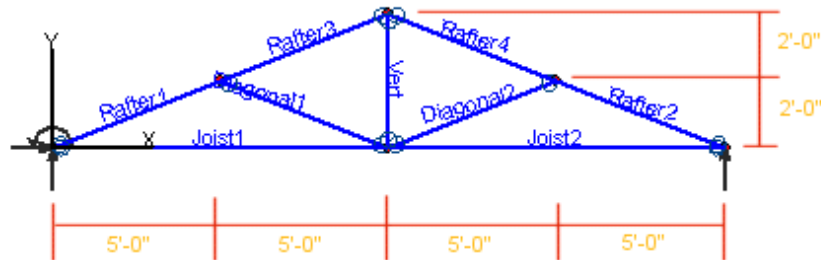


Cold Formed Steel Design

Project Description:

The task at hand is to design the rafters of the truss shown below. The rafters will be Cold Formed SSMA Structural Studs. They need to be designed according to 2001 AISI ASD provisions for the US.



Building the Model

Use the diagram above to draw the model. The preliminary shapes for all of the members should be set to SSMA41 250S162-33 Structural Studs. Note that if your shape database still has the old SSMA Cold Formed shape category in it, you might mistakenly select a shape from this category. It won't hurt anything but you won't be able to get unity check values for the members. Make sure you select the 250S162-33 shape from the SSMA41 category.

Loading

Create the following five load cases:

Service Cases:

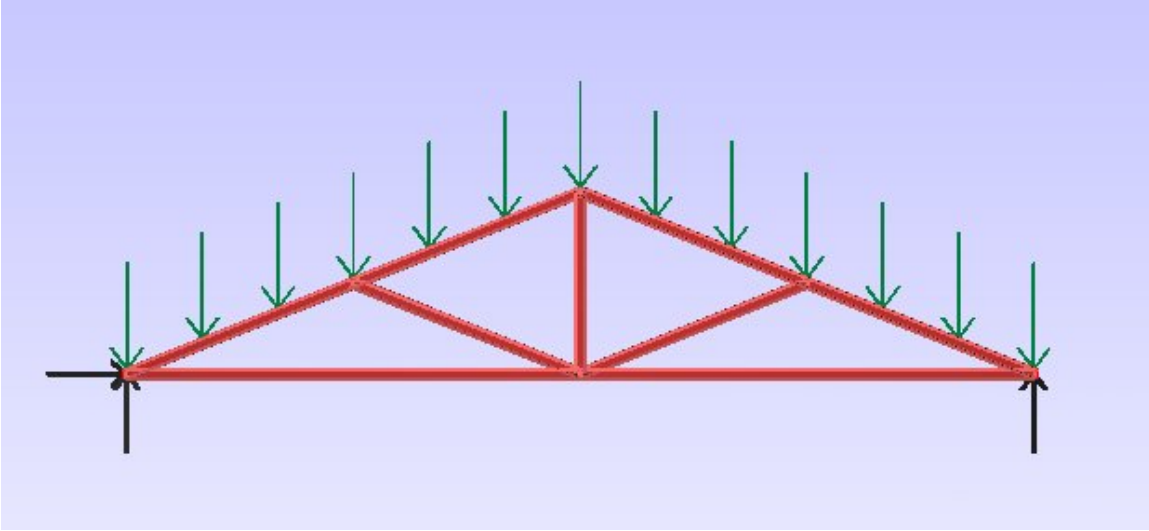
Dead Loads: 0.03 kips/ft uniform load on the rafters (Don't include the structure weight.)

Snow Loads: 0.07 kips/ft uniform load on the rafters

Equation Combination:

Equation Combination 1: DL + SL

If you need help creating the model or applying the loads please consult the VisualAnalysis 6.0 User's Guide.



Design Group Parameters

Switch to Design View and create a design group containing only the rafter members.

General:

Select SSMA41/Structural Studs as the Design As shape category. The Design Type is 2001 AISI – US(ASD). The default material will be fine for this example. No strength increase needs to be specified.

Deflections:

No deflection limits need to be specified for the design group.

Bracing:

The members are braced continuously on the top. They are un-braced along the bottom and in the strong axis.

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 VisualDesign, especially in large models with many design groups. The size constraints lower the number of shapes that VisualDesign must scan through when coming up with adequate sizes for the members.

Options:

Specify 0.8, and 2 for K_z , and K_y respectively.

Once the design group has been created and the design parameters have been set up analyze the model.

Designing the Member

Once the analysis is complete, take a look at the rafters in the design view. Select one of the rafters in the design view, right click and choose Design Selected Group. The software compiles a list of shapes that meet the necessary design requirements and presents them to you in the Cold-Formed AISI Steel Design Selection dialog. Pick one of the shapes in the dialog and select 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 original members in place. To get the real updated unity value you must synchronize the design changes.

Synchronizing Design Changes

Select **Design | Synchronize Design Changes**. You will be prompted to re-analyze, select “Yes”, and when it finishes re-analyzing go back to the 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.