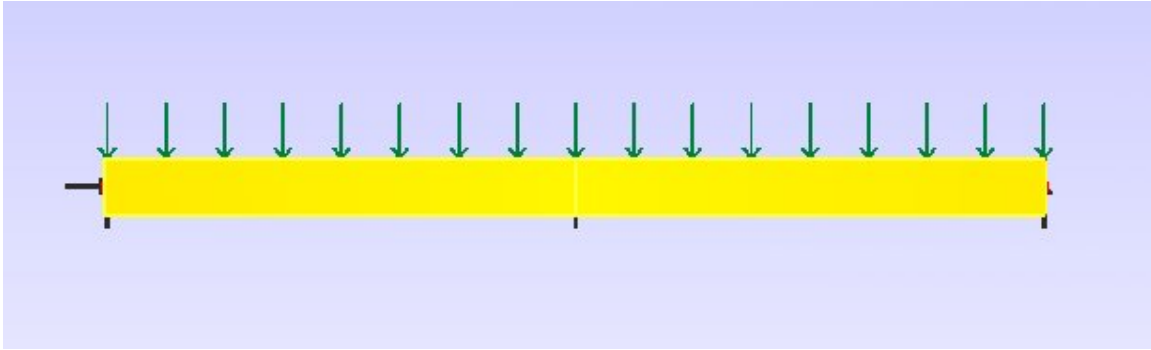


# Glue Laminated Beam

## ***Project Description:***

The problem presented is to design a glued laminated timber beam that runs continuous over two spans.



## *Building the Model*

The beam is modeled as two continuous 20 foot long members. For a preliminary size choose a GL5.125x27 Western Species Glulam. For the material select Softwood Glulam, Primary Bending, Expanded Classes, 16F-V6 DF/DF.

If you need help creating the model please consult the VisualAnalysis User's Guide (**Help | Contents**).

## *Loading*

Dead Load: 500 lb/ft on both spans.

Live Load: 1000 lb/ft on both spans.

Go to **Load | Load Case Manager** and create a custom load combination: DL + LL. Set it for Allowable checks.

Information on applying loads and creating equation combinations is available in the VisualAnalysis User's Guide (**Help | Contents**).

## *Design Parameters*

**Glued Laminated Beam Example** Glue Laminated Beam

Move to Design View. All of the design parameters are controlled through the Modify tab of the Project Manager. Select one of the beams to make the design group active and go to the Modify tab to set up the parameters.

**General:**

Leave the General Parameters alone for this example.

**Design As:**

Set the member type to “Beam,” the shape category to “Western Species Glulams,” and activate the Show Advanced? Feature.

**Bracing:**

We will assume the beam is continuously braced along its top flange and unbraced in the strong axis and along its bottom flange.

**Deflections:**

Specify Member Span Ratio for the Strong Type and enter an ‘L only’ limit of 360.

**Size Constraints:**

No size constraints need to be specified. It should be noted that implementing Size Constraints is a very effective way to improve the performance of the software, especially in large models with many design groups. The size constraints lower the number of shapes scanned through when coming up with adequate sizes for the members.

**Configuration:**

We will assume that the beam doesn’t have bolt holes. We will also assume that the member does not have multi-piece lams.

**Options:**

We will assume that the beam has a normal temperature range (< 100 F), doesn’t have a high moisture content, isn’t pressure treated, and does not qualify for the Buckling Stiffness Factor or the Incise Factor.

**Beam:**

For the Beam type, select continuous. The member is uniformly loaded so select uniform for the loading pattern.

If you examine the moment diagram for the beam (available in the VA result view) and consider that in the negative region of either half of the beam, the program will interpret the length between inflection points as 5 feet, because it considers the end of the model member to be an inflection point. In actuality, the length between inflection points here will be 15 feet. In order to avoid an improperly low volume factor for that region of the beam, we must check the box for use custom length between inflection points and enter a value of 15 ft.

For the End Notch Type select No Notches.

**Advanced:**

Leave the Advanced parameters unchanged.

## *Designing the Member*

After analyzing, switch to a design view if you aren't currently in one. Select one of the members and choose **Design | Design Selected Group**. The Wood NDS 2001 ASD Design Selection dialog will be brought up, with a list of acceptable sizes. Choose a size and **click** OK.

After accepting the design, the unity value that appears in the design view should have a ~ in front of it indicating that it is a preliminary value based on the analysis results with the member in place. To get the real updated unity value you must synchronize the design changes.

## *Synchronizing Design Changes*

To synchronize the design changes, select **Analyze | Synchronize Design Changes**. You will be prompted to re-analyze, select "Yes", and when it finishes re-analyzing go back to a Design View and review the unity check. It should no longer have the ~ in front of it, indicating that is a final unity value.

If the unity value is greater than one the member has failed and you need to reiterate the design process. The closer the unity value is to one the more efficient, but less conservative the member is.