. Choose ***Glulam-E*** from the ***Material*** drop-down list.
5. Click ***Add***.
6. Click ***Yes*** in the warning screen.
7. Click ***OK***.
8. Choose ***Ridge*** from the ***Group*** drop-down list on the data bar.

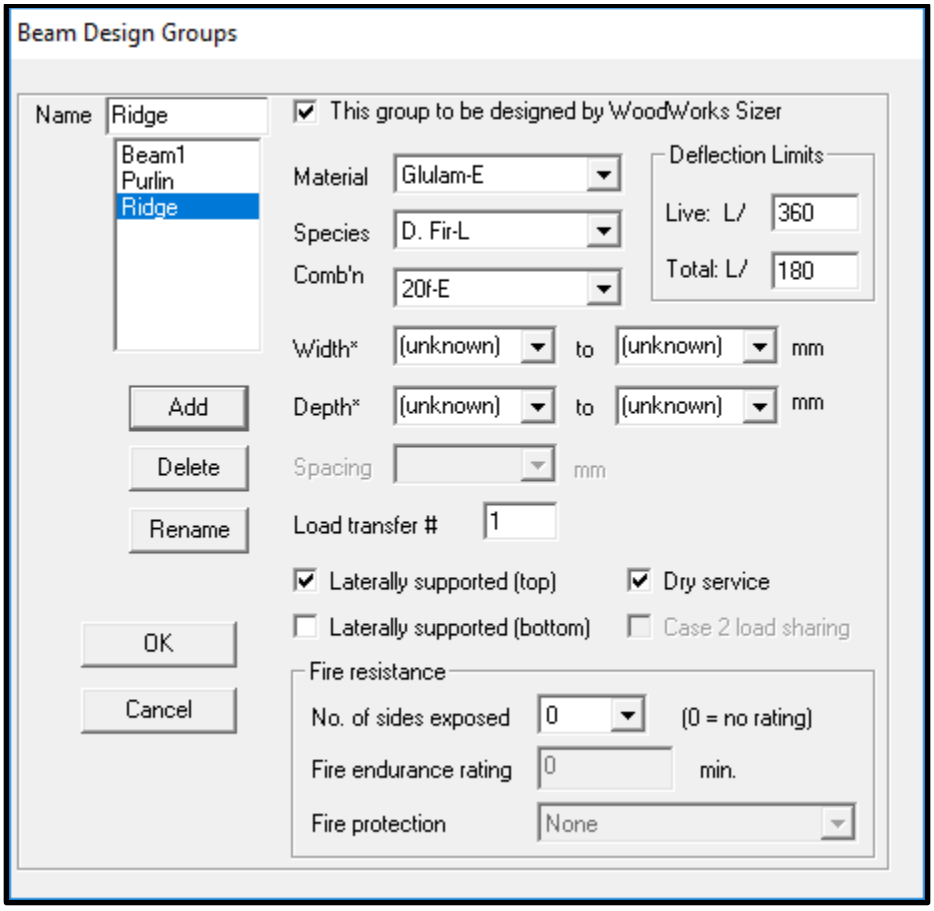

Figure 51: *Concept Mode Tutorial 5 - Adding Ridge Beam to Beam Design Group*

8. Point to grid point ***A-3***, click and drag a beam to ***B-3***.
9. Repeat step 8 to create beams between: ***B-3*** and ***C-3***, ***C-3*** and ***D-3***, ***D-3*** and ***E-3***, ***E-3*** and ***F-3***.

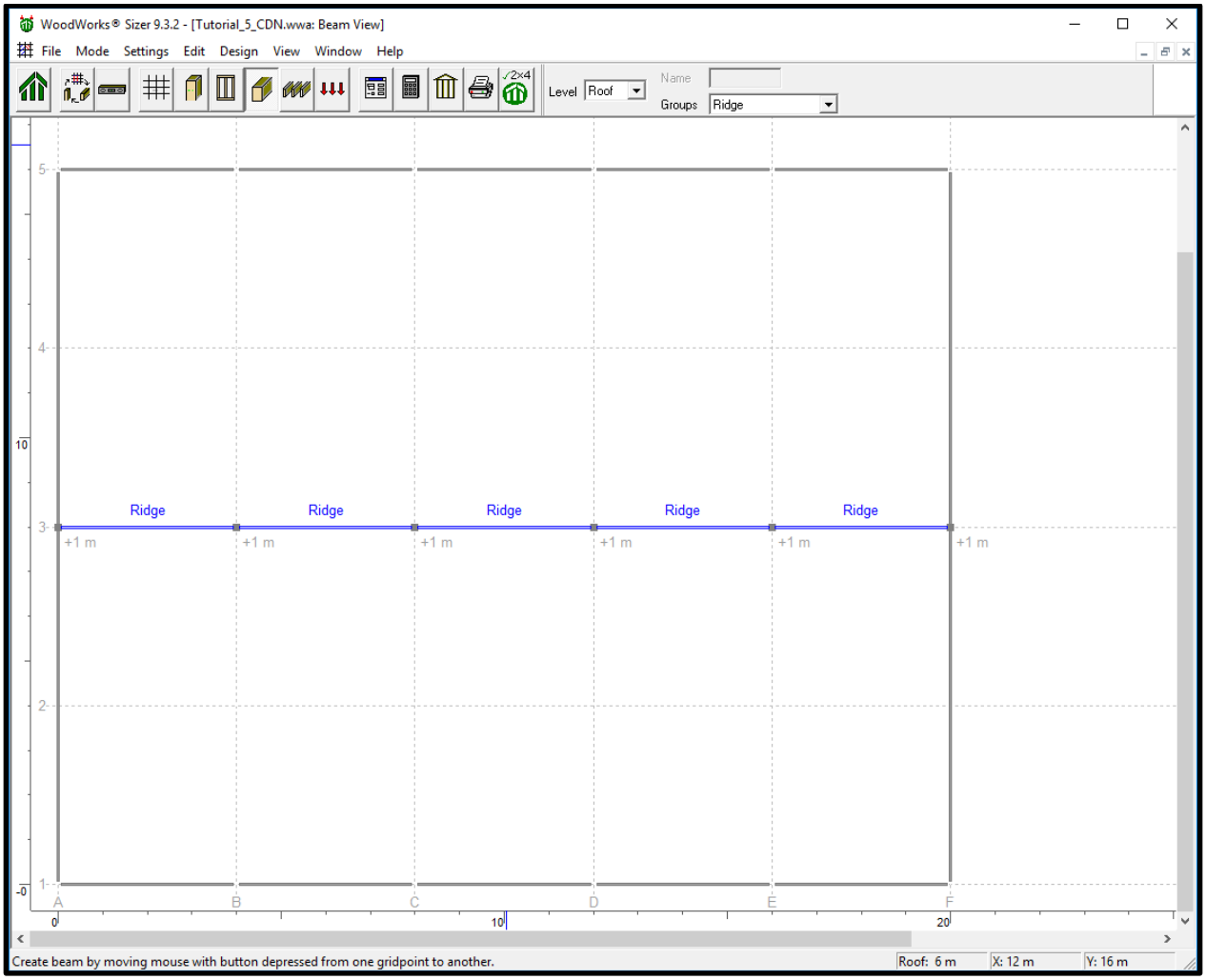

Figure 52: *Concept Mode Tutorial 5 – Ridge Beam Locations at Roof*

5.9.5 Joists

1. Click ***Joist*** on the toolbar.
2. Click ***Design Groups*** to define an additional joist group.
3. Select ***Roof Joist*** in the ***Type*** field.
4. Select the ***Name*** field and enter a new name: ***Parall.Truss.***
5. Click the check box beside ***To Be Designed***. (This tells *Sizer* not to size the members belonging to this group. Use this feature to model trusses or non-wood load-bearing members in the structure.)
6. Click ***Add*** and then click ***OK.***
7. Click ***Yes*** in the warning screen.
8. Choose ***Parall.Truss*** from the ***Group*** drop-down list in the status bar.

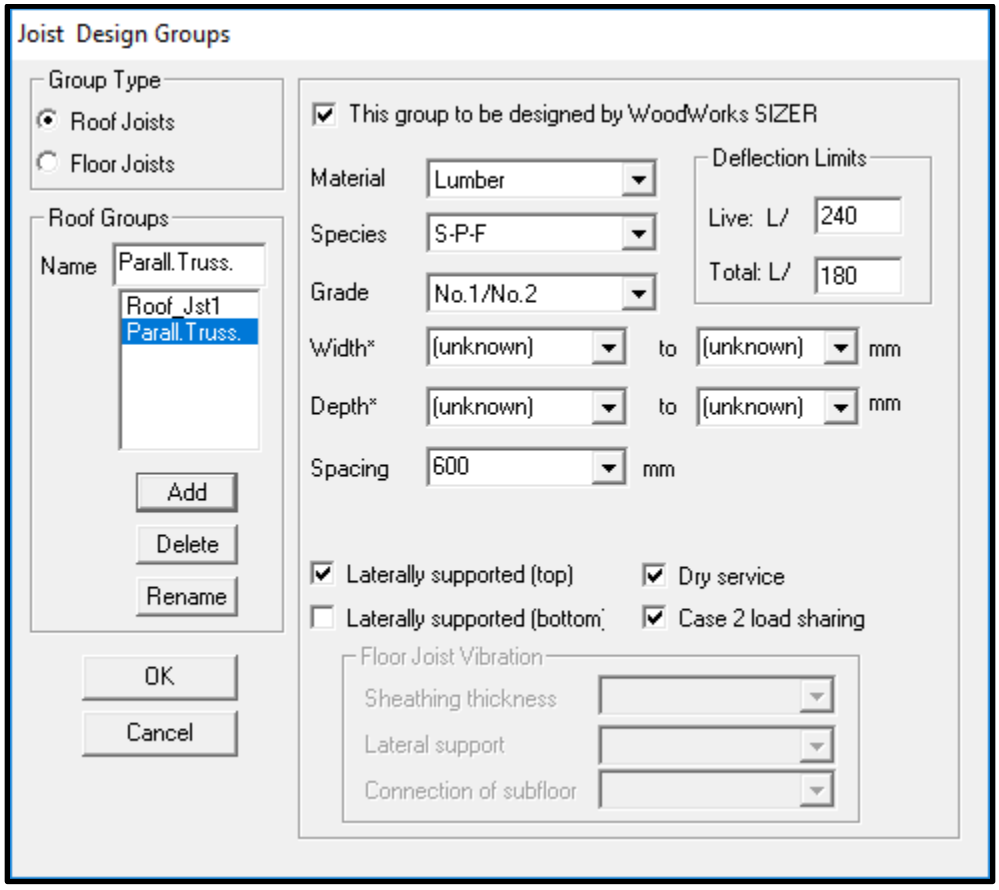

Figure 53: *Concept Mode Tutorial 5 – Adding Parallel Truss to Joist Design Groups*

8. Click gridpoints ***A-1***, ***B-1***, ***B-3***, and ***A-3*** to create the first joist area.
9. Repeat step 8 to create the remaining joist areas as shown on the left screen.

