Plan Analyst

Beam & Column Calculator
User Manual

TABLE OF CONTENTS

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System Requirements

To use the Beam & Column Calculator we recommend the following:

- Computer running Microsoft Windows
- Hard drive with at least 5 MB available
- Mouse
- Printer

Downloading and Installation

Download the program from the online Account (https://www.plananalyst.com/my-account/) you created during the purchase checkout process.

It is important to exit (close) any other programs/applications that may be running before installing any new Microsoft based software, including Plan Analyst. During the setup process, Plan Analyst will check your Windows directory to determine which libraries need to be added before installation. If another program is using one of these libraries, Plan Analyst cannot complete the setup process.

Note: Many systems start programs during the boot process and do not indicate that they are running in the background. To close programs running in the background:

1. Launch the Task Manager from the Microsoft Taskbar by right-clicking on the Taskbar and then select the option "Task Manager."

2. Click on a program, then click "End Task", to close programs - except for 'Windows Explorer'.

Follow the prompts on the install dialog to install on your computer.
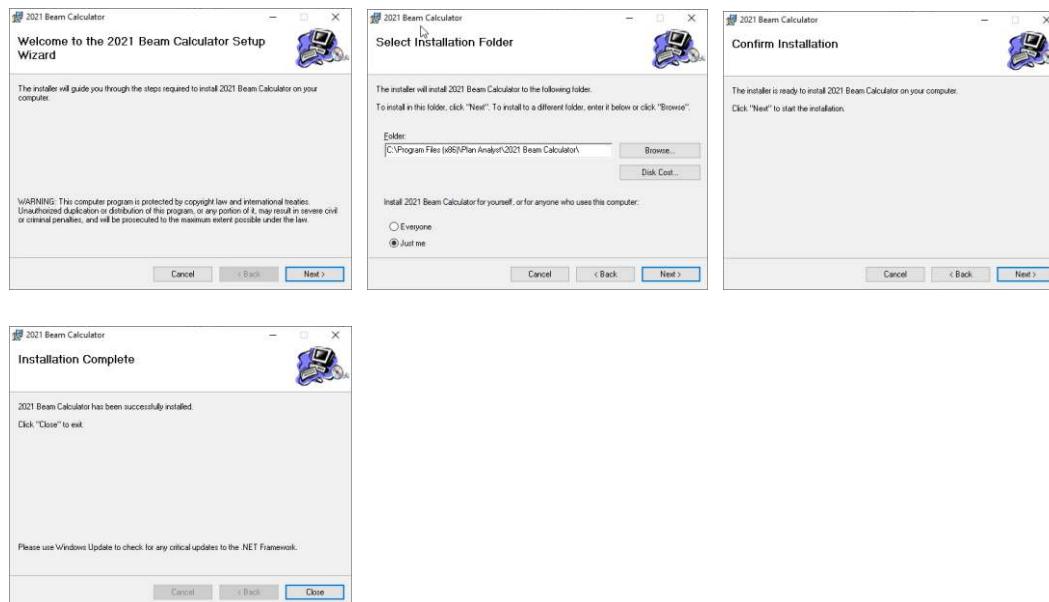
Running the Beam & Column Calculator for the First Time

The first time you use the Beam & Column Calculator, the **User Information** screen below will be displayed. You must fill this out before you can continue.

> The **Installation Code** can be found either on one of the emails you were sent after purchasing the software or in your online Account (that you created during Checkout when purchasing the software) under the Order area. The code format looks something like this: 12g465d25d8n
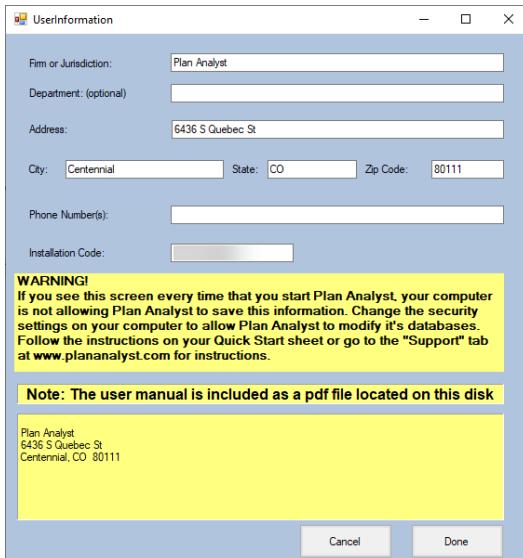
Note: The information entered will be included on all reports. To change any of the default settings with the product open:

