

A17-2_003	On Center Event
Product(s):	Adams Car
Feature(s):	This examples illustrates On Center event
Directory:	<none>
Files:	on_center.plt

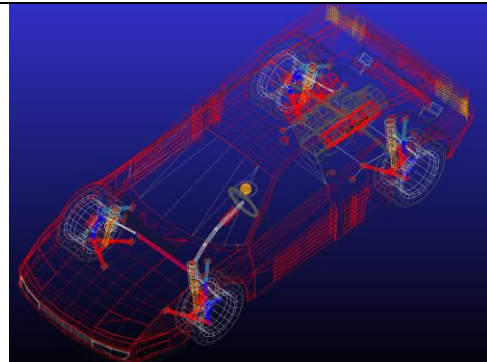
Problem Statement

The On Center event is an open loop event with constant sinusoidal input.

This test is used as the primary method to measure steering feel properties. The mostly evaluated output of this event are vehicle yaw gain and steering wheel torque.

Model Description

The Adams Car MDI_Demo_Vehicle.asy model from acar_shared database is used.



Getting Familiarize with event:

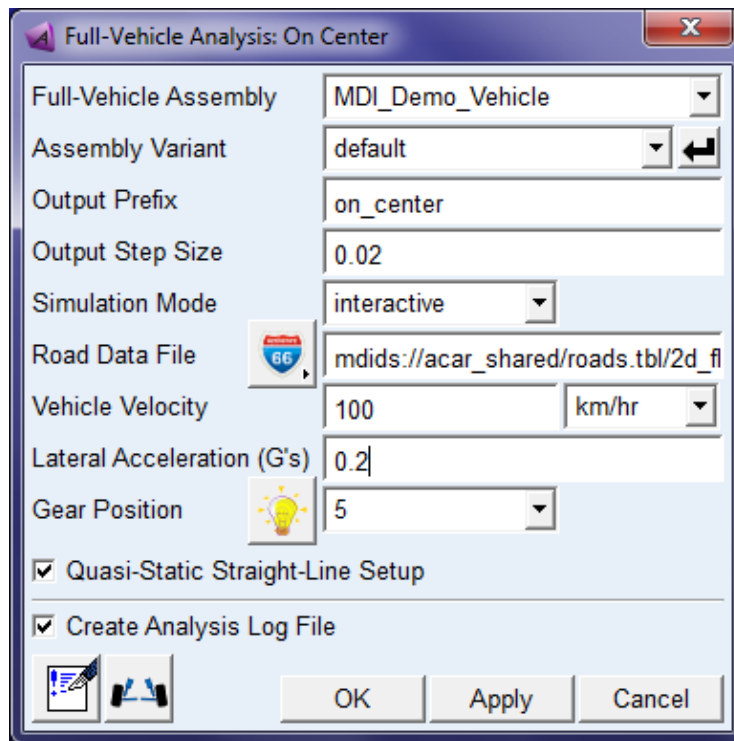
In the On Center event simulation, the vehicle drives with a constant longitudinal speed and a 0.2Hz sinusoidal steering input accelerates vehicle laterally between +0.2g and -0.2g.

The steering controller routine runs one cycle with a 15 degree amplitude, and then a second cycle with an amplitude of 20 degrees. The routine then calculates the steering amplitude necessary to accelerate the vehicle to 0.2g right and -0.2g left.

Steps for Running Examples:

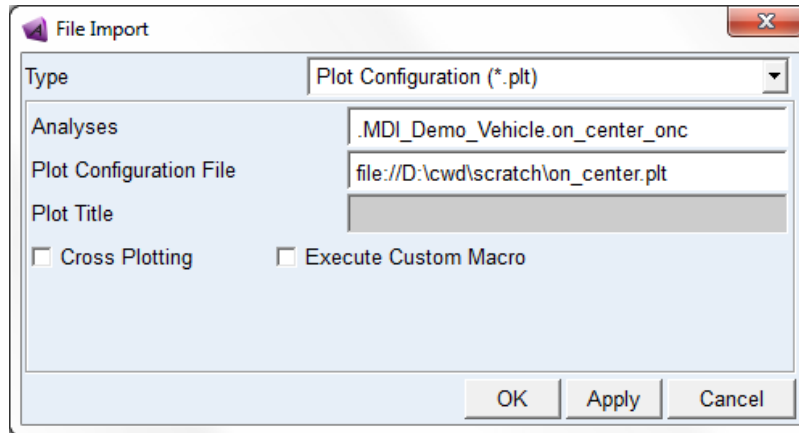
1. Start Adams/Car, click **File - Open - Assembly**
2. Right-click in the **Assembly Name** field, navigate to **Search**, then choose 'acar_shared'