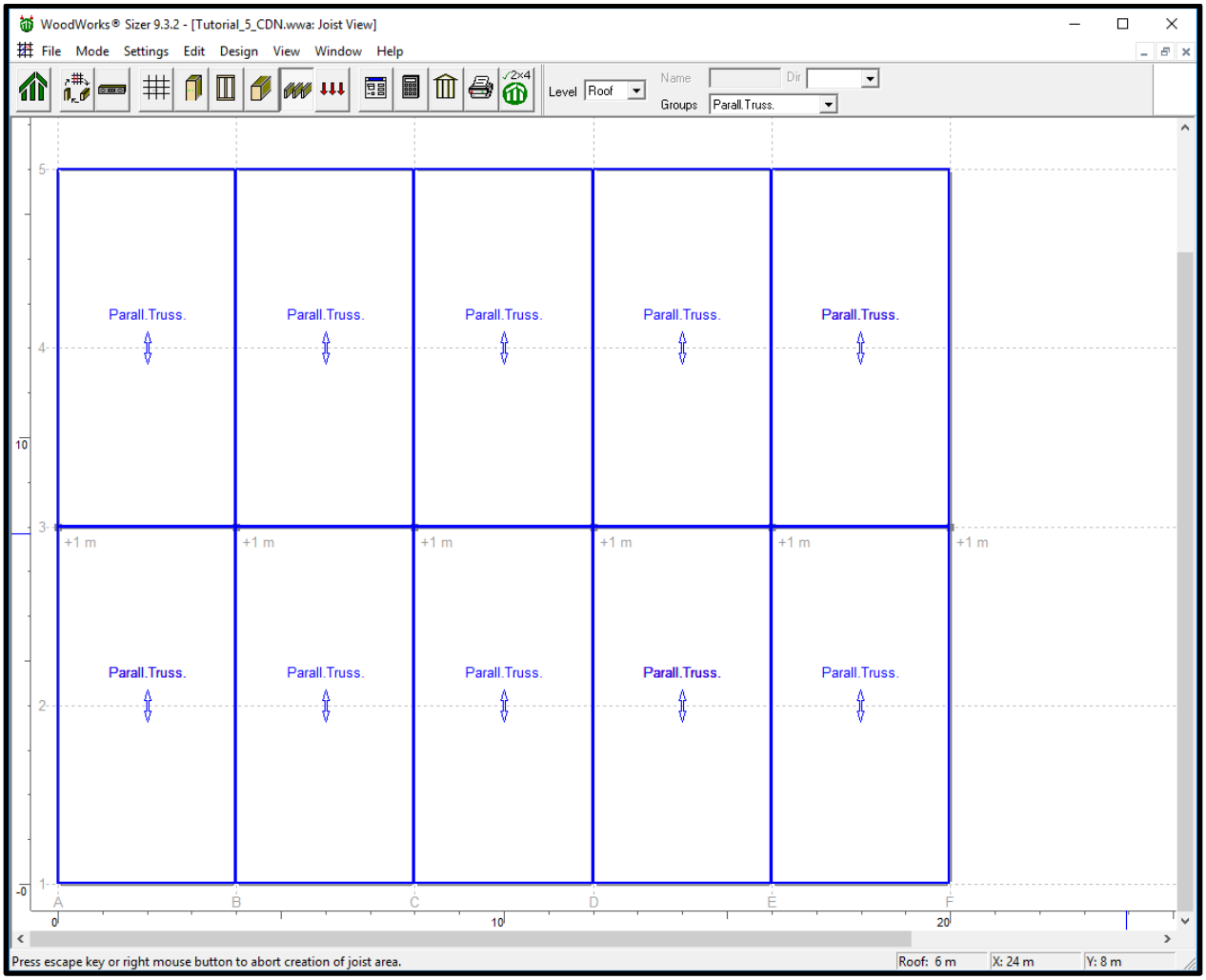

Figure 54: *Concept Mode Tutorial 5 – Truss Locations and Orientations at Roof*

5.9.6 Elevation View

1. Click on the ***Grid*** button from the toolbar.
2. Click on gridline ***A*** so that it is highlighted in red.
3. Click on ***Elev. View*** from the toolbar.
4. The elevation view along the North-South gridline "A" is now shown.
5. To see successive views along gridlines ***B***, ***C***, ***D***, ***etc***. click the ***Grid*** button, and repeat Steps 1 and 2.
6. To return to the main window, click any of the toolbar buttons.

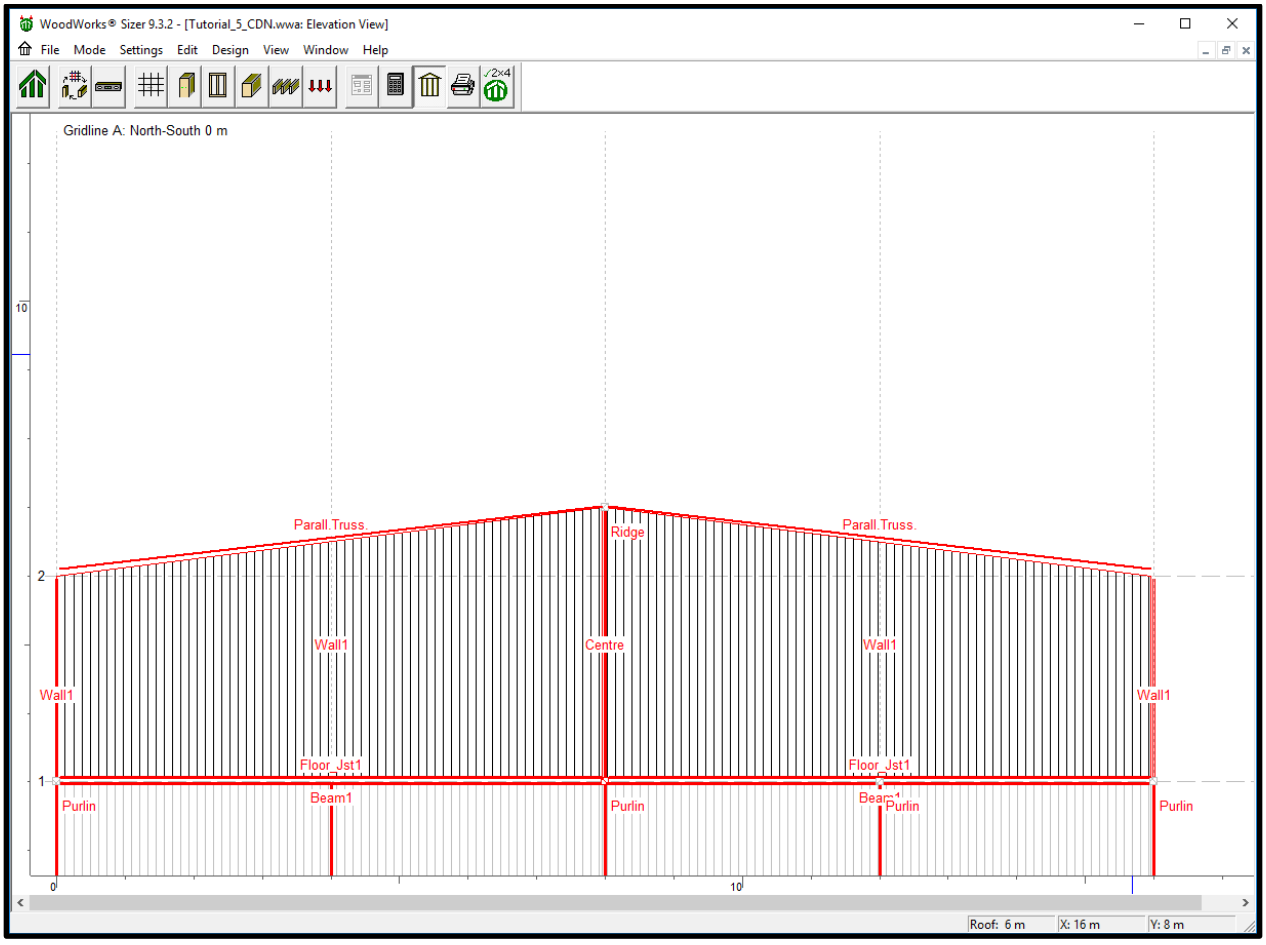

Figure 55: *Concept Mode Tutorial 5 – Elevation View along Gridline A*

5.9.7 Loads

1. Click ***Load*** on the toolbar.
2. Choose ***Dead Area*** from the ***Type*** drop-down list on the data bar.
3. Enter a load magnitude of ***1 (kN/m2)*** in the data bar.
4. Click gridpoints ***A-1***, ***F-1***, ***F-5*** and ***A-5*** to load the area.