- Click the Defaults tab
- Change information
- Click the Save changes button

Beam & Column Calculator Features

Using the Keyboard

- Pressing **Enter** will accept your selections and move cursor to the next field or screen.

- Pressing **Esc** will move the cursor back to the last field or screen.

- Pressing **Tab** will move the cursor to the next field or screen.

- Pressing **Shift+Tab** will move the cursor to the previous field or screen.

Text Boxes

When you are entering information into a text box, all standard editing capabilities are available, delete, insert, overtype, etc. *If you need to delete characters and type new ones in their place*, highlight the characters to be deleted first. You may do this by using your mouse to highlight the word or drag the mouse cursor over the characters with the left button pressed. Then type the new replacement characters.

Note: You may also use this method to delete characters or words. Highlight characters/words to be deleted and press the Delete key.

Calculator

There is no need to reach for your calculator!

When numbers, such as dimensions and square footage, are required, a four-function calculator is built into Plan Analyst. Use:

      + for addition

      - for subtraction

      x or * for multiplication

      / for division.

Algebraic logic is used, i.e. division and multiplication are always done before addition and subtraction.
Example: When asked for the floor area enter: 100 x 40 + 30 x 38 and the floor area will be calculated for you.
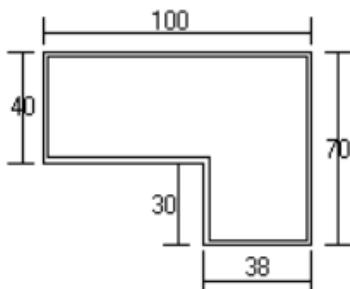
Entering Dimensions

Dimensions may be entered using either decimals of a foot (10.4167) or by using the Feet_inches (10_5) format. For example, for 10 feet 5 inches, you enter either 10.4167 or 10_5.

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Copy and Paste using the Windows Clipboard

Highlight the word or words that you want to move to or from Plan Analyst.

- ***To delete the highlighted words and copy them to the clipboard***, simply press Shift + Delete (at the same time).

- ***To copy the highlighted words to the clipboard***, simply press Ctrl + Insert or Ctrl + C (at the same time). Move the cursor to the new location.

- To place the selected text at the new location, press Shift + Insert or Ctrl+V (at the same time).

Location of Project Files

The default location for files is C:\Program Files (x86)\Plan Analyst\2021 Beam Calculator

Edit User Information

If your address or phone number changes, click Setup and then Edit User Information on the first screen. This will allow you to edit the header information that you entered the first time you ran Plan Analyst. See Screen on the last page.

Printer & Font Information

To change, click Setup and then Printer and Font Information. Plan Analyst uses the Windows default printer.

Note: If you change the printer in Plan Analyst, the Windows default printer will be changed to the new selection. Changing fonts will only affect the printed drawing. The information on the screen is very tight and changing the font will cause information to write over other information. If some information writes over other information when you change printer font, try a smaller size.

Printing Problems - Solutions

1. If some information writes over other information when you change printer font, try a smaller size or a different font.
2. Get error every time you print
   a. Verify that the printer is turned on.
   b. Verify that Windows has the correct printer selected.
   c. Verify that the font selected is valid for the printer selected.

Using the Tabs and Buttons

There are four tabs located across the center of the Beam and Column screen.

- Beam Description
- Loads on Beam
- Column
- Defaults

The tabs display information and allow you to change options related to your project.

