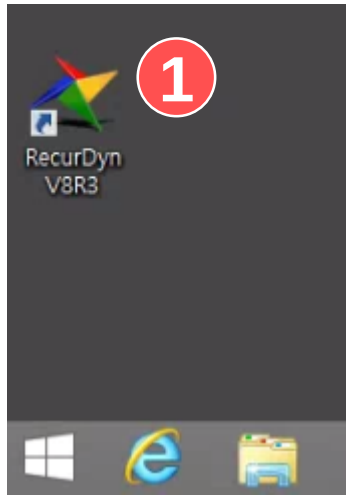
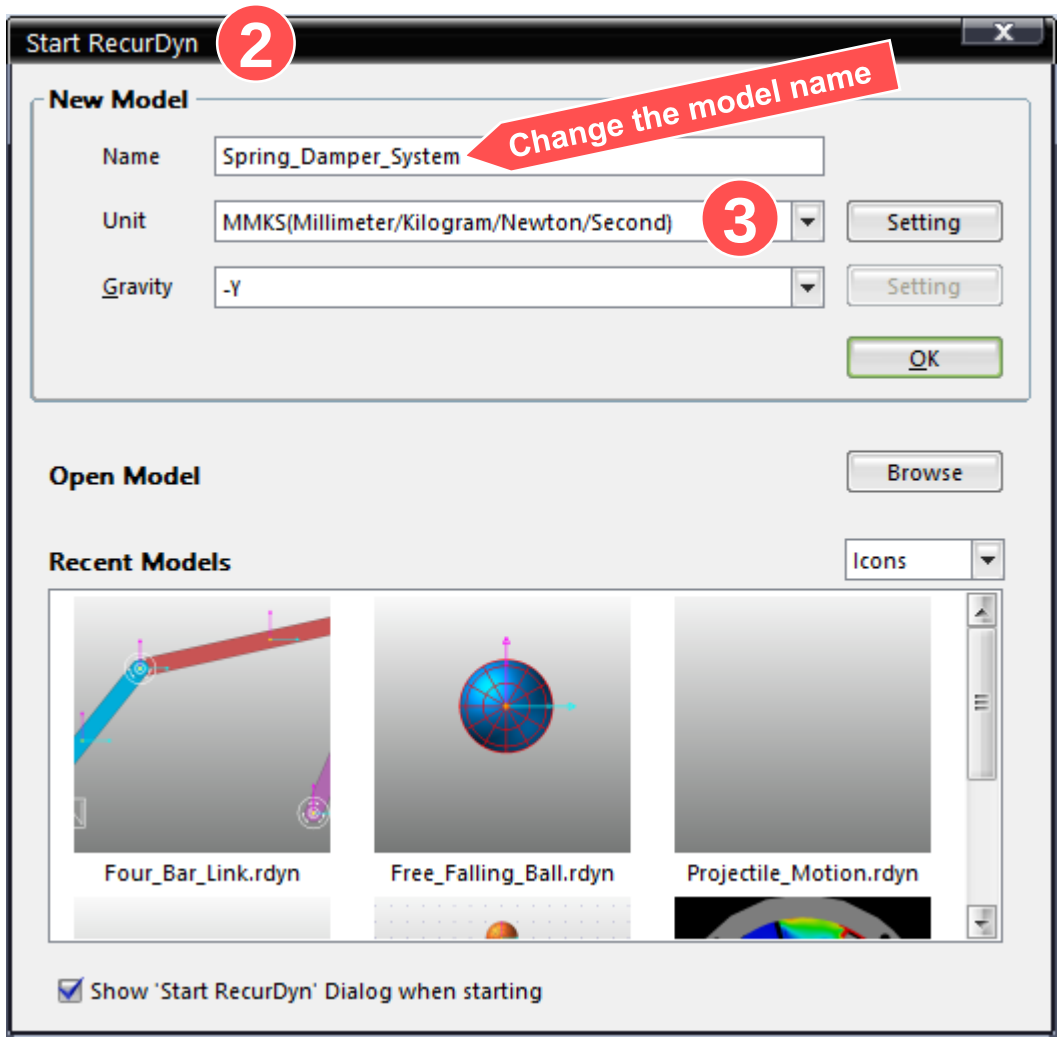
1. Running RecurDyn and Creating a New Model