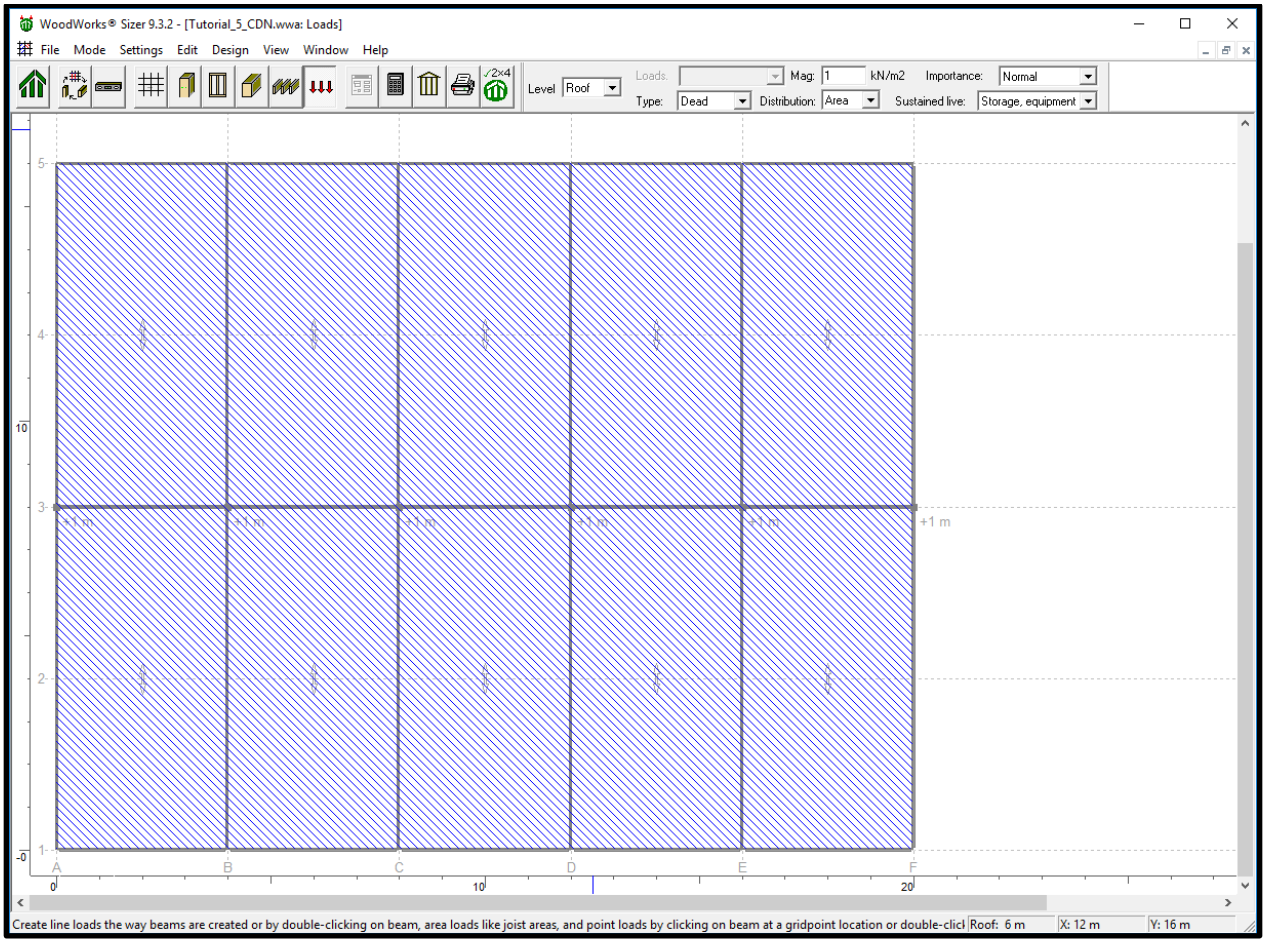

Figure 56: *Concept Mode Tutorial 5 – Applying Dead Load to Roof*

5.10 Design the Members

1. Click ***Design*** on the toolbar. *Sizer* designs all of the members in your structure and then displays the results.

5.11 View Results

1. Use the scroll bar to look through the results.
2. To close the results window, click on any of the *View* toolbar buttons.
3. Click here to download a pdf of the material list.
4. Click here to download a pdf of the reactions at base.
5. Click here to download the results by group.
6. Click here to download the results by member.

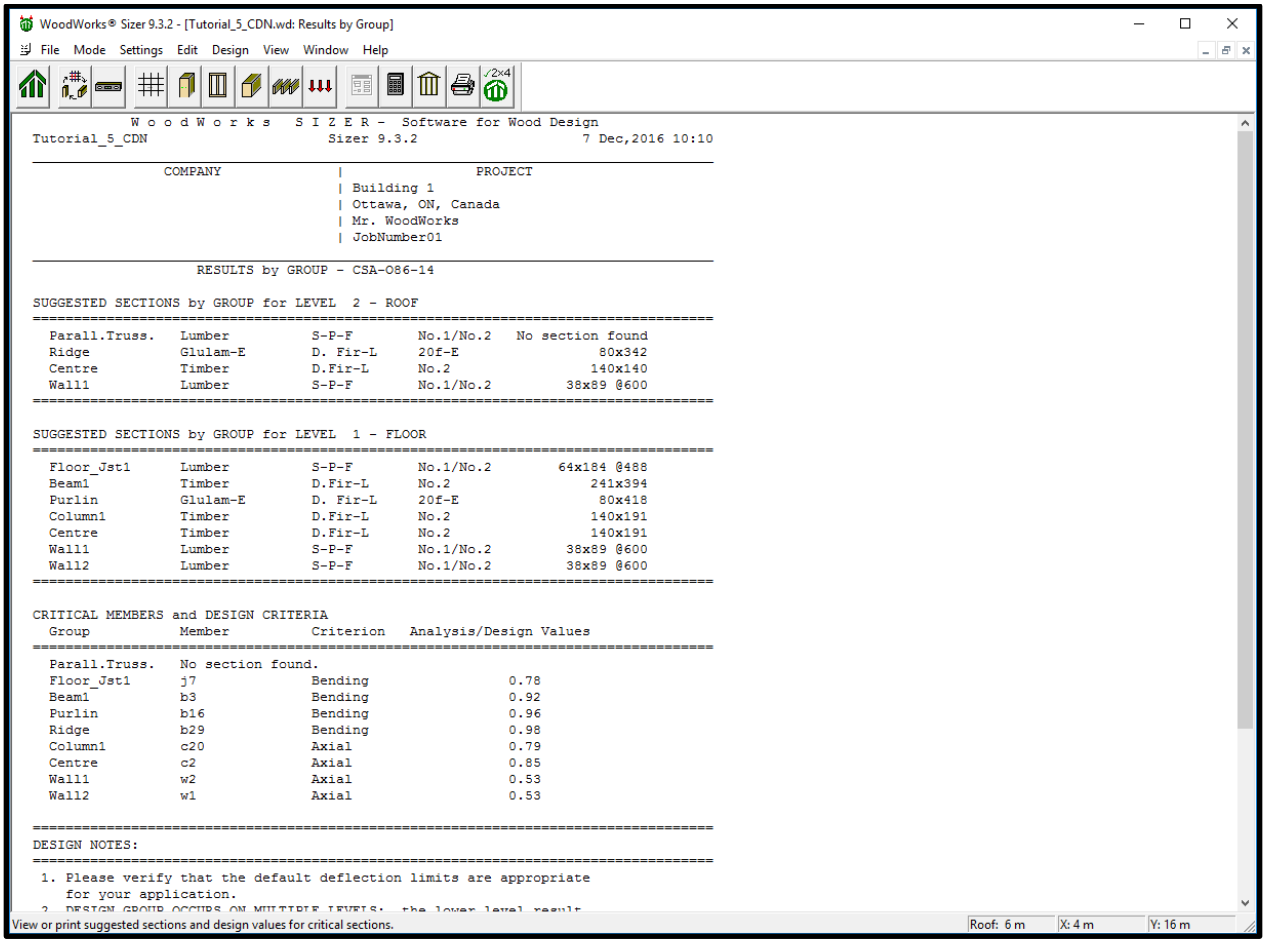

Figure 57: *Concept Mode Tutorial 5 – Results by Group*

5.12 More Practice

To further familiarize yourself with Concept mode, try the following:

1. Move some gridlines and click ***Design*** on the toolbar to re-design the structure.
2. Try using transfer beams (columns supported on a beam).
3. Create an addition to your project.

6 Concept Mode Tutorial 6 – Example from Concept Mode Demo (CDN)

The Sizer file (.wwa) created from going through this tutorial can be downloaded by clicking here.

6.1 Introduction

This tutorial provides instructions for completing the Concept mode model from the following demonstration video (https://www.youtube.com/watch?v=g6d7Z6Gduo8).

6.2 Snap Increment

7. Enter Concept Mode by clicking on the ***New Concept Mode File*** button.
8. Click the ***Settings*** icon.
9. Click on the ***View*** tab.
10. In the ***Viewing Area*** field, modify the ***North-South*** limit to ***15 (m)*** and the ***East-West*** limit to ***24 (m)***.
11. Enter ***North-South*** and ***East-West Snap Increments*** of **100** ***(cm)***.
12. Click ***OK***.