3. Open 'MDI_Demo_vehicle.asy'
4. Perform an On Center analysis, by clicking **Simulate** then navigating to **Full Vehicle Analysis > Open loop Steering Events > On Center...**
5. Fill out the box as shown, then select **OK**



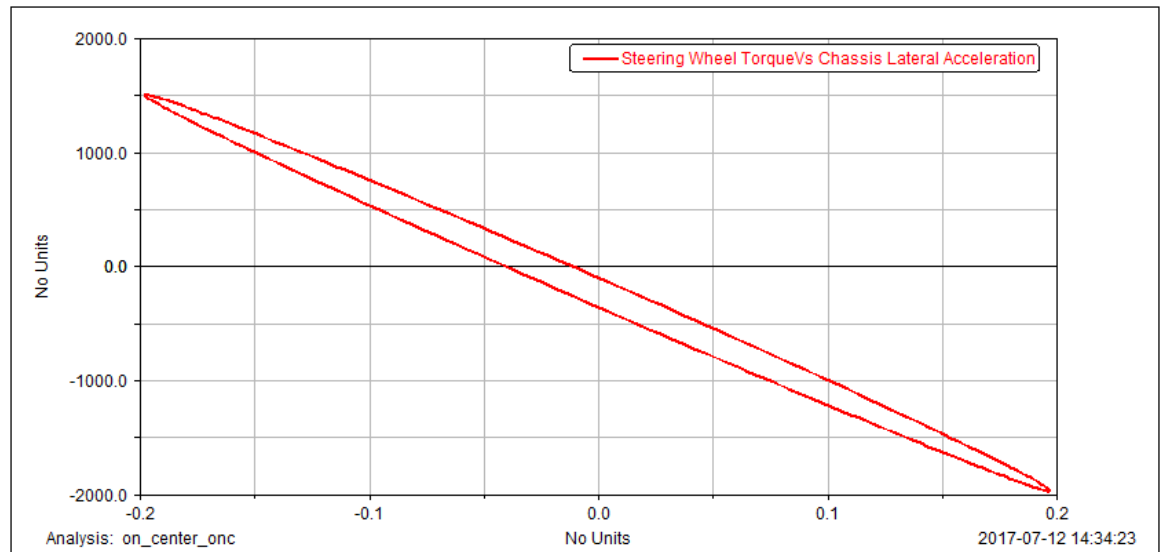
6. To visually inspect the simulation, select **Review > Animation Controls**. click **Animation Forward** to view animation
7. Go to Adams PostProcessor; from the **Review** menu, select **Postprocessing window...** or press **F8**
8. Plot curves using the plot configuration file included with this example

Go To **File > Import > Plot Config File...** and fill out the box as shown below, then select OK