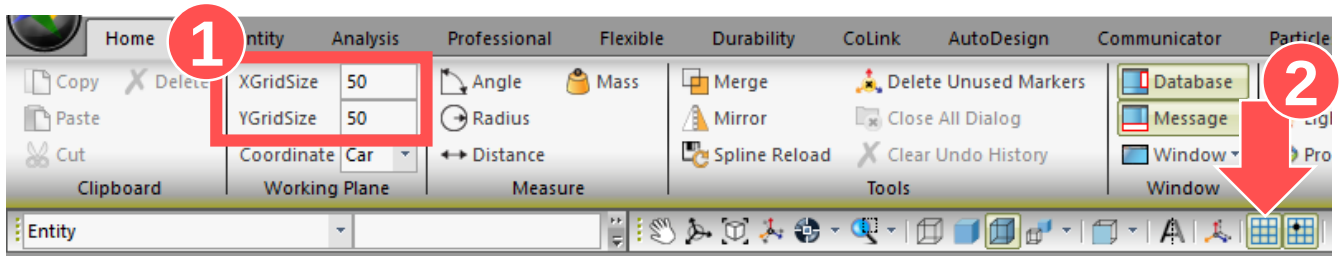
1. Double-click the RecurDyn icon on the Desktop to run RecurDyn.
2. Enter "Spring_Damper_System" in the Name box and click **OK** to create a new model.
3. Check if the system of units is correct for the Units.