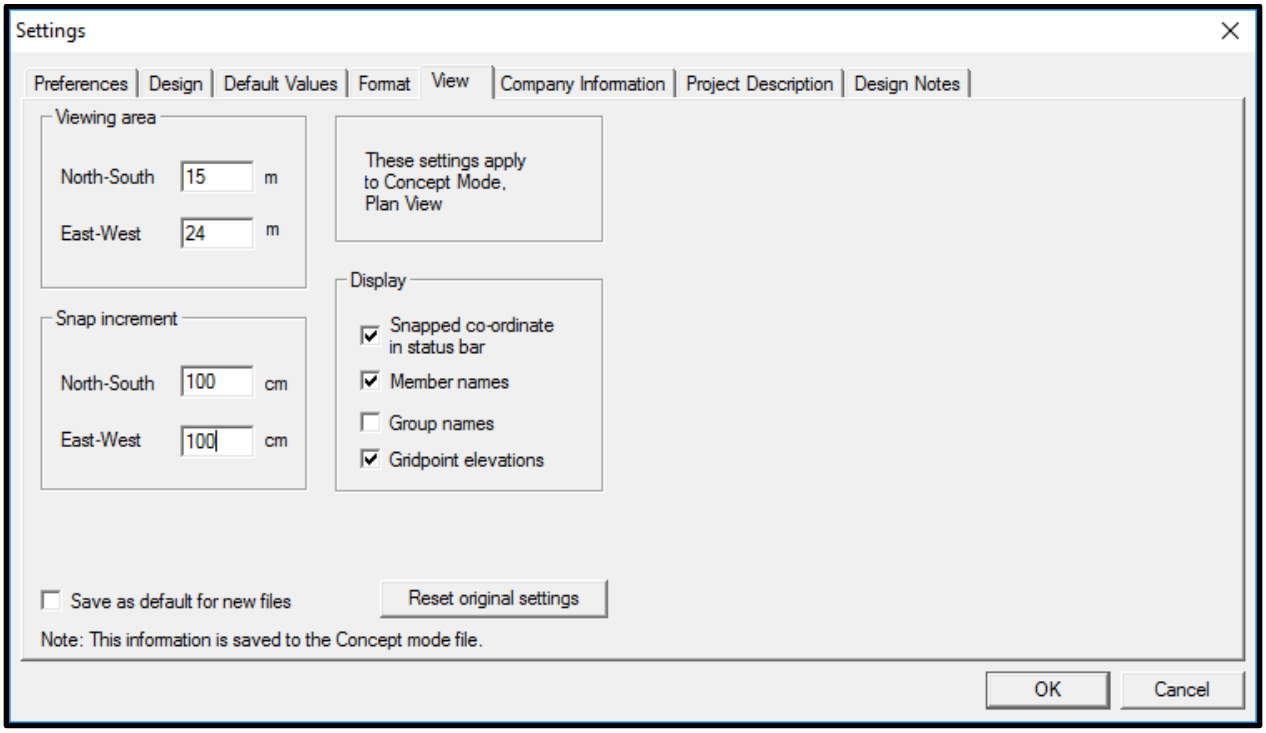

Figure 58: *Concept Mode Tutorial 6 – View Settings*

6.3 Levels Above Grade

4. Click on the ***Levels*** button from the main toolbar.
5. Structure will consist of one storey. Modify the ***Roof*** elevation to ***3.2 (m)***, by inputting the new elevation and clicking ***Modify***.
6. Press ***OK***.

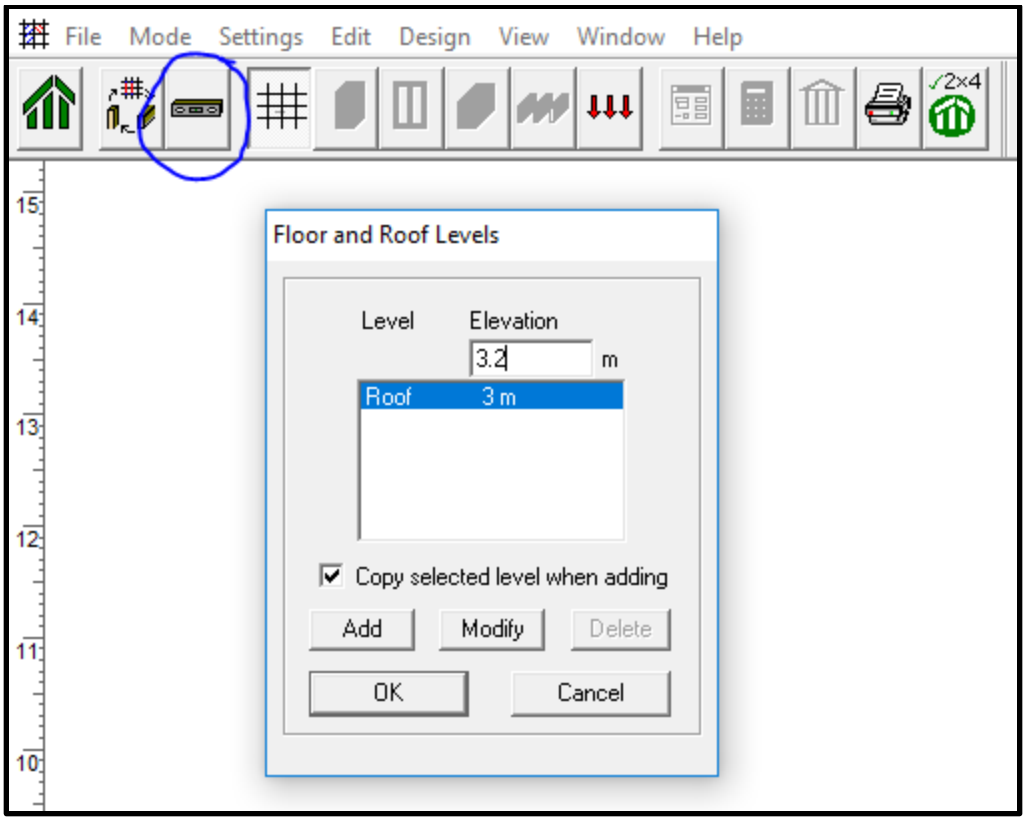

Figure 59: *Concept Mode Tutorial 6 – Floor and Roof Levels*

6.4 Gridlines

1. Click on ***Edit***, ***Generate Grid*** button from the main toolbar to create a grid based on the specified snap increment

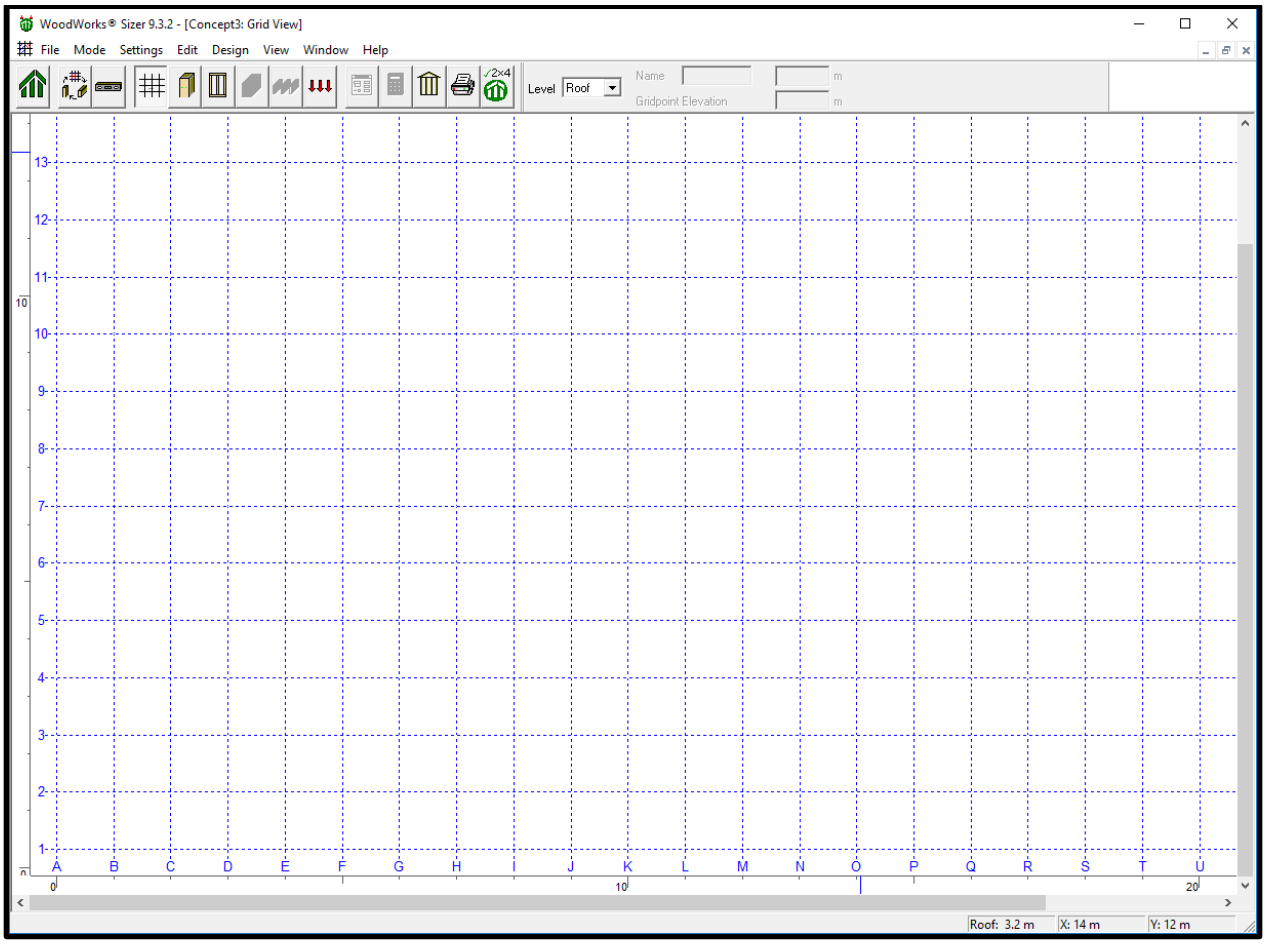

Figure 60: *Concept Mode Tutorial 6 – Gridline Placement*

6.5 Columns

Note: In the case of the columns in this model, the default Column Design group Column1 will be specified.