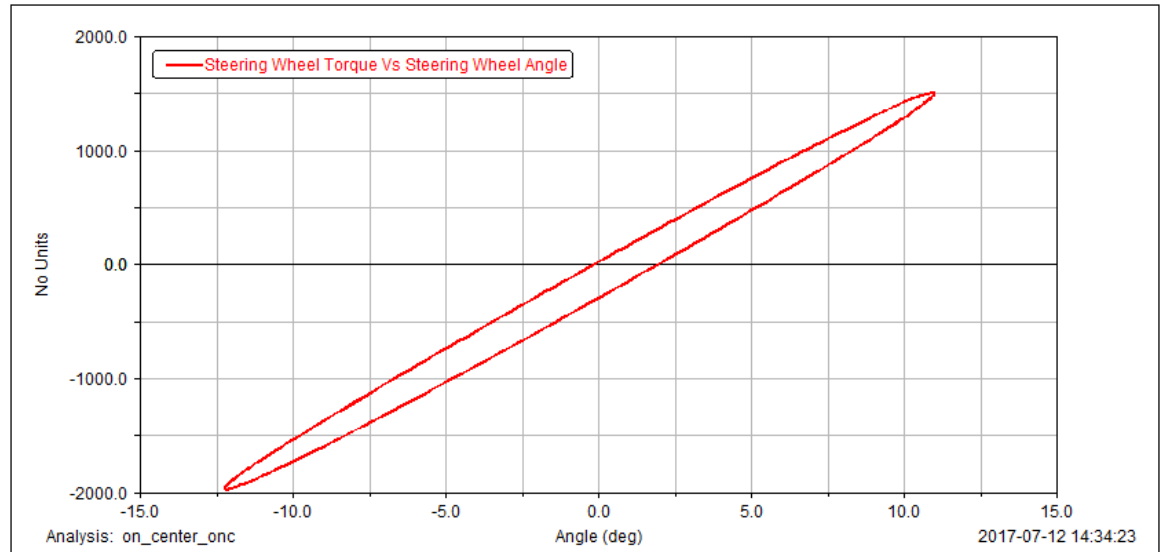


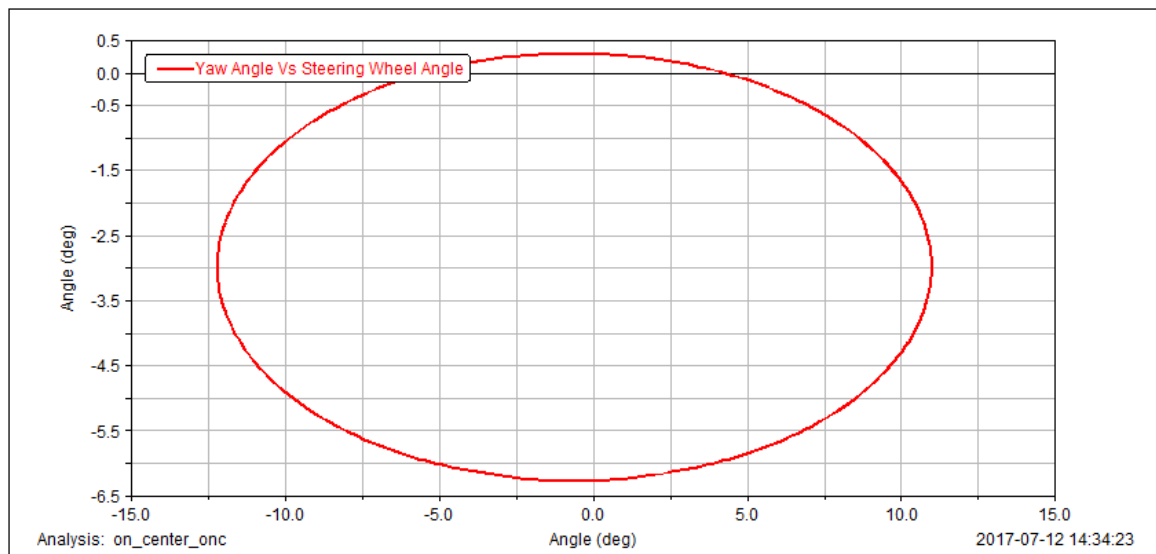
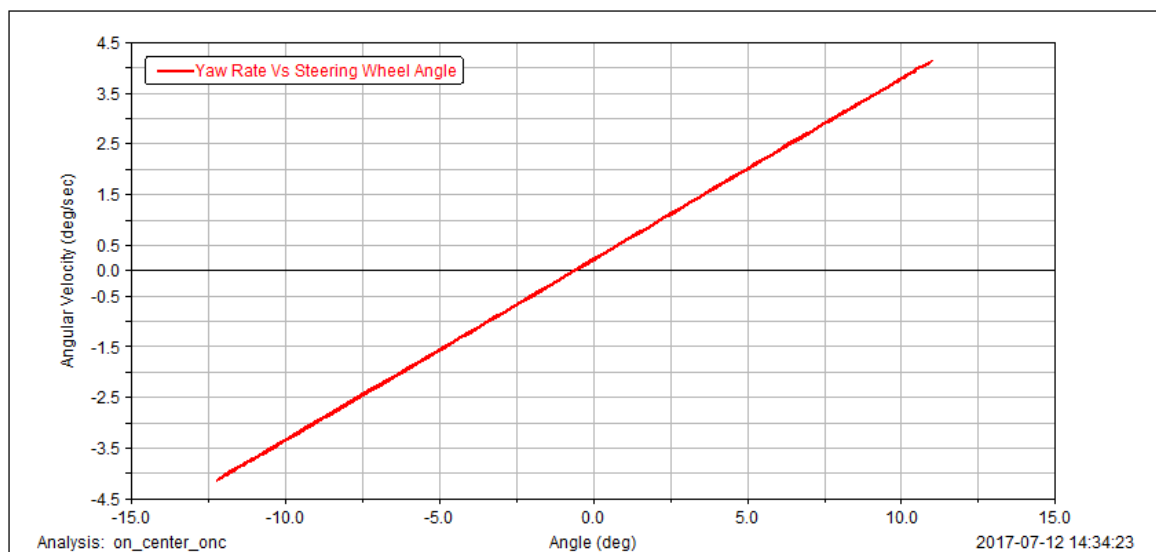
9. Review the steering wheel torque and vehicle response characteristics that play an important role in On Center handling performance.

