SAP2000 Tutorials: MISC Tips

By Andrew Chan

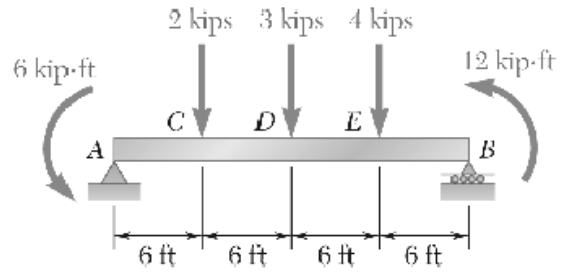
Brief:

This tutorial is intended to give you an understanding of how to analyze a problem in statics with SAP2000. With the intention of demonstrating a few tips. In this case we will highlight how to apply a moment force such as in example 1. This tip should benefit the Statics student in double check his work to ensure accuracy. If setup correct, SAP2000 will simulate real statics problems with extreme accuracy.

Example 1: From Problem set 13. Chapter 7, #76

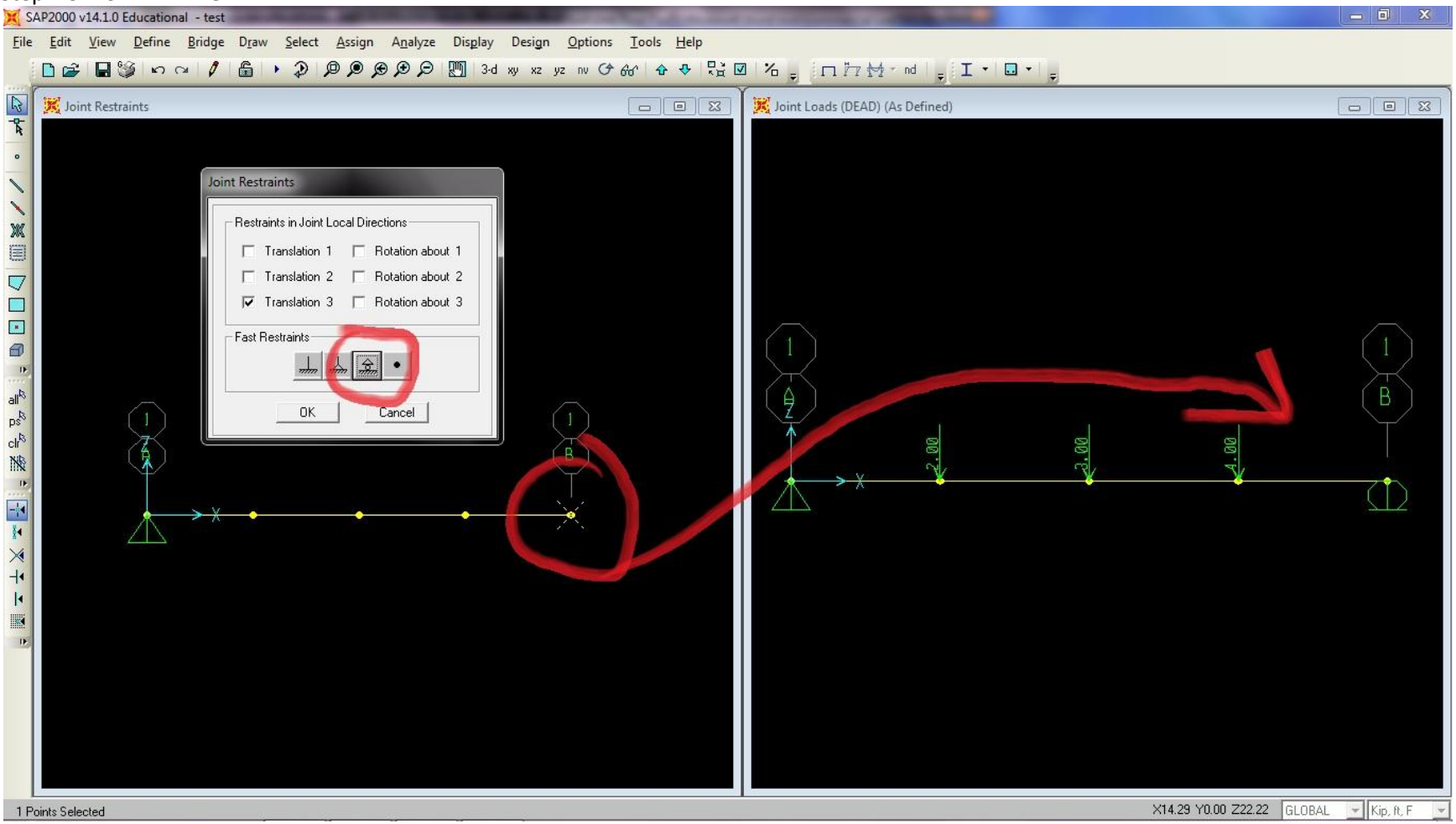
The problem we have selected is shown below. This problem is to alert the student on how to apply a moment force.