1. Click ***Column*** on the toolbar.
2. Click gridpoints ***E-10*** and ***H-10***.

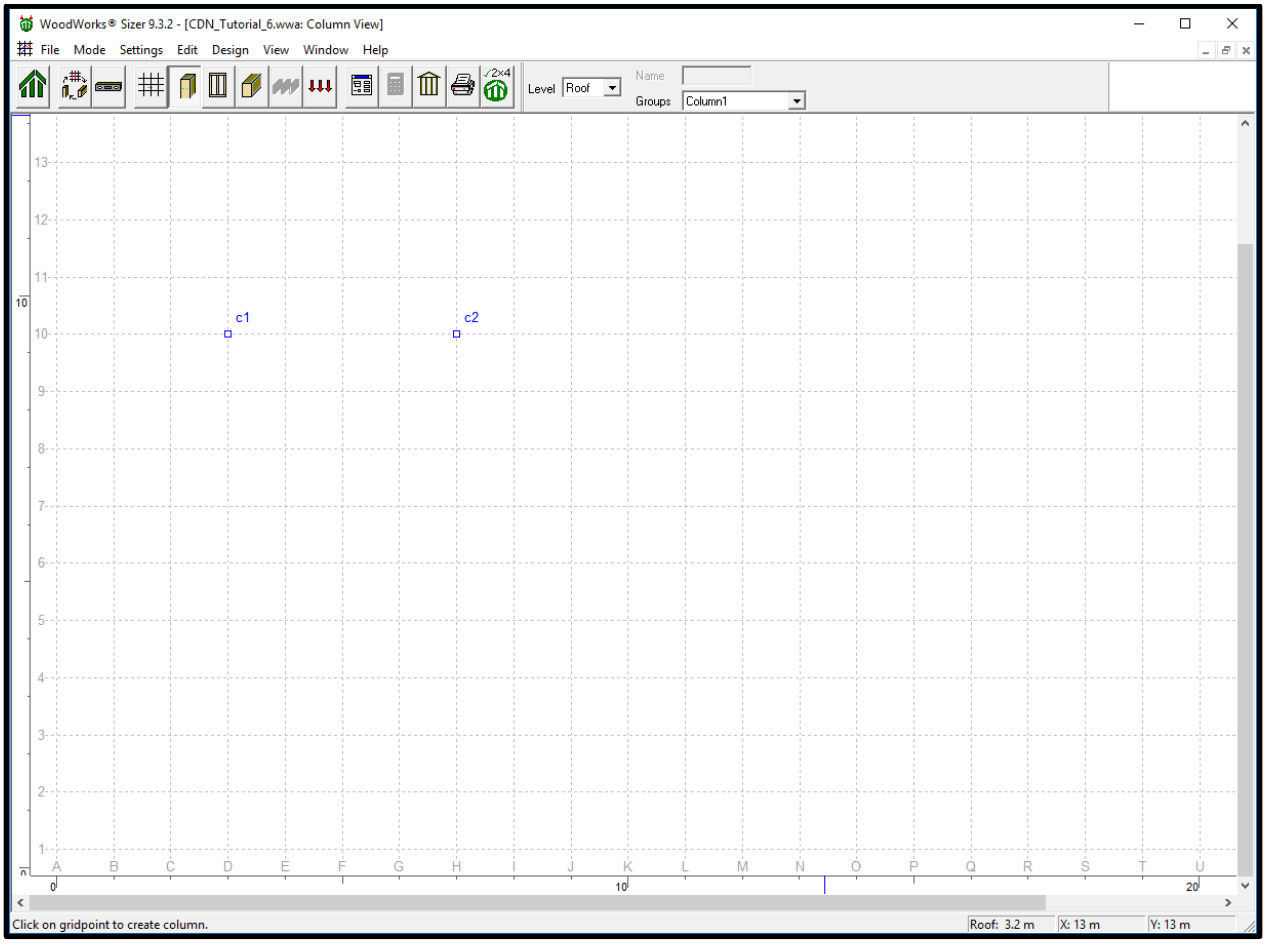

Figure 61: *Concept Mode Tutorial 6 – Column Locations*

6.6 Walls

Note: In the case of the walls in this model, the default Wall Design group Wall1 will be specified.

1. Click ***Walls*** on the toolbar.
2. Draw a wall by clicking on gridpoint ***B-5***, holding the left mouse key and dragging a line to gridpoint ***J-5***.

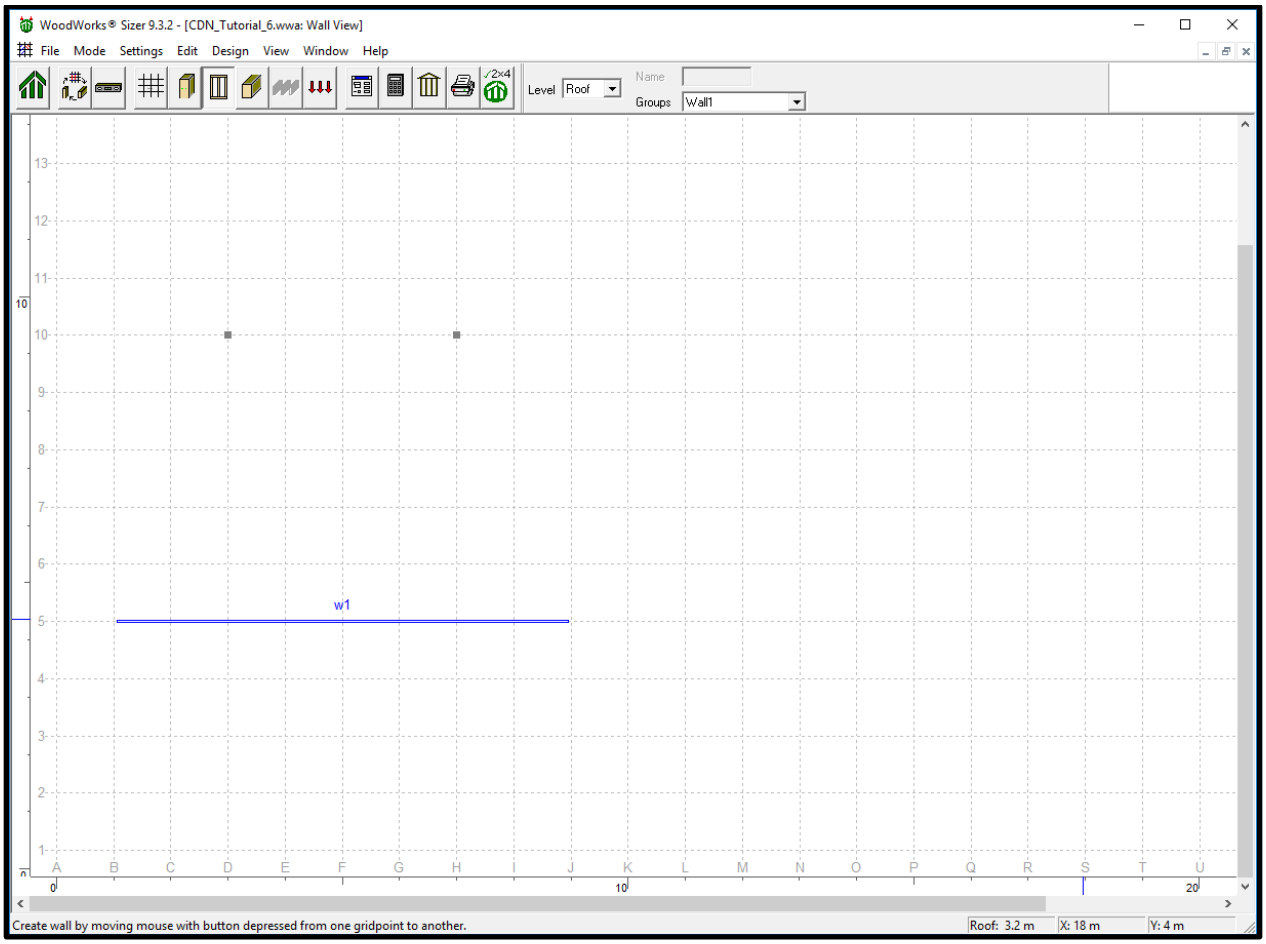

Figure 62: *Concept Mode Tutorial 6 – Wall Locations*

6.7 Beams

Note: In the case of the beams in this model, the default Beam Design group Beam1 will be specified.

14. Click ***Beam*** on the toolbar.
15. Draw a beam by clicking on gridpoint ***B-10***, holding the left mouse key and dragging a line to gridpoint ***J-10***.

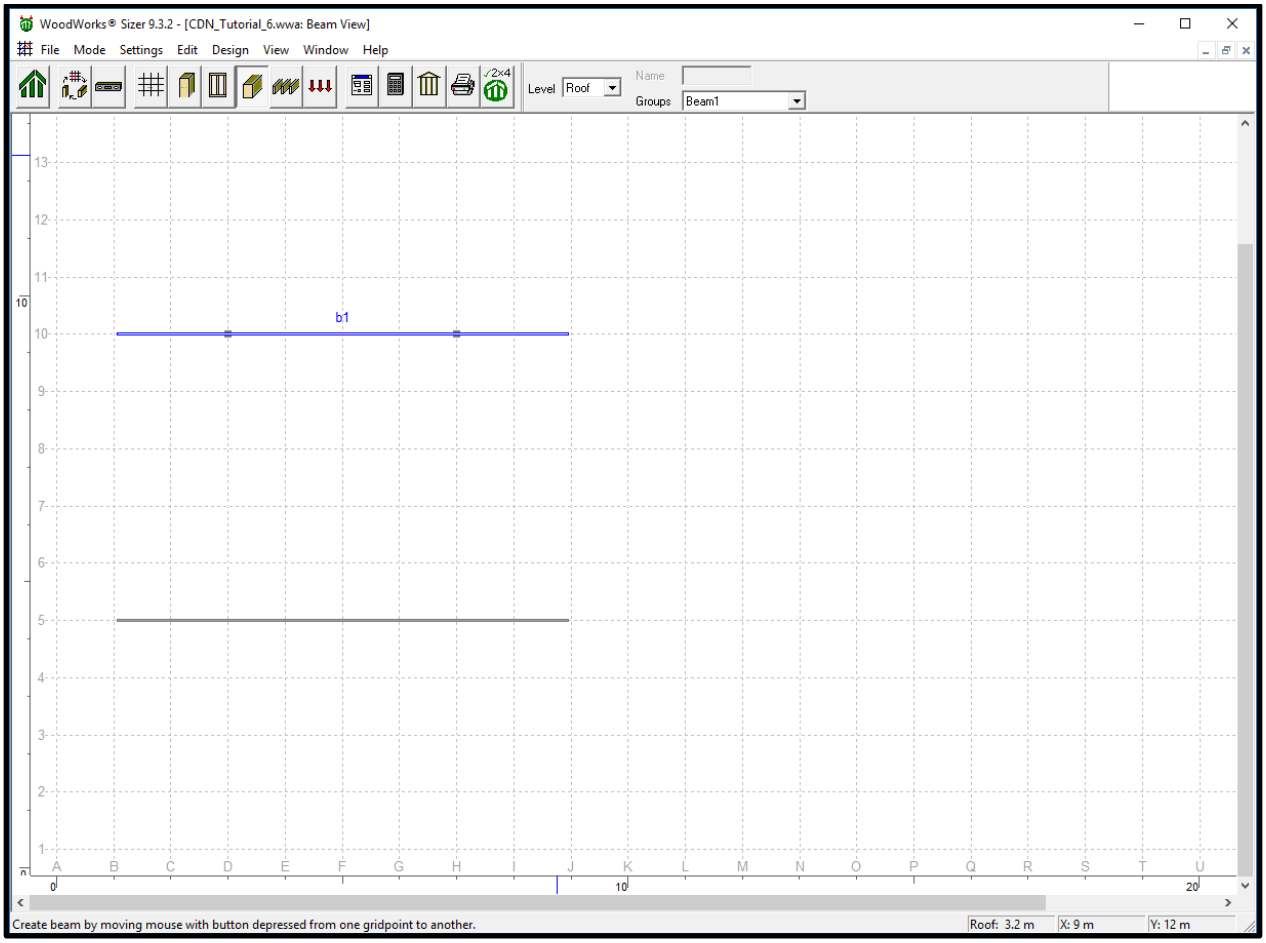

Figure 63: *Concept Mode Tutorial 6 – Beam Locations*

6.8 Joists

6. Click on the ***Joist*** button.
7. Click gridpoints ***B-11***, ***J-11***, ***J-4*** and ***B-4*** to create a roof joist area.

