

Product Design Suite 2013

Simulation

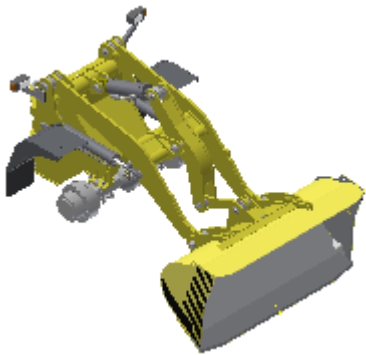
Exercise: Dynamic Simulation

In this exercise, you utilize Dynamic Simulation to analyze the mechanical linkage. Specifically, you analyze the hydraulic cylinder and the force required to move the linkage. Based on this information, you can determine the proper size of the cylinder.

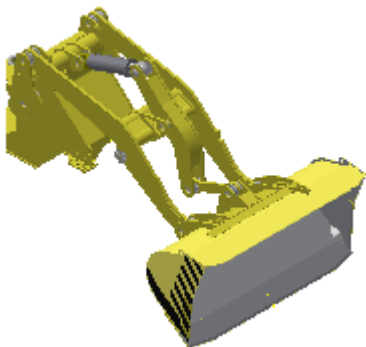
To complete the steps in this hands-on test drive you will need Autodesk® Product Design Suite Ultimate 2013. If you are not currently a user, [click here](#) to download your free, 30-day trial of Autodesk® Product Design Suite Ultimate 2013.

For this exercise, make sure that *PDS2013-Simulation.ipj* is set as the active project in Inventor prior to starting the steps.

1. Open *_Assy, Chassis, Front DS.iam*.

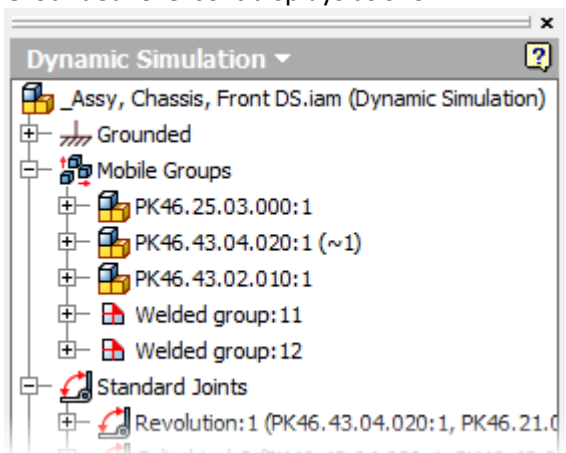


2. In the browser, under Representations > Level of Detail, right-click Dynamic Simulation. Click Activate.

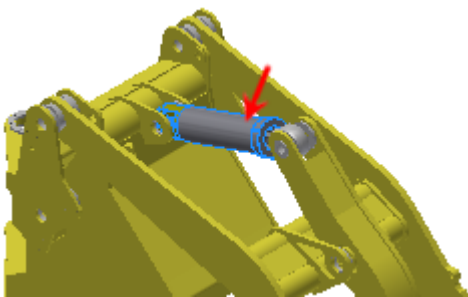


3. Orbit and review the components that are now active in the assembly.
4. On the Environments tab, Begin panel, click Dynamic Simulation.
5. If the Dynamic Simulation dialog box displays asking if you want to start the Dynamic Simulation tutorial now, click No.

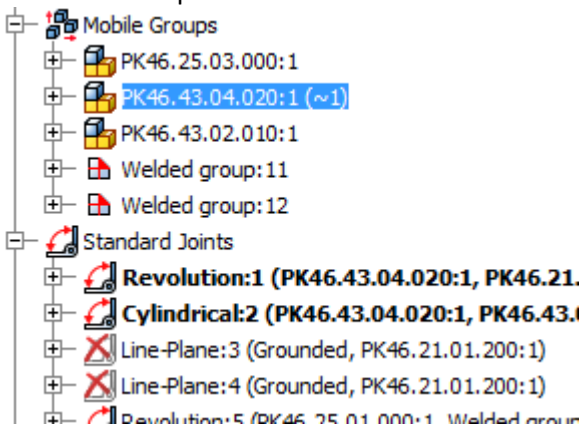
6. In the Dynamic Simulation browser, collapse the Grounded level so it displays as shown.