Chapter 7, Problem 76



For the beam and loading shown, (*a*) draw the shear and bending-moment diagrams, (*b*) determine the maximum absolute values of the shear and bending moment.

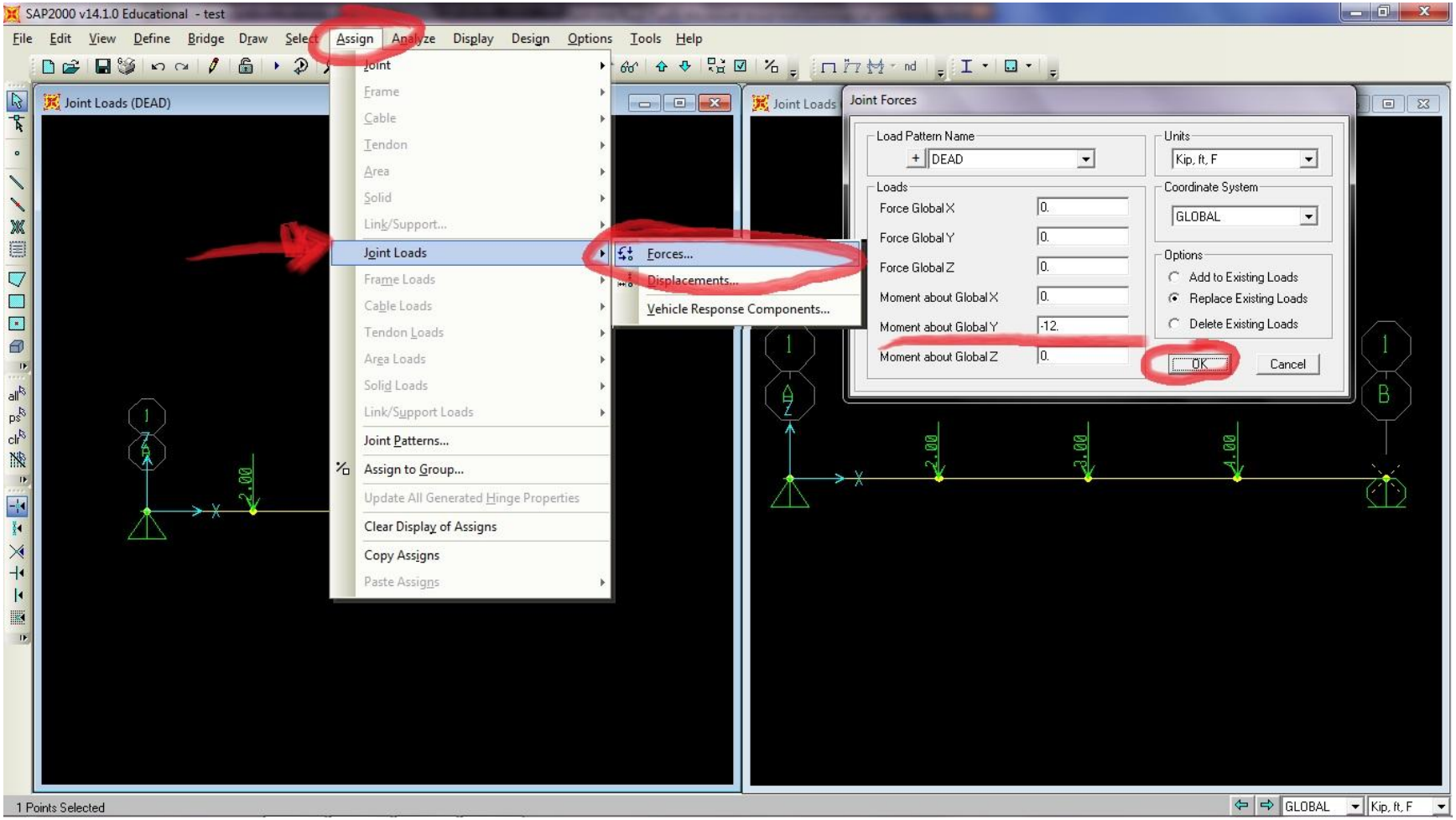
Step 1 SETUP THE PROBLEM:



Directions:

So first we setup the problem like we did before in the previous tutorial. If you follow every step, you should have no problem creating this example. Take note that the other end of the beam has a roller now. So when assigning the restraint, look for the triangle with a ball beneath it. This symbolizes the roller restraint.