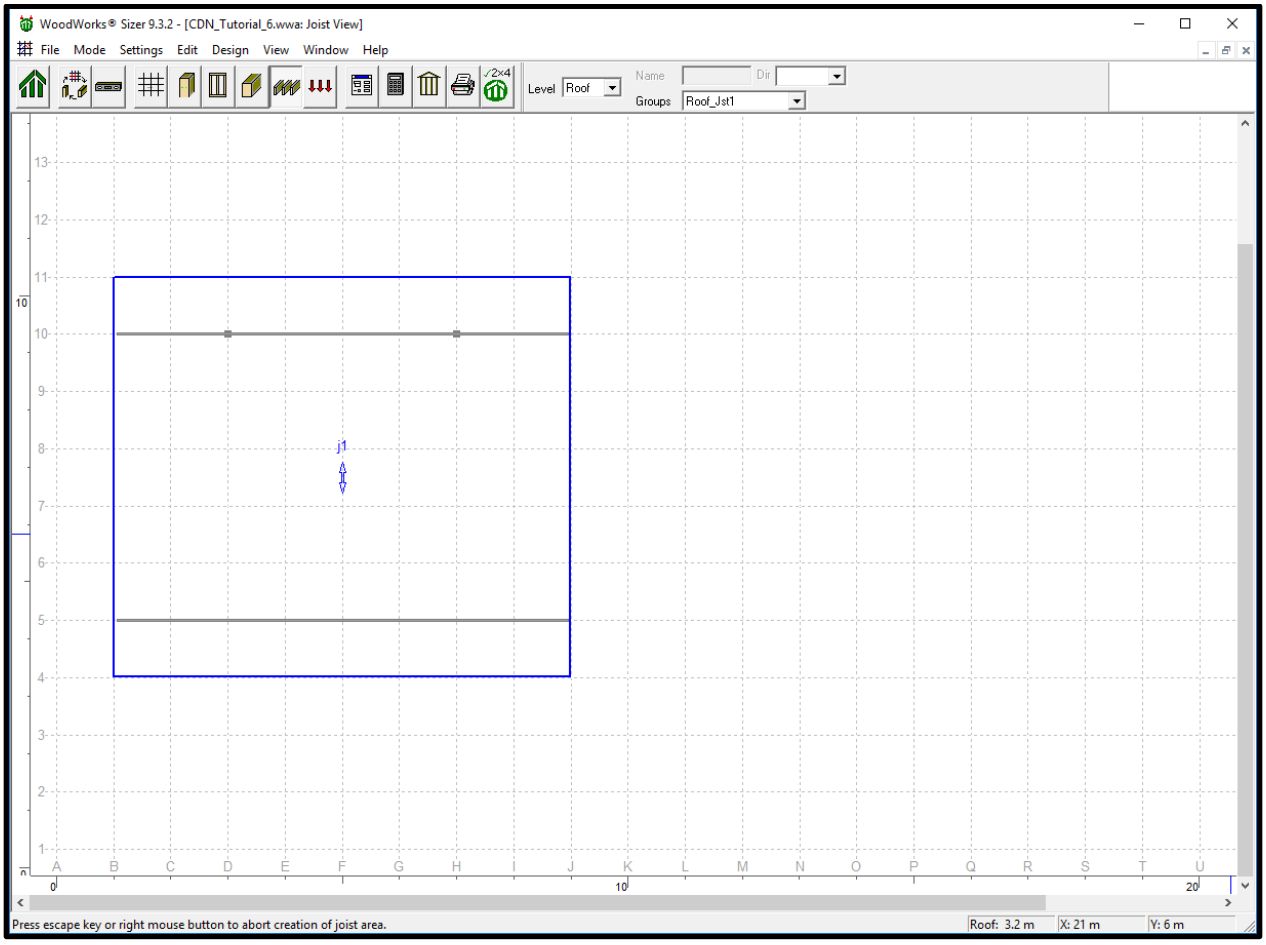

Figure 64: *Concept Mode Tutorial 6 - Placing Roof Joists*

6.9 Modify Gridline Elevations

8. Click on ***Grid*** from the toolbar.
9. Select gridpoint ***D-10*** so that it is highlighted in red (both gridline ***D*** and ***10*** should appear in red).
10. Select the ***Gridpoint Elevation*** field from the data bar and enter an elevation of ***3.6 (m)*** and press **Enter**.
11. Press ***OK*** in the warning screen to move the gridpoint to an elevation of 3.6 m.
12. Complete steps 2 to 4 for Gridpoint ***H-10***.

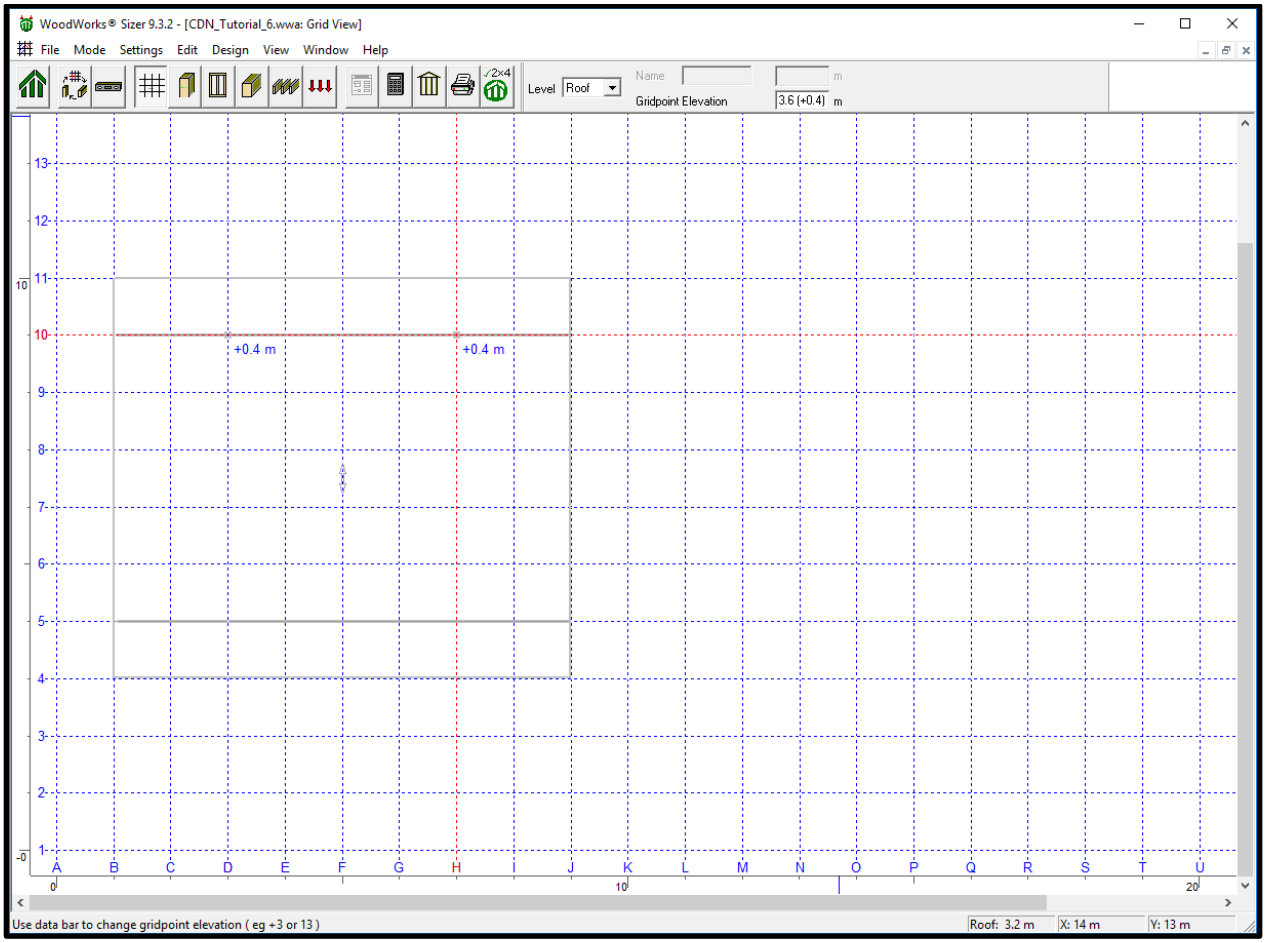

Figure 65: *Concept Mode Tutorial 6 – Adjusting Roof Height*

6.9.1 Elevation View

7. Click on the ***Grid*** button from the toolbar.
8. Click on gridline ***H*** so that it is highlighted in red.
9. Click on ***Elev. View*** from the toolbar.
10. The elevation view along the North-South gridline "H" is now shown.
11. To return to the main window, click any of the toolbar buttons.