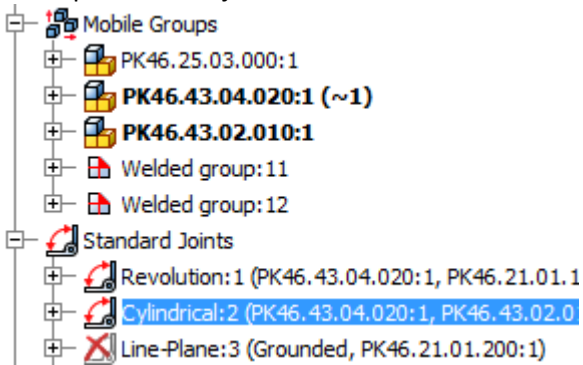
7. In canvas, select the identified hydraulic cylinder.



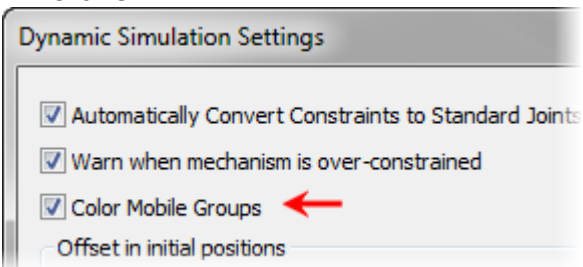
8. In the browser:
 - Under Mobile Groups, notice which assembly appears in bold text to identify it as being selected.
 - Under Standard Joints, notice which joints appear in bold text to indicate the joints that correspond to what is selected.



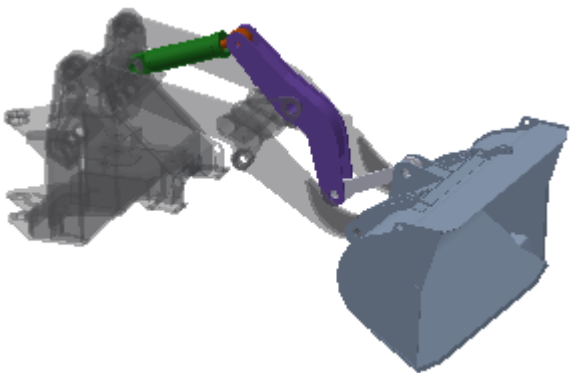
9. In the browser, under Standard Joints, select Cylindrical:2. Notice the two mobile groups that correspond to this joint.



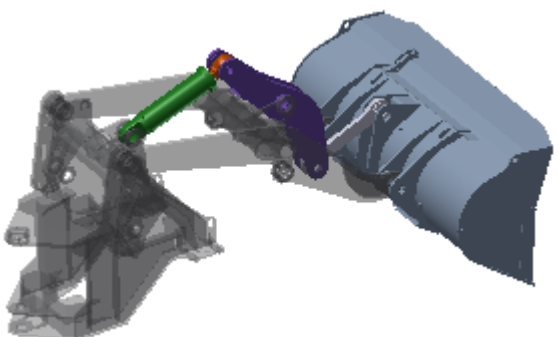
10. On the Dynamic Simulation tab, Manage panel, click Simulation Settings.
11. In the Dynamic Simulation Settings dialog box:
- Select the Color Mobile Groups check box.
 - Click OK.



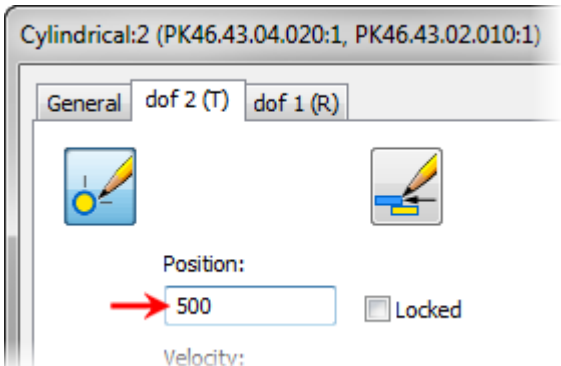
12. In the Dynamic Simulation warning dialog box asking if you want to overwrite the existing view representation, click Yes.
13. Review the change to the display. Only the components that are in the mobile groups appear in color. The other components appear translucent.