Defaults Tab
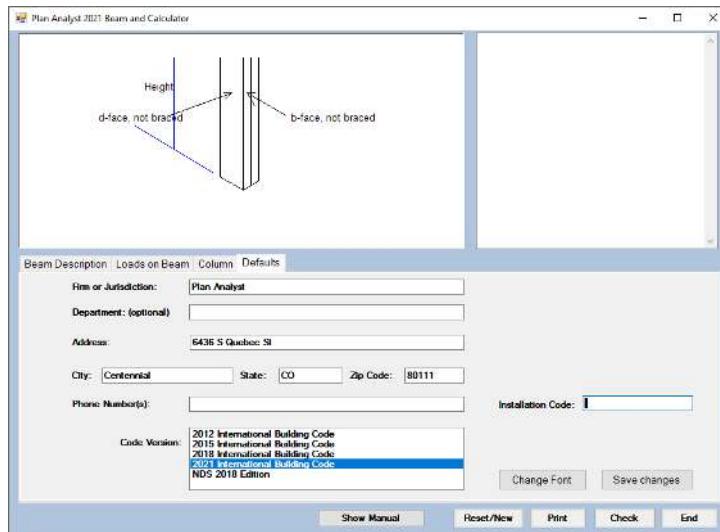
The information prompted for on this form is needed to produce the header on all Plan Analyst reports. Once this information is input it will be used until you change it.

To change the default header information such as a change in address, contact numbers, etc., simply return to this tab/form and replace the outdated information.

Buttons

There are two buttons located on the default screen near the bottom: Change Font and Save changes.

Using the Change Font Button

The only way to change the fonts used on your reports is via the Chane Font button on the Default tab. Click the Change Font button to display the Font Change screen from where you can change the font style or size for your reports. Click Ok once you have made your changes.

Beam Description Tab
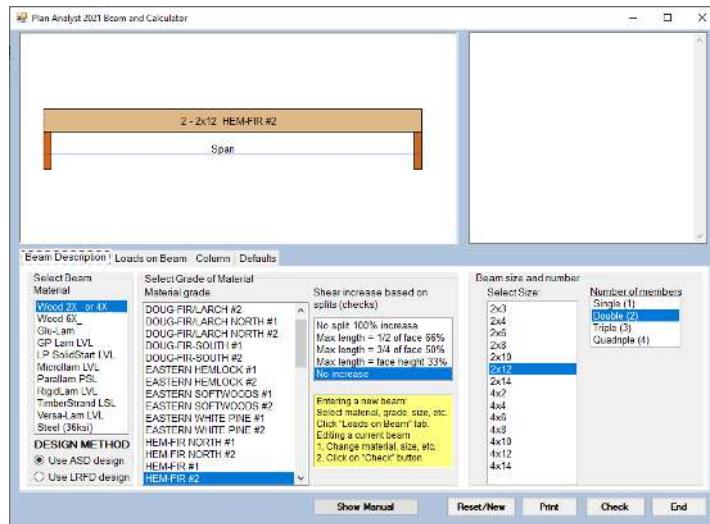
1. Select Beam Material: Click on the name of material in the list box on the left bottom of the screen.

2. Select Grade of Material: Click on the desired grade (grade will always default to last one selected).

   Note: The materials grade box will change depending on the material name you choose in the first box and will only show if there is more than one grade available.

3. Shear increase based on splits (checks): This will only show for 2X_, 4X_ and 6X_ material.

4. Beam size and number: Select the size of the beam by clicking the appropriate entry in the list box.

5. Number of members: If multiple members are allowed, click the number of members. If multiple members are not allowed, box will not show.