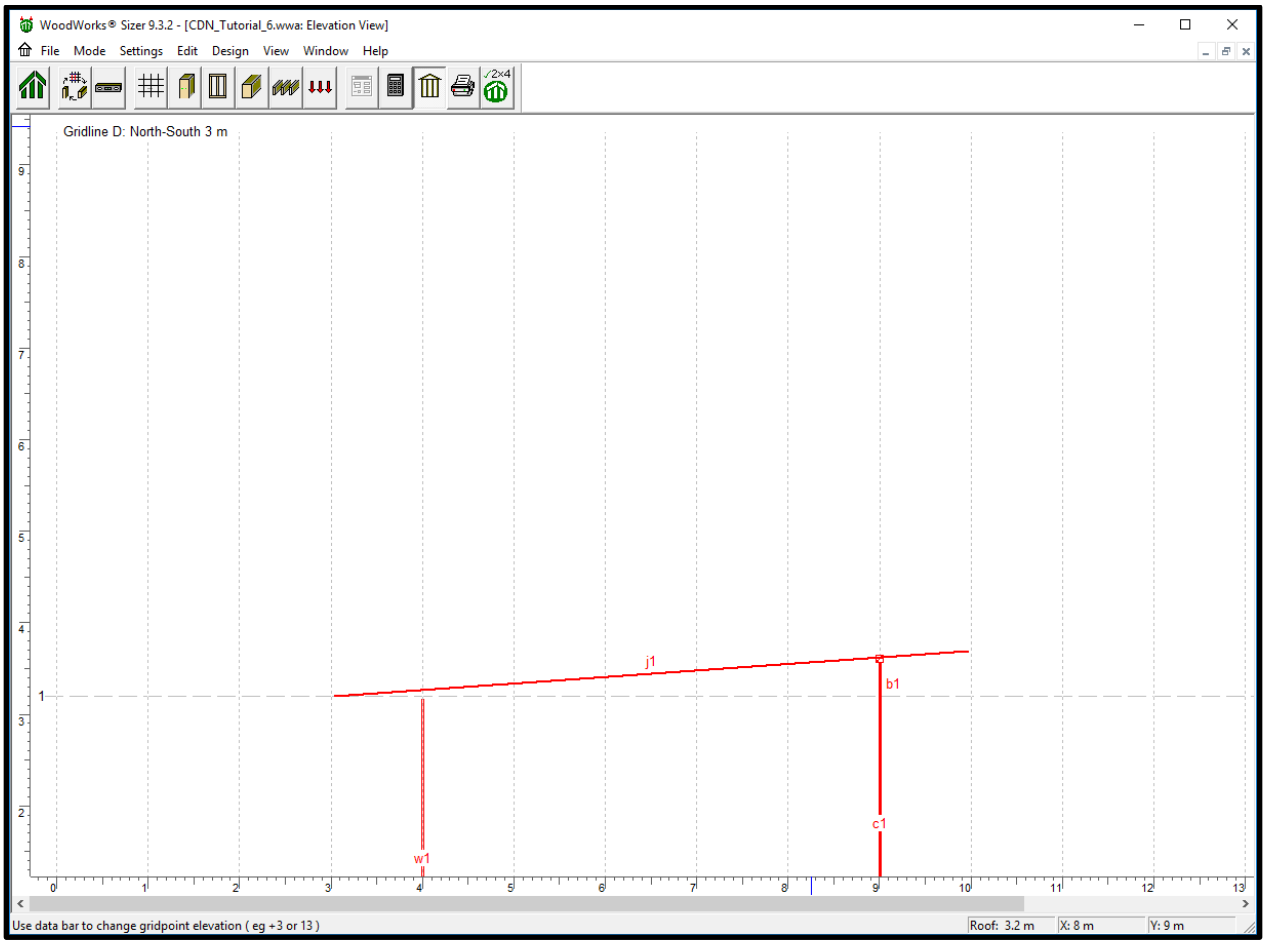

Figure 66: *Concept Mode Tutorial 6 – Elevation View along Gridline H*

6.10 Loads

5. Click ***Load View*** on the toolbar.
6. Choose ***Dead Area*** from the ***Type*** drop-down list on the data bar.
7. Enter a load magnitude of ***0.3 (kN/m2)*** in the data bar.
8. Click gridpoints ***B-11***, ***J-11***, ***J-4*** and ***B-4*** to load the area.

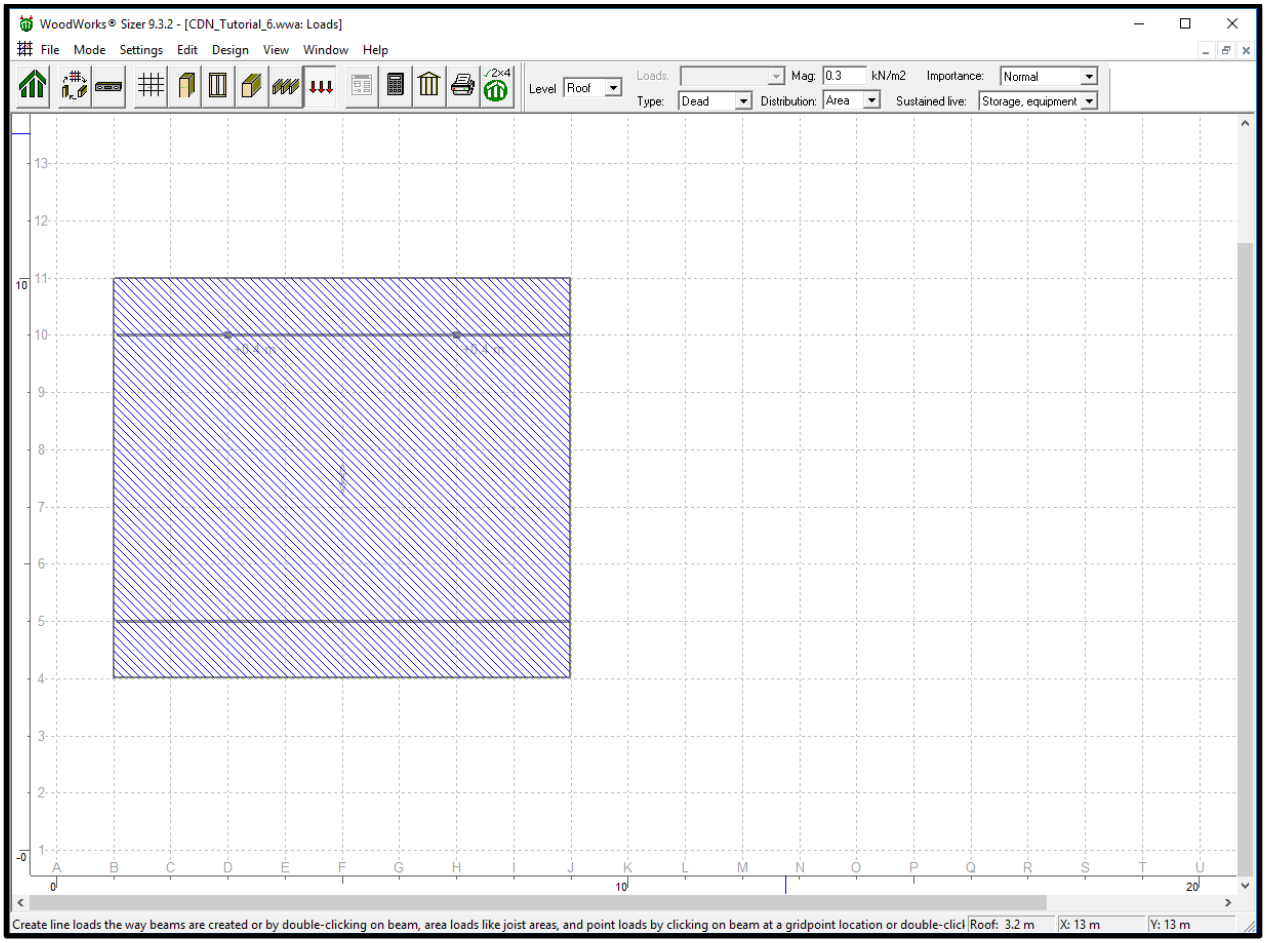

Figure 67: *Concept Mode Tutorial 6 – Applying Dead Load to Roof*

9. Choose ***Snow Area*** from the ***Type*** drop-down list on the data bar.
10. Enter a load magnitude of ***2 (kN/m2)*** in the data bar.
11. Click gridpoints ***B-11***, ***J-11***, ***J-4*** and ***B-4*** to load the area.
12. Choose ***Wind Area*** from the ***Type*** drop-down list on the data bar.
13. Enter a load magnitude of -***0.2 (kN/m2)*** in the data bar.
14. Click gridpoints ***B-11***, ***J-11***, ***J-4*** and ***B-4*** to load the area.