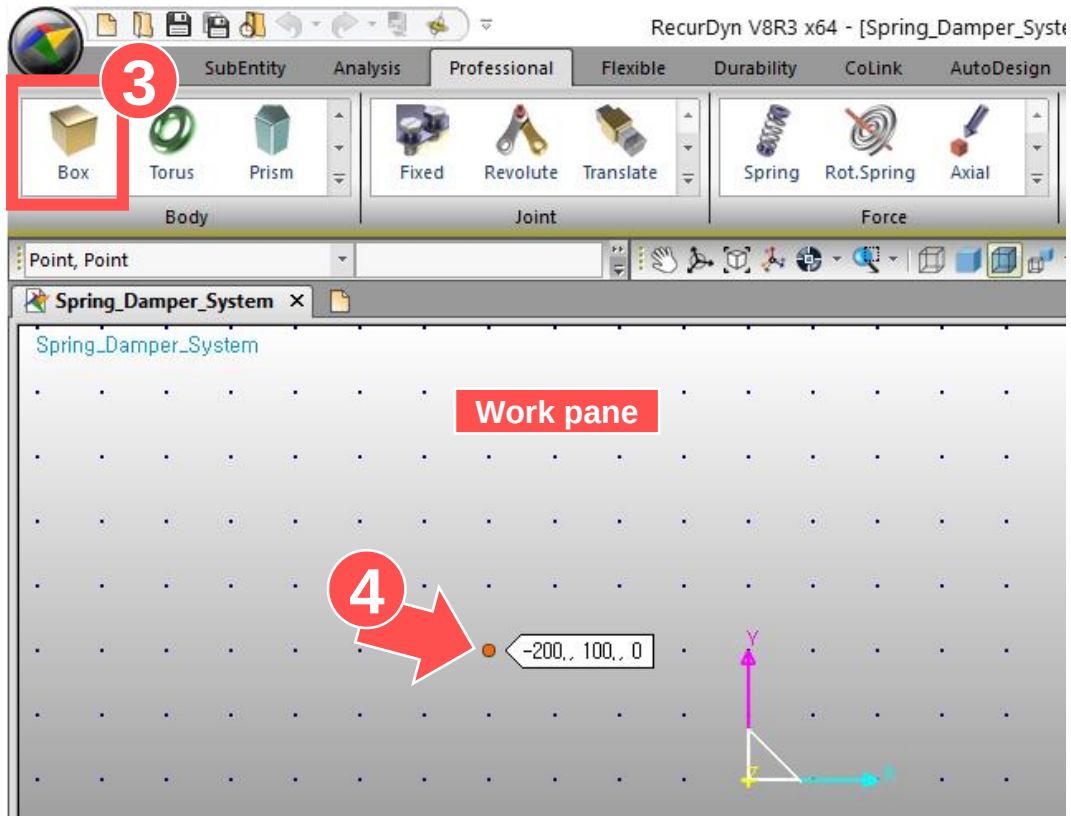


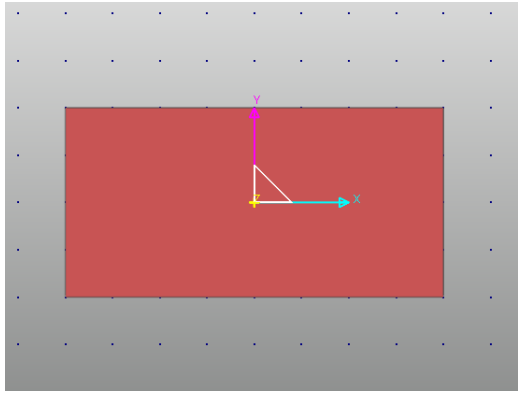


2. Creating a Box Body

1. On the Home tab, in the Working Plane group, enter "50" for the XGridSize and YGridSize coordinates respectively.
2. On the toolbar, click the Grid button to display the grid.
3. On the Professional tab, in the Body group, click Box.
4. Click point **(-200, 100, 0)** and then click point **(200, -100, 0)** on the work pane.

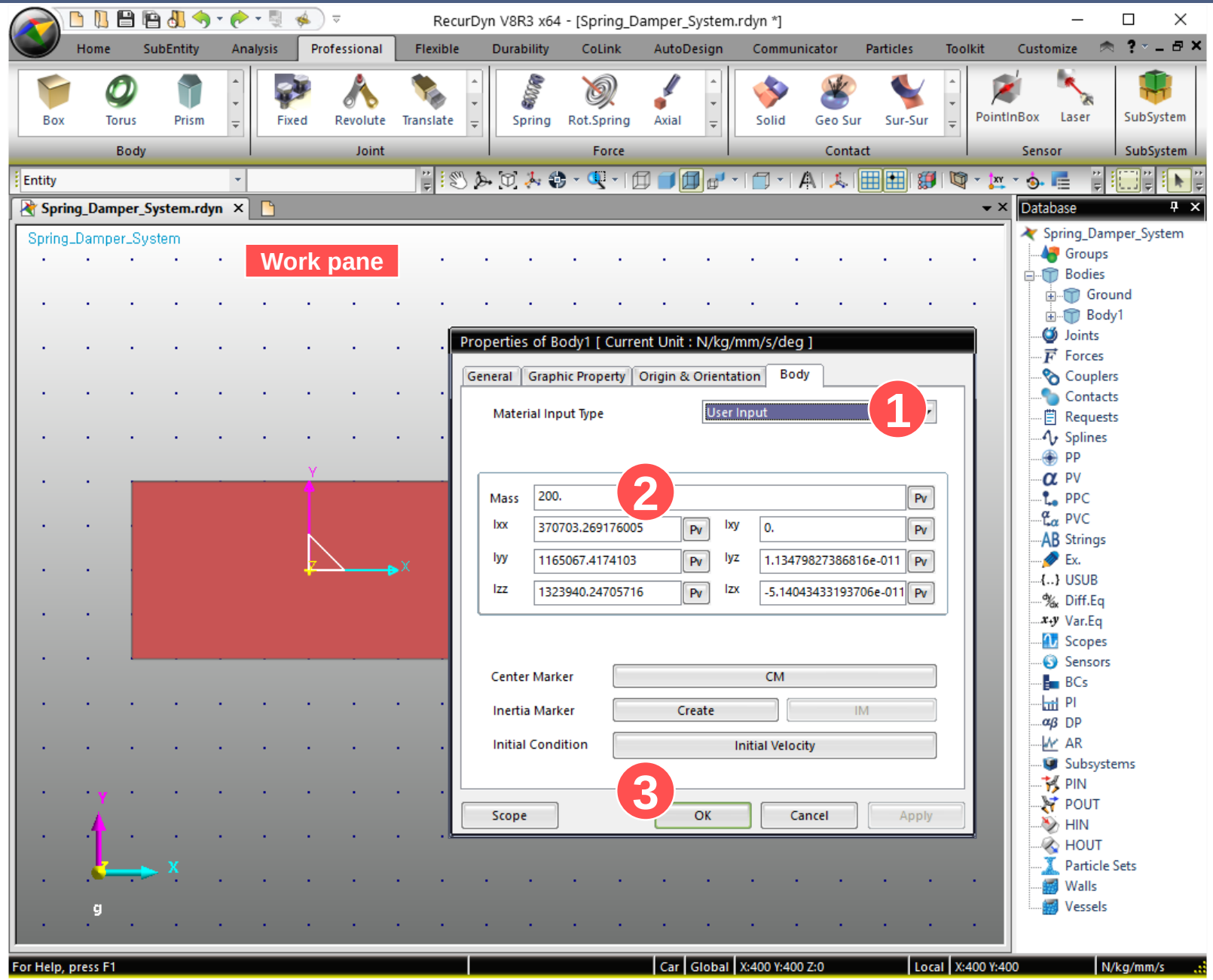






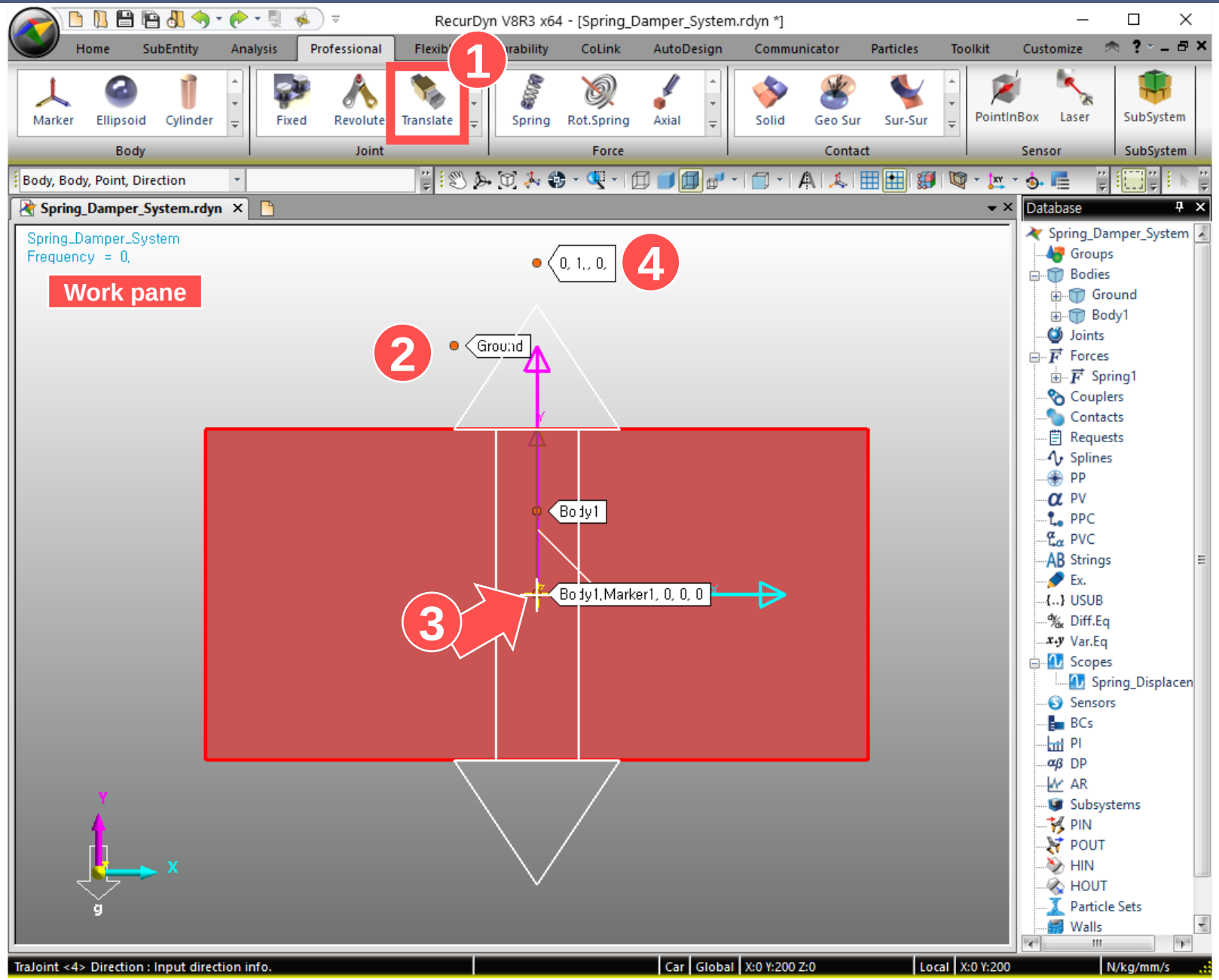
3. Changing the Mass of a Box Body

1. Select Body1(Box) in the work pane and press **P**. When the Properties of Body1 dialog box appears, click the Body tab, and click to select **User Input** for **Material Input Type**.
2. Enter "200" for the Mass.
3. Click **OK** to apply the changes.



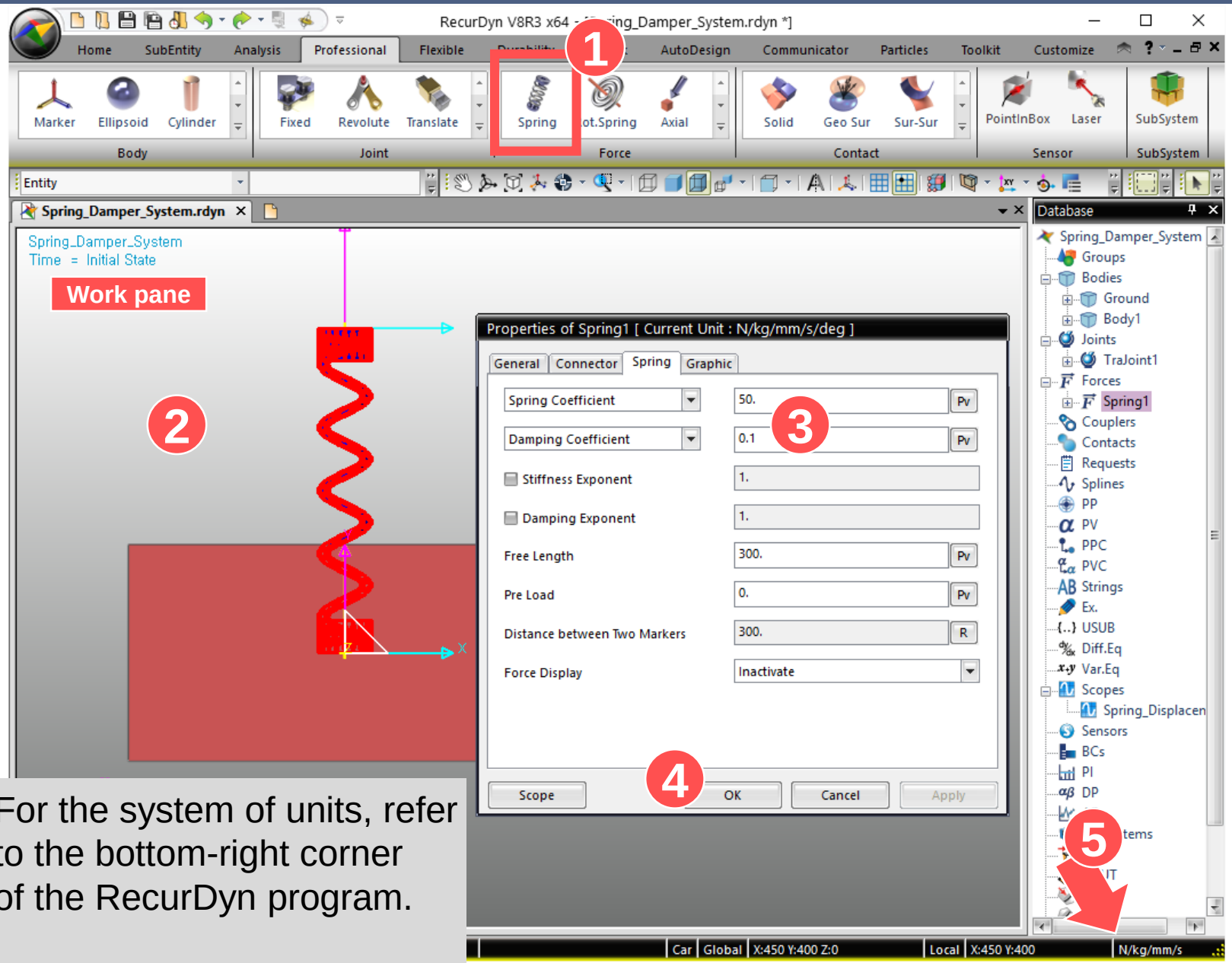
4. Creating a Constraint (Creating a Joint with One Degree of Freedom)

1. On the Professional tab, in the Joint group, click Translate.
2. Click Ground and then click Body1 on the work pane.
3. Click the origin **(0, 0, 0)** on the work pane.
4. Drag the translate joint to point **(0, 1, 0)** and select it on the work pane.



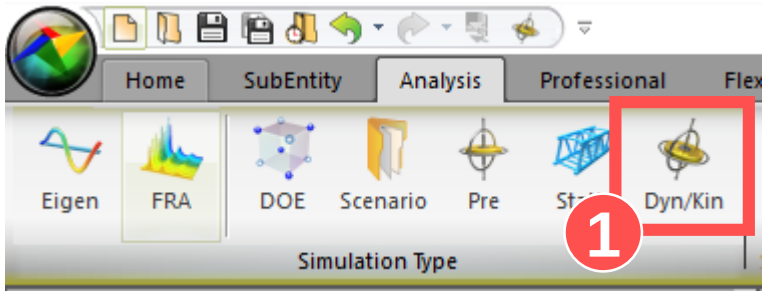
5. Creating a Spring Damper

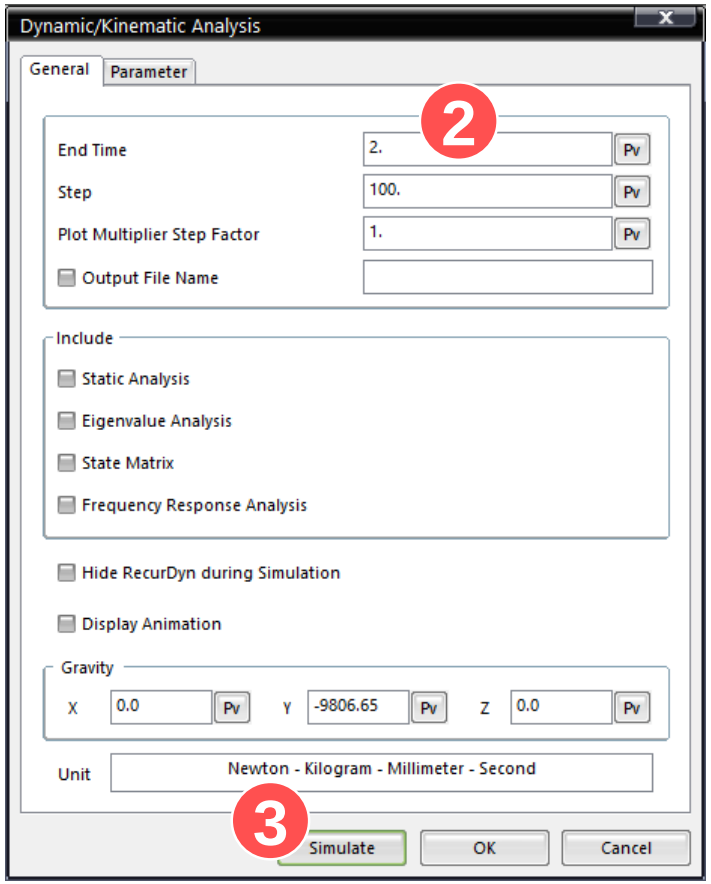
1. On the Professional tab, in the Force group, click Spring.
2. Click Ground and then click Body1(Box) on the work pane. Click point **(0, 300, 0)** and then click the origin **(0, 0, 0)**.
3. Select the spring force that you created on the work pane and press **P**. When the Properties of Spring1 dialog box appears, click the Spring tab, and enter "50" and "0.1" for the Spring Coefficient and Damping Coefficient respectively.
4. Click **OK** to apply the changes and close the dialog box.
5. For the system of units, refer to the bottom-right corner of the RecurDyn program.



6. Performing Dynamic Analysis

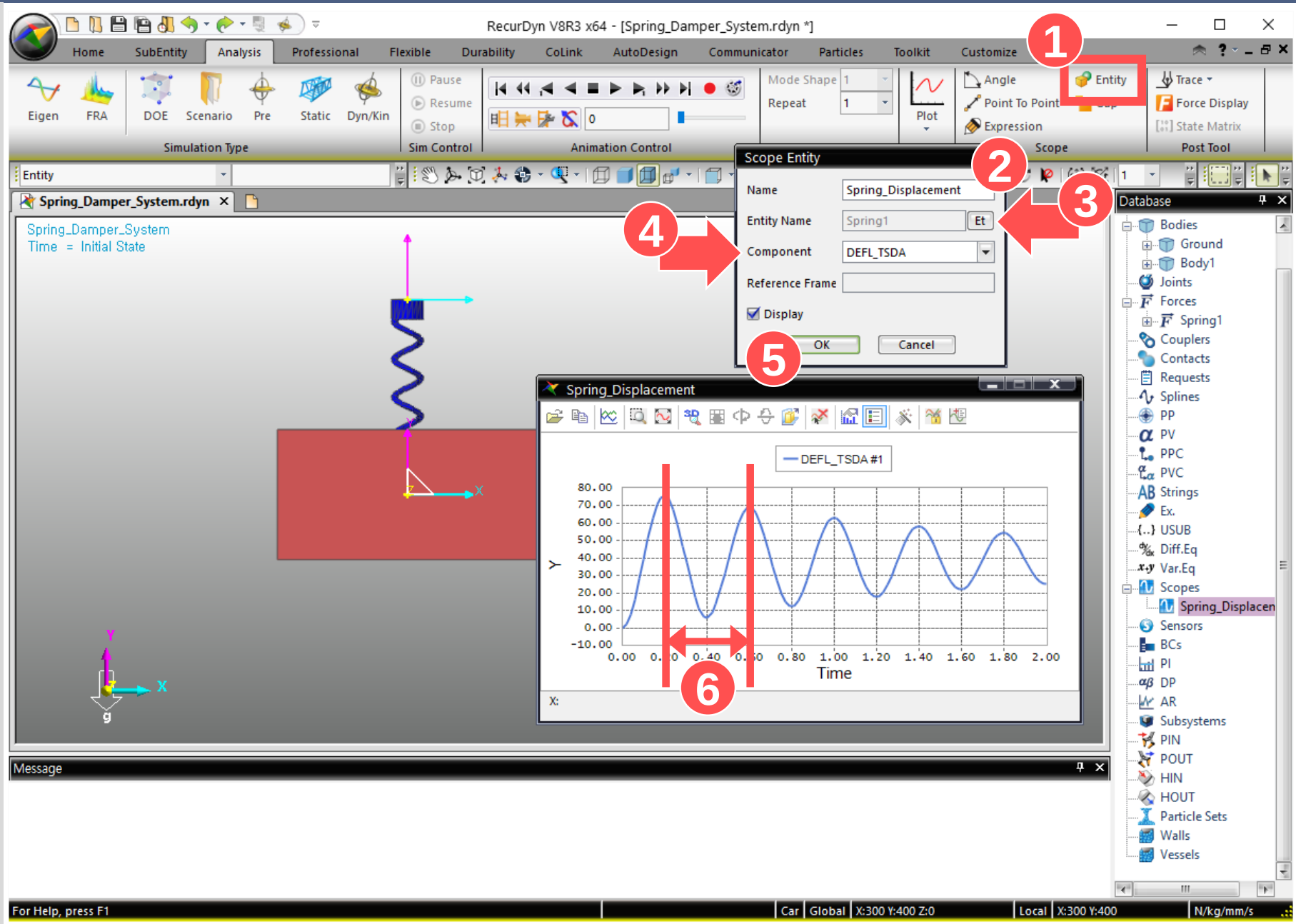
1. On the Analysis tab, in the Simulation Type group, click Dyn/Kin.
2. In the dialog box, click the General tab, and enter "2" for the End Time.
3. Click **Simulate** to run the simulation.





7. Measuring the Displacement of a Spring

1. On the Analysis tab, in the Scope group, click Entity.
2. Enter **Spring_Displacement** in the Name box.
3. Click the **Et** button to select a spring in the work pane.
4. Click to select **DEFL_TSDA** for the Component.
5. Select the **Display** check box and click **OK** to create a spring displacement graph.
6. Check if the period is 0.4 sec/cycle in the spring displacement graph.



8. Analytical Solution

- Check the period from the dynamic analysis results of RecurDyn.
- Calculate the unique vibration frequency.

The period of the spring displacement in the analysis results of RecurDyn is 0.4 sec/cycle.

$$\tau = \frac{sec}{Cycle} = 0.4\ sec/Cycle$$

$$f = \frac{1}{\tau}, \frac{Cycle}{sec}$$

$$f = \frac{\omega}{2\pi} = \frac{rad/sec}{rad/Cycle} = \frac{Cycle}{sec}$$

$$f = \frac{1}{0.4} = \frac{\omega}{2\pi}$$

$$\omega = \frac{2\pi}{0.4} = 15.708\ rad/sec$$