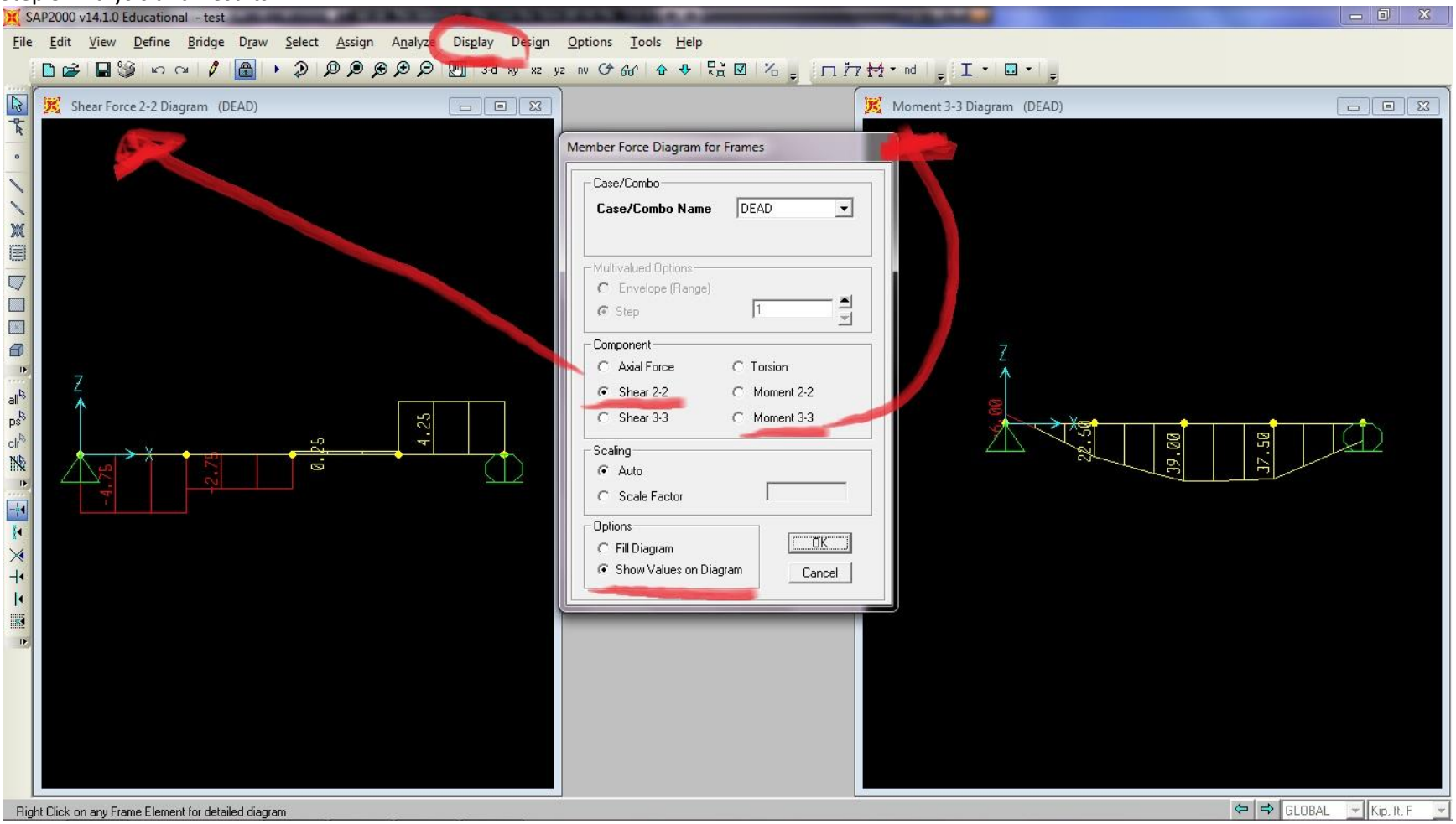
Step 2:



Directions:

Now after setting up the problem, select the one of the end points. We will be assigning moments at those locations as required by the problem. I selected the point with the roller. Now go to **Assign → Joint Loads → Forces → then assign Moment about Global Y → -12 kips.** Then select ok. Similarly we assign the point at the triangle, a **Moment about the Global Y → -6 kips.** We chose the Y axis as it is the one not displayed in our view. Notice we are on the Z-X plane. And we choose -12 and -6 as that represents moments in **the CCW direction**.