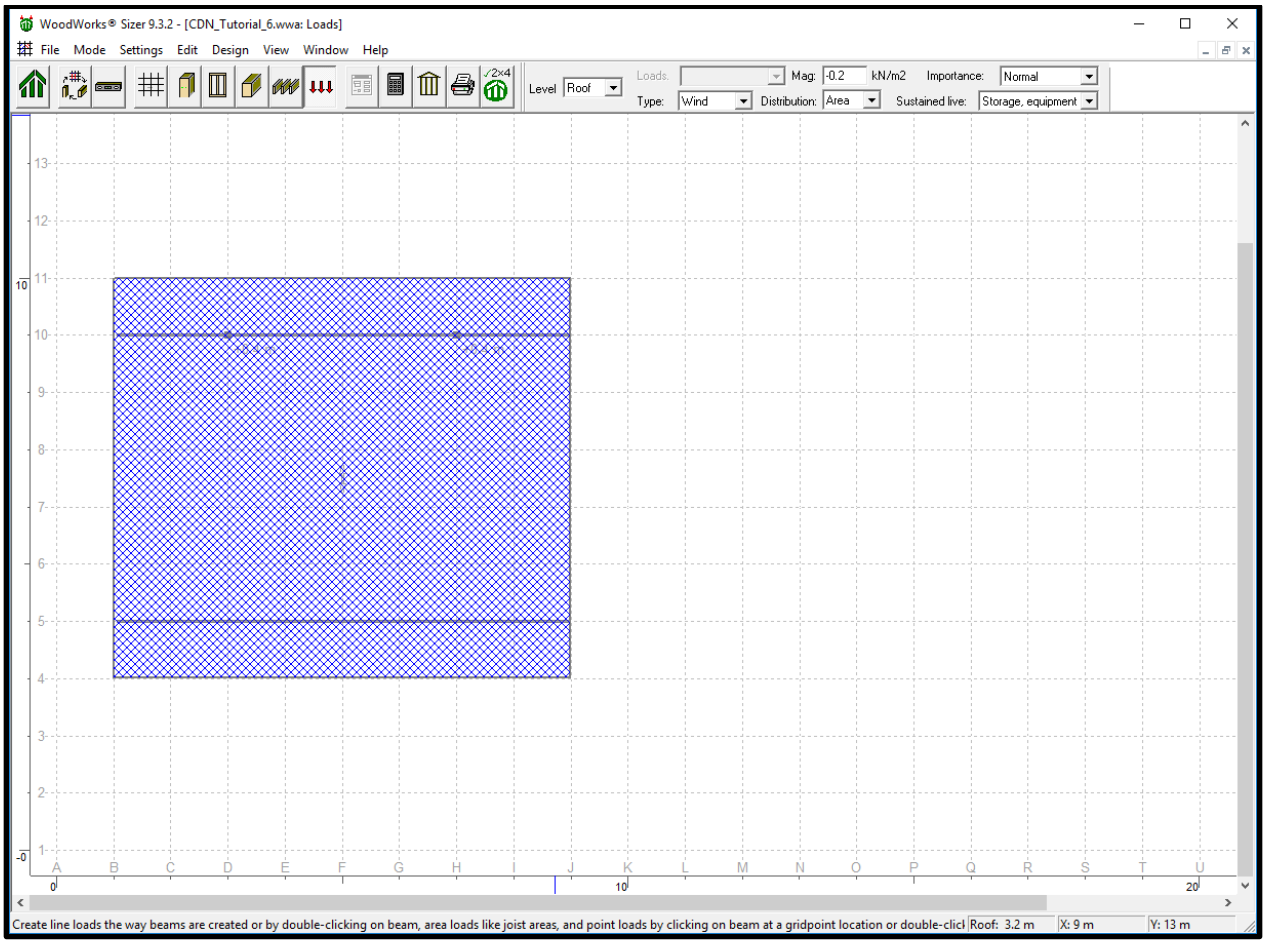

Figure 68: *Concept Mode Tutorial 6 – Applying Snow and Wind Load to Roof*

6.11 Design the Members

2. Click ***Design*** on the toolbar. *Sizer* designs all of the members in your structure and then displays the results.

6.12 View Results

7. Use the scroll bar to look through the results.
8. Click here to download a pdf of the material list.
9. Click here to download a pdf of the reactions at base.
10. Click here to download the results by group.
11. Click here to download the results by member.
12. To close the results window, click on any of the *View* toolbar buttons.

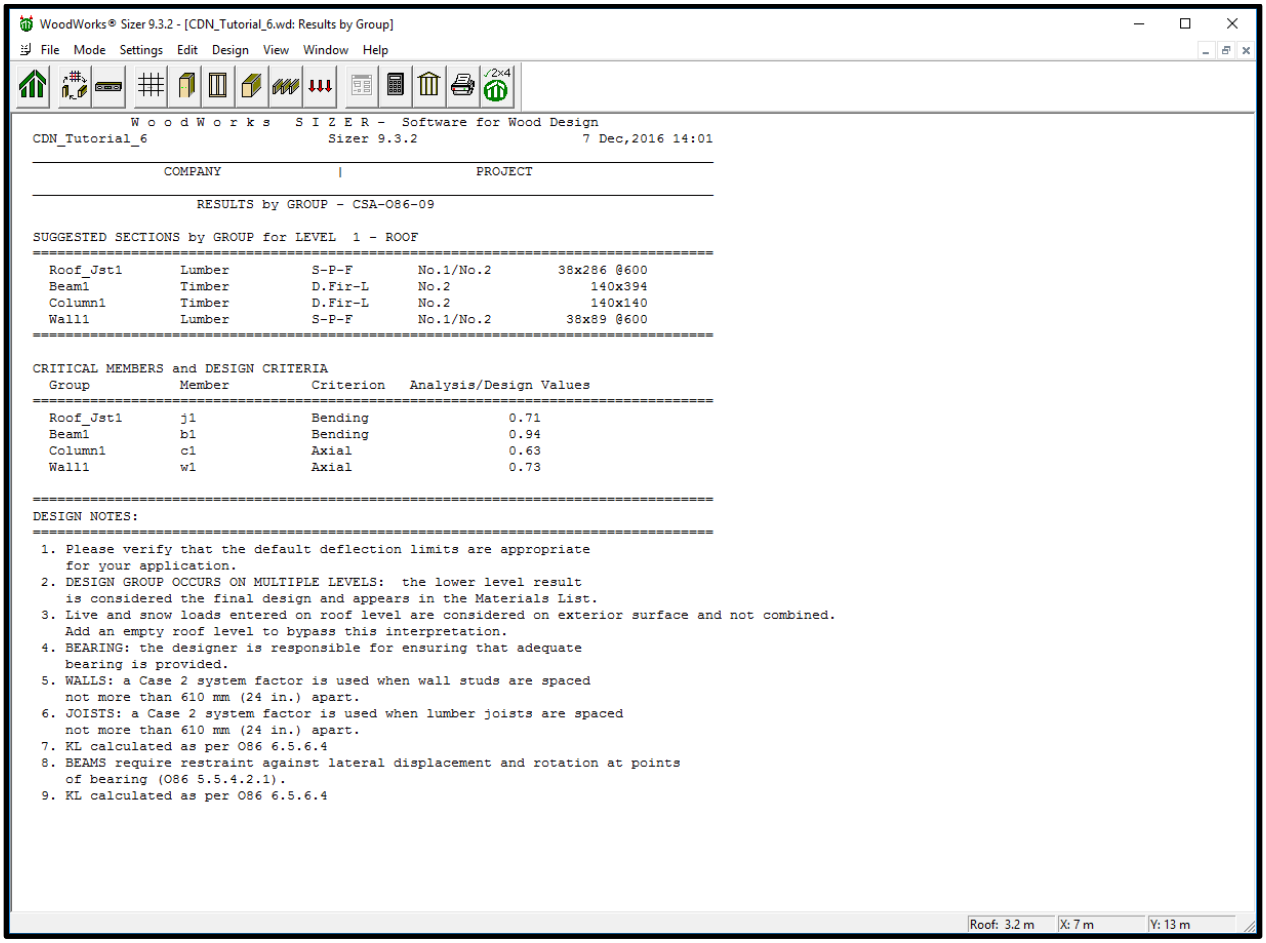

Figure 69: *Concept Mode Tutorial 6 – Results by Group*

6.13 Transfer Member into Beam Mode

1. Click on ***Beam View***.
2. Click on Beam ***b1***.
3. Transfer member into beam mode by clicking ***alt+B***.

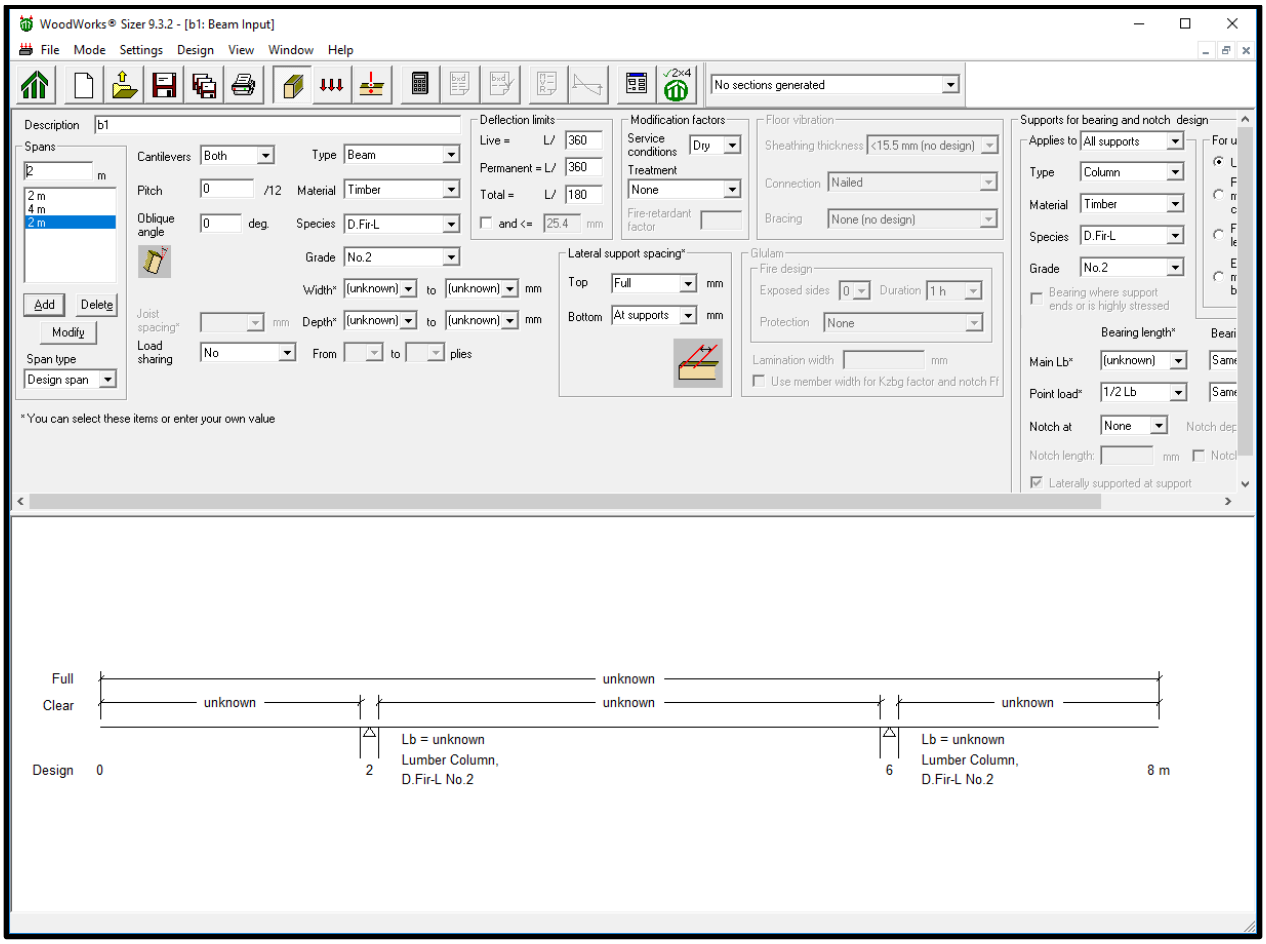

Figure 70: *Concept Mode Tutorial 6 – Transfer member into Beam Mode*