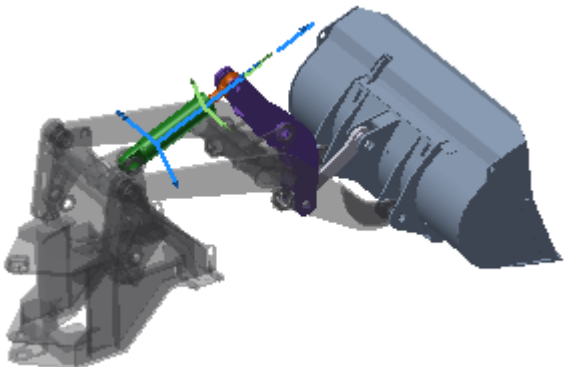
14. Orbit the display to a view approximately as shown.



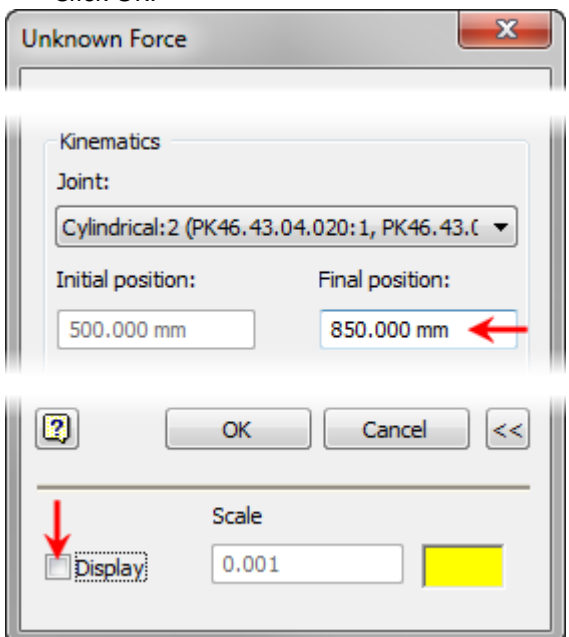
15. In the browser, under Standard Joints, right-click Cylindrical:2. Click Properties.
16. In the Cylindrical:2 dialog box:
 - On the dof 2 (T) tab, in the Position field, enter **500**.
 - Click OK.



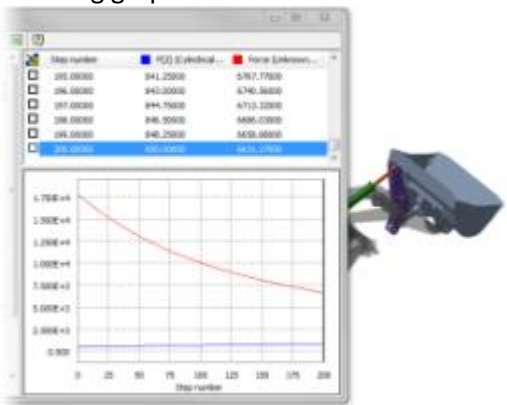
17. In canvas, review the change to the stroke of the hydraulic cylinder.



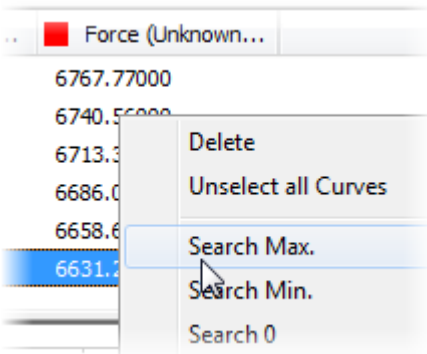
18. On the Dynamic Simulation tab, Results panel, click Unknown Force.
19. In the Unknown Force dialog box:
 - In the Final Position field, enter **850**.
 - In the expanded area of the dialog box, clear the Display check box.
 - Click OK.



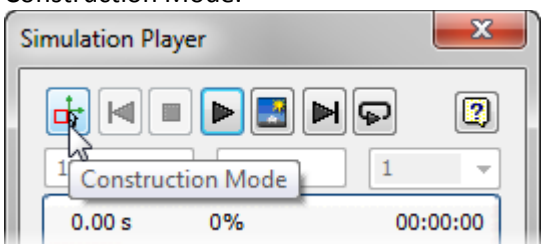
20. As the results are being calculated, reposition the Dynamic Simulation – Output Grapher so you can see the assembly in canvas and the resulting graph.



21. To identify the step with the largest force, in the Output Grapher, right-click in the Force results column. Click Search Max.

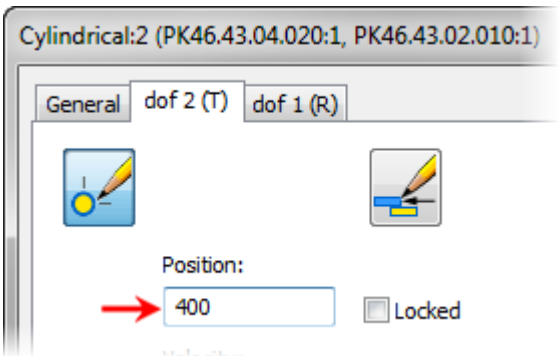


22. Review the results.
- In the Output Grapher, notice that step 0 is now selected and it has a force greater than 17,800. This is the step with the highest required force because it is the position with the least mechanical advantage.
 - In canvas, notice that the position updated to match that distance setting.
23. To review more information about the force curve:
- Right-click in the Force results column. Click Curve Properties.
 - After reviewing the values in the Dynamic Simulation – Properties dialog box, click Cancel.
24. Close the Output Grapher.
25. In the Simulation Player dialog box, click Construction Mode.



26. To change the starting position of the simulation:

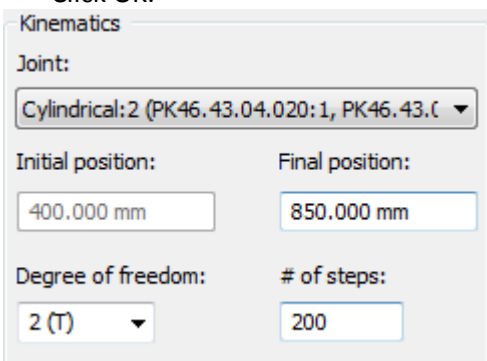
- In the browser, under Standard Joints, right-click Cylindrical:2. Click Properties.
- In the Cylindrical:2 dialog box, dof 2 (T) tab, in the Position field, enter **400**.
- Click OK.



27. On the Dynamic Simulation tab, Results panel, click Unknown Force.

28. In the Unknown Force dialog box:

- Review the value in the Initial Position field.
- Ensure that the value in the Final Position field is still 850.
- Click OK.

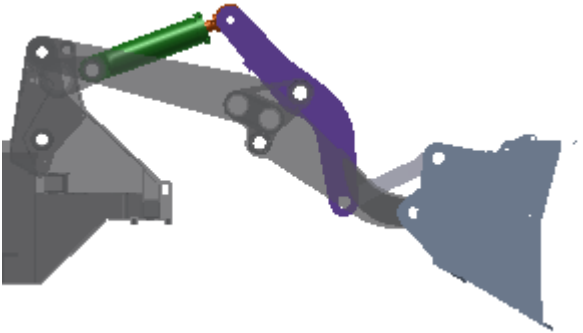


29. As the results are being calculated, reposition the Dynamic Simulation – Output Grapher so you can see the assembly in canvas and the resulting graph.

30. To identify the step with the largest force, in the Output Grapher, right-click in the Force results column. Click Search Max.

31. Review the results.

- In the Output Grapher, notice that step 0 is now selected and it has a force greater than 25,700. The required force is now greater than before because this position has even less mechanical advantage to push the linkage than when the hydraulic cylinder is extended 100 mm farther out.
- In canvas, notice that the position updated to match that distance setting.



32. To review more information about the force curve:

- Right-click in the Force results column. Click Curve Properties.
- After reviewing the values in the Dynamic Simulation – Properties dialog box, click Cancel.

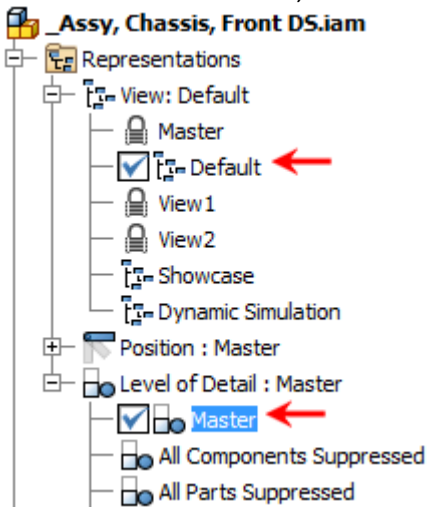
33. Close the Output Grapher.

34. In the Simulation Player dialog box, click Construction Mode.

35. On the Dynamic Simulation tab, Exit panel, click Finish Dynamic Simulation.

36. To see all of the components in the design, in the browser, under Representations:

- Under View, right-click Default. Click Activate.
- Under Level of Detail, double-click Master.



37. Close all files. Do not save changes.