![Plan Analyst logo] **Loads on Beam Tab**
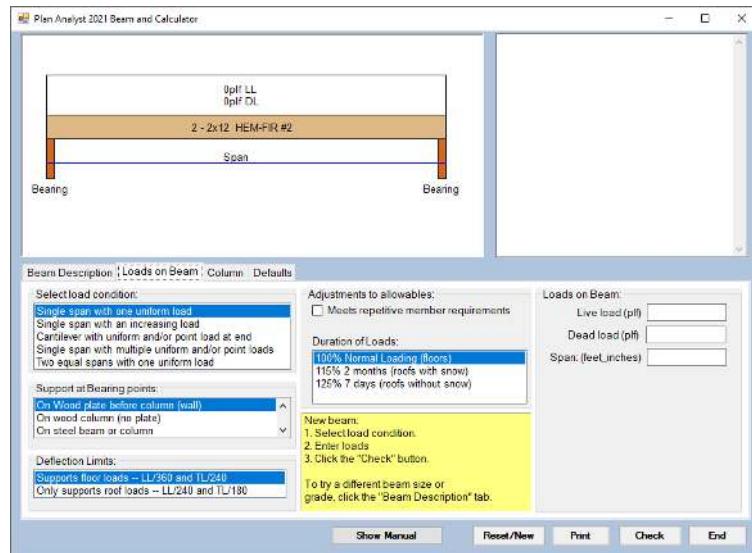
1. Select load condition (further description of each option follows on the next page).

   Note: The Loads on Beam form on the right hand side will change according to the load condition selected.

2. Support at Bearing points:

   a. On wood plate before column (wall): The Bearing size will be based on the Fc perpendicular for default wood species/grade. This procedure is used for all beam material.

   b. On wood column (no plate): Plan Analyst will check the required bearing size for the beam material and for the wood column and use the greater of the two.

   c. On steel beam or column: The minimum bearing will be based on the beam material.

   Note: For all conditions, when the required bearing is smaller than the code minimum or manufacture's minimum, the minimum bearing is always used.

   d. On masonry or concrete: The minimum bearing will be based on the beam material.

   Note: For all conditions, when the required bearing is smaller than the code minimum or manufacture's minimum, the minimum bearing is always used.

3. Deflection limits

   a. If any portion of the load is from a floor, select "Supports floor loads".

   b. If no portion of the load is from floors, select "Only supports roof loads".

4. Meets repetitive member requirements: Click in the checkbox to use repetitive member. The bending allowable for visually graded wood members may be increased 15% when three or more members are in contact or are spaced less than 24inches on center. Use this when checking joist, rafters or triple beams.

   Note: This will only be displayed when you have selected visually graded wood.

5. Duration of Loads: This option is only available for wood members since wood has the property of carrying substantially greater loads for short durations than for long durations. The allowable bending will be adjusted based on the duration selected. If the allowable bending is 1000 psi and you select 115%, the allowable will be increased 15% to 1150 psi.

   Note: Some areas with heavy snow loads do not allow an increase for duration.

How to Calculate Loads

The loads indicated in the codes are listed in pounds per square foot. To check a beam, you need to enter the pounds per lineal foot.

Common symbols for pounds per square foot pounds/square foot are:

psf

#/sq.ft.

#/ft2

Common symbols for pounds per lineal foot are:

pounds/foot

plf

lbs/ft

#/ft

Distribution of Loads

For simple spans with uniform loads, one-half of the load goes to each support.

For a Rafter or Joist:

The plf is the spacing of the rafter or joist times the pounds per square foot. For a rafter spaced at 16 inches on center and supporting 30 pounds per square foot, the plf would be 30*1.3333 or 40 plf

For a Beam:

For a beam supporting one end of a 12 foot floor joist, the plf would be 12 divided by 2 times the pounds/square foot. plf on beam = 12/2*30 or 180 plf

Input of Span

Span must be input in decimals of a foot, or feet inches.

For	Enter	For	Enter
10'-0"	10	10'-6"	10.5 or 10_6
10'-1"	10.0833 or 10_1	10'-7"	10.5833 or 10_7
10'-2"	10.1667 or 10_2	10'-8"	10.666 or 10_8
10'-3"	10.25 or 10_3	10'-9"	10.75 or 10_9
10'-4"	10.3333 or 10_4	10'-10"	10.8333 or 10_10
10'-5"	10.4167 or 10_5	10'-11"	10.9167 or 10_11

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Select Load Condition: List Explanation

Type of loading - select from the following load conditions:

1. ***Single span with one uniform load***: This is the most common loading condition. You can also use this for multiple span beams since it is conservative.

