

Altair MotionView 2019 Tutorials

MV-8500: Using the Truck Library

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Introduction

The purpose of this tutorial is to walk you through the process of how to build a full truck model with advanced drivers and how to add events to the model built. The new event user interface is supported only for models with advanced drivers. Files can be edited or updated in the event editor. Sixteen event types are supported. To learn more about the events, see the *Full vehicle with Advanced Drivers* topic.

The process involves:

- Launching MotionView
- Building a Full Truck Model with Driver
- Adding Events to the Model
- Viewing Reports

Step 1: Launching MotionView.

In MotionView, models are assembled from libraries of pre-defined systems using the **Assembly Wizard**. The *Assembly Wizard* dialog guides you through the assembly process, ensuring that your selections are compatible.

- **Note** The MBD Vehicle Dynamics Tools preferences must be loaded before using the event builder. Select *File > Load > Preference File > MBD-Vehicle Dynamics Tools* from the MotionView interface.
- 1. Start a new MotionView session.

The MotionView window is displayed.



Note Set the required truck wizard paths to start assembling the model through **Assembly Wizard** dialog.



2. Click *Model > Set Wizard Paths*.



The **Set wizard library** dialog is displayed.

🛆 Set wizard library	×
Wizard library:	Car/Small truck
Assembly wizard file:	C/Program Files/Altair/2017.1.0.6-raghpMauto_BVT_BW1-dev3/hw/mdl/mdllib