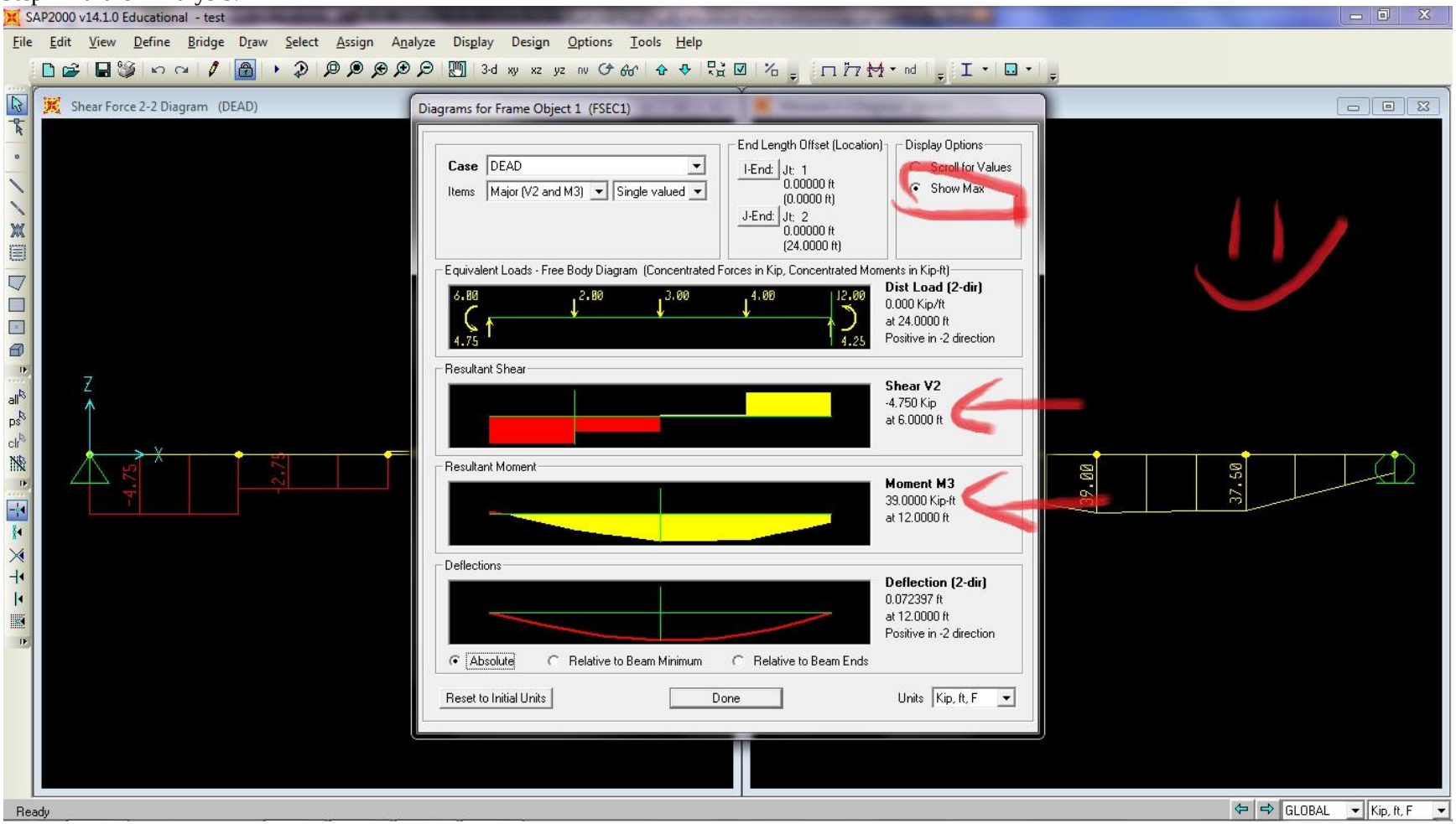
Step 3 Analysis and Results:



Directions:

We run the analysis with the ► button and the results should display. To see the Shear diagram go to **Display → Show Forces/Stress → Frames/Cables.** Now the **Member Force Diagram for Frames** window should appear. And per above, we can select **Shear 2-2** in one window and **Moment 3-3** for the next window. Select **Show Values on Diagram** to instantly display our results.

Step 4 Further Analysis:



Directions:

Finally if we right click our beam object, the **Diagrams for Frame Object 1** should display. Here we can select **Show Max** and the maximum values should appear for the **Resultant Shear and Resultant Moment.** Notice the values are **4.75 kip and 39 kip-ft** which is what the answer is! *This concludes the moment tutorials.*