   ### Loading

	Roof	Floor
Live	30 psf	40 psf
Dead	15 psf	10 psf

   Weight of wall = 10 plf, height = 8'

   Note: psf = Pounds per square foot

   Span of Beam #1 = 9 feet

   Span of Beam #2 = 8 feet
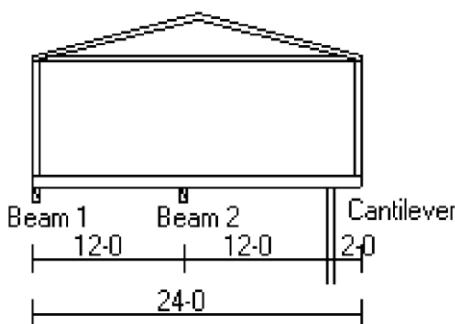
Load on Beam #1

This beam supports roof, wall, and floor loads. The beam supports ½ of the roof plus an 8 foot high wall plus ½ of an 11 foot floor joist.

Live = 24/2*30+11/2*40 = 580 plf

Dead = 24/2*15+8*10+11/2*10 = 315 plf

Span of beam = 9 feet

Load on Beam #2

This beam supports ½ of an 11 foot floor joist from each side. This would be ½ of 11 plus ½ of 11 or a total of 11.

Live = 11*40 or 440 plf

Dead = 11*10 or 110 plf

Span of beam = 8 feet

Example of rafter input:

Live (snow) Load = 30 psf

Dead Load = 15 psf

Spacing of rafters = 24" or 2'

Span of Rafter = 14'-6"

Live = 30*2 or 60 plf

Dead = 15*2 or 30 plf

Span = 14.5

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2. *Cantilever with uniform and/or point load at end:* Enter a uniform load and/or a point load at the end of the cantilever. With the easy editing, you can quickly check several load combinations. Place all loads on the beam to get maximum stresses and reactions. Place only uniform dead loads and full end load to see if there is an uplift problem (empty house with full snow on the roof).

Example: The floor joist on the right side of the section is cantilevered 2 feet and supports a wall and roof. The plf on the cantilever is the load times the spacing of the joist. The load at the end is the weight of the wall plus ½ of the roof times the spacing of the joist. If the floor joists are spaced at 16" o.c.

To calculate the plf on cantilevered joist:

Live = 40*1.3333 = 53.333 plf

Dead = 10*1.3333 = 13.333 plf

To calculate the Load at end of cantilever:

Live = 12*30*1.3333 = 480 pounds

Dead = 12*15*1.3333+8*10*1.3333= 346.6666 pounds

3. *Single span with an increasing load*: The most common use for this option is for the corner rafter of a hip system or for a valley rafter. This loading condition starts at zero and increases to a maximum at the other end.
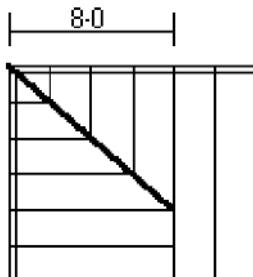
Hip (corner) rafter

Live (snow) Load = 30 psf

Dead Load = 15 psf

Note: The easiest way to find the span when the rafter is at 45 degrees is to multiply the setback by 1.414. The span of this hip rafter is 8 times 1.414.

Example: Rafter span = 8 X 1.414 = 11.312 feet

Since the rafter is at a 45 degree angle to the loading, we can reduce the plf. This reduction is the sin (45) or 0.707. The maximum load on this hip rafter is:

Live = 8 X 30 X .707 = 169.68 plf

Dead = 8 X 15 X .707 = 84.84 plf

Span = 11.312 feet 4.

4. *Multiple uniform and/or point loads*: This is good for:
   - a beam that supports another beam plus rafters and/or joists.
   - beams supporting joists and/or rafters that vary in length.
   - for a beam that supports rafters on part of the beam and supports joists on the other part of the beam.