Plot: Steering Wheel Torque Vs Lateral Acceleration



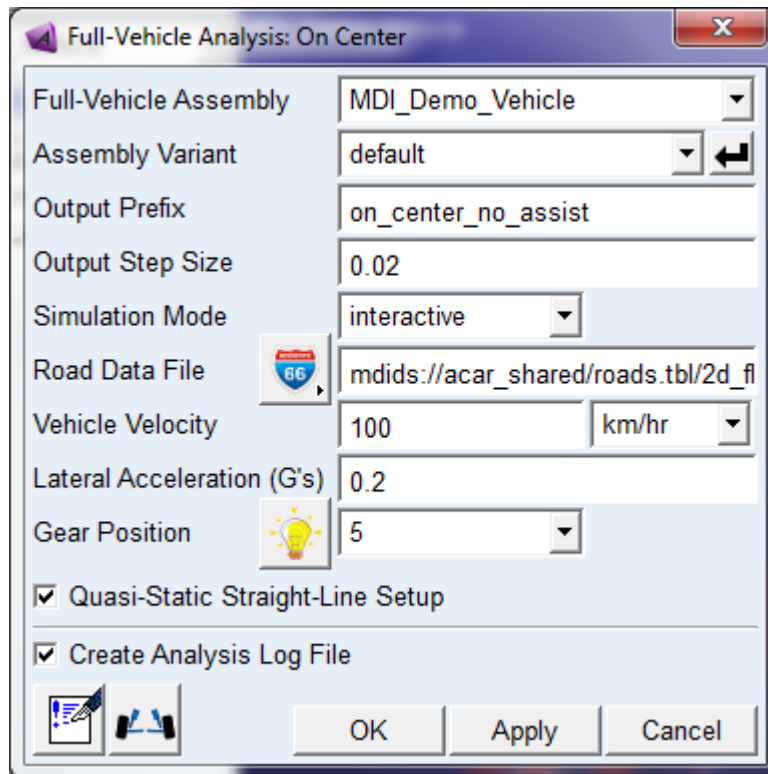
Plot: Steering Wheel Torque Vs Steering Wheel Angle



Plot: Yaw Angle Vs Steering Wheel Angle**Plot: Yaw Velocity Vs Steering Wheel Angle**

10. In the Adams Car Standard Interface mode, from the model browser, select steering subsystem .MDI_Demo_Vehicle.**TR_Steering**
11. From Adjust menu, select Steering Assist and unset **Steering Assist Active**. From the model browser, select vehicle assembly **.MDI_Demo_Vehicle**
12. Perform an On Center analysis again, by clicking **Simulate** then navigating to **Full Vehicle Analysis > Open loop Steering Events > On Center...**

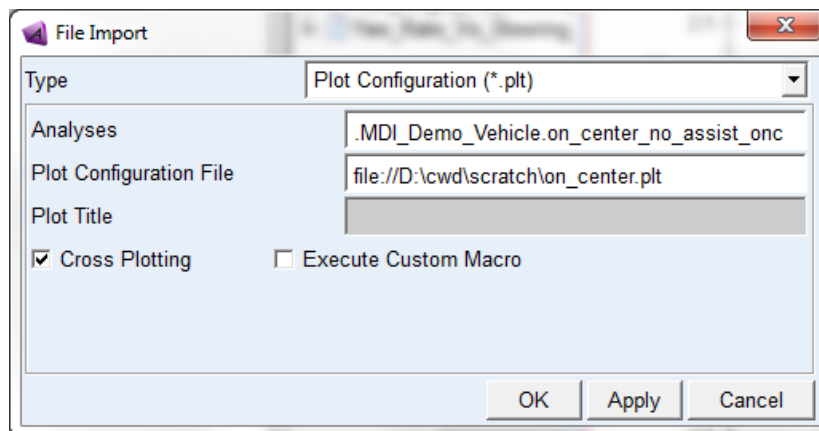
13. Fill out the box as shown, then select **OK**



14. Go to Adams PostProcessor; from the **Review** menu, select **Postprocessing window...** or press **F8**

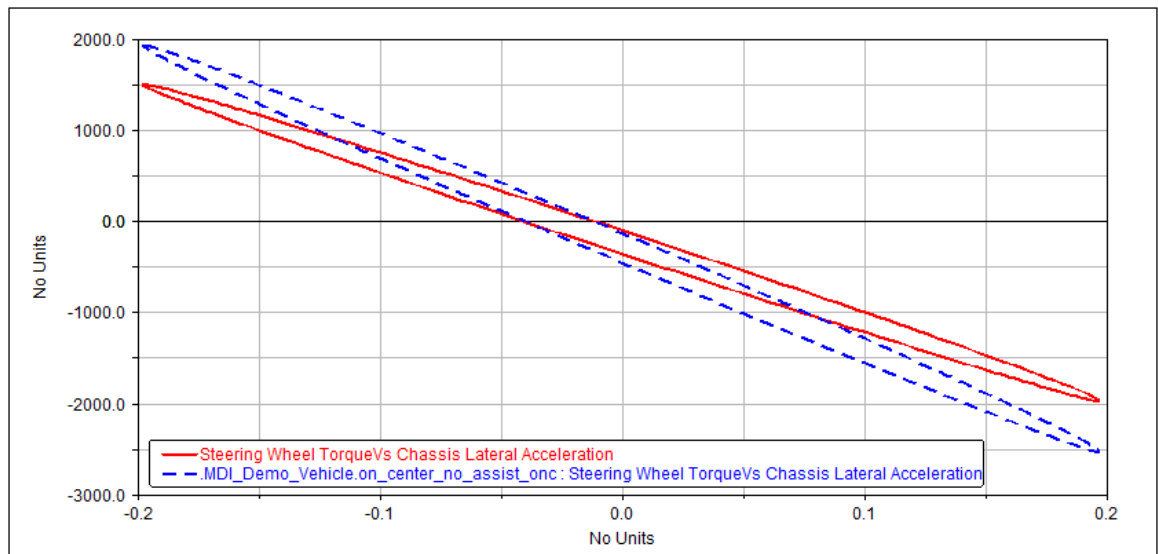
15. Plot curves using the plot configuration file included with this example

Go To **File > Import > Plot Config File...** and fill out the box as shown below, then select OK

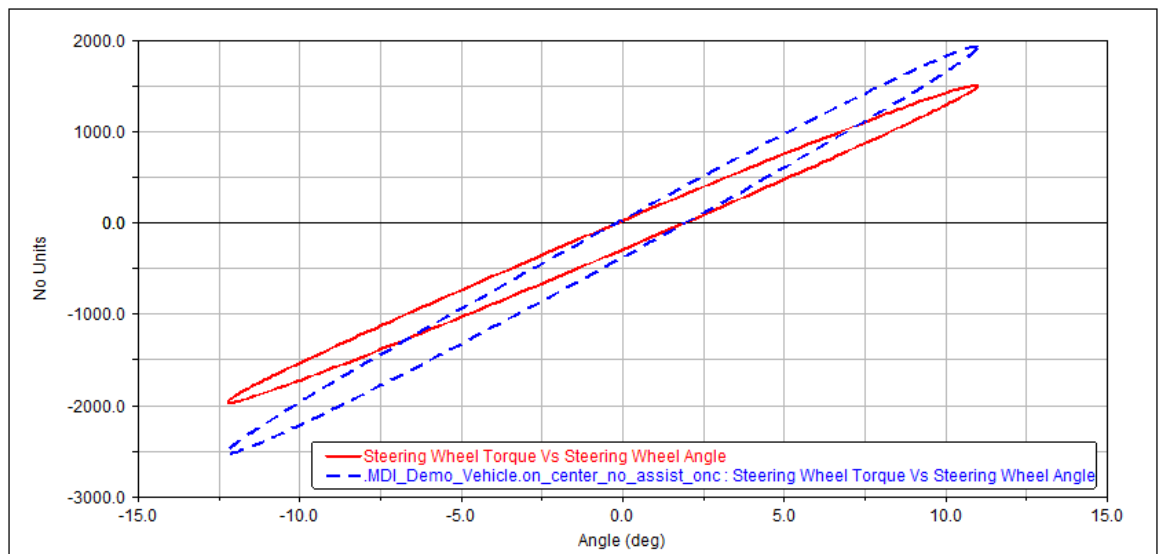


16. Review the effect of steering assist in the steering wheel torque, lateral acceleration and steering wheel angle.

Plot: Steering Wheel Torque Vs Lateral Acceleration



Plot: Steering Wheel Torque Vs Steering Wheel Angle



Remarks and Known Issues:

- Limitation: The On Center event couldn't be simulated through "File Driven Event" or Event Builder because of references to control routine.
- A number of other new events are available in Adams Car 2017.2, be sure to see the other new feature examples included with this release.