Framing Plan (Top view)
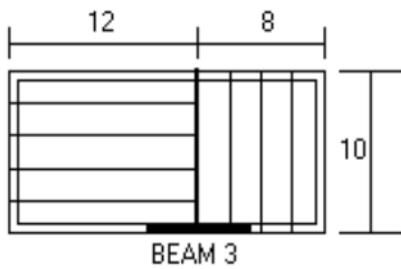
BEAM 3

Beam #3 spans 6 feet between supports. The load changes direction 3 feet from the left end of beam #3. This beam (header) has 2 different plf loads and one point load. The point load is the load from the end of the beam or girder. For the 1st 3 feet, the uniform load is the psf times the spacing of the trusses. For the last 3 feet, the uniform load is ½ of the span of the trusses times the psf.

Example:
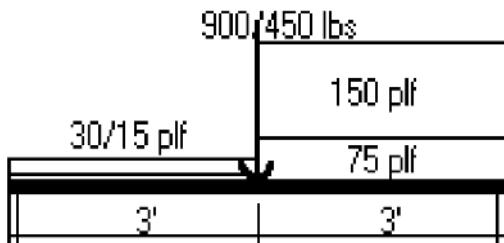
PLF – first three feet

LL = 2/2*30 or 30 plf

DL = 2/2*15 or 15 plf

PLF - last three feet

LL = 10/2*30 or 150 plf

DL = 10/2*15 or 75 plf

Point Load

Using the distribution rules explained above. We will use ½ of the beam/girder span and ½ of the span of the joist that it is supporting.

Total point load

LL = 10/2*12/2*30 = 900 pounds

DL = 10/2*12/2*15 = 450 pounds

5. ***Continuous beam over two spans***: The input for this beam is the same as the example #1 for the simple span beam shown above.

   Note: For the span, enter the distance between supports enter the distance between supports, not the total length.
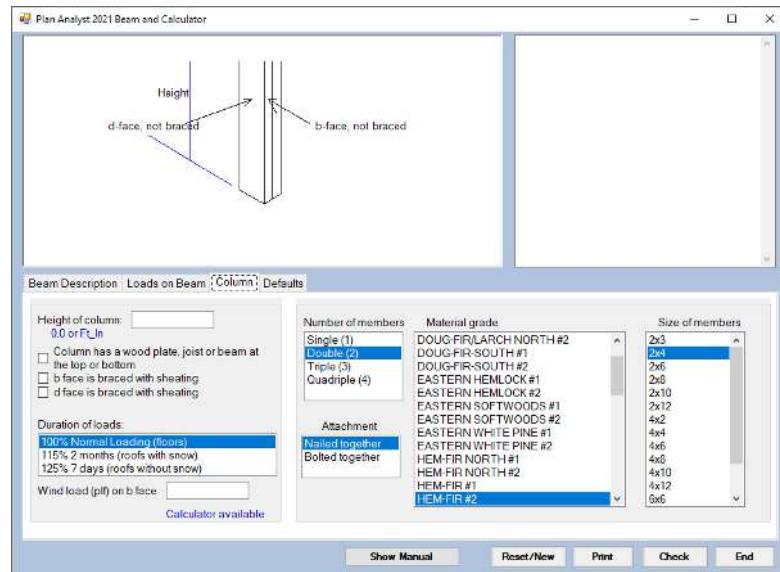
1. Height of column.
2. Column on plate, joist or beam. Wood cannot support as much weight on sides as it can on ends. If you select this, compression perpendicular to grain will be checked and allowable adjusted if necessary.
3. If column is braced with sheathing, it controls buckling, therefore increasing allowable.

   Note: Some sheathing is not strong enough to control buckling. Check sheathing before selecting this.

The rest of the input is similar to beam input. See information in Beam Description tab for additional details.

The Column Calculator is interactive. Current results show each time you change something. There is no need to click the Check button to see results.

The maximum load that the column can support is shown above the column in the picture and at the bottom of the results (top right).

Do you like the Beam & Column Calculator?
Please provide a recommendation on Linked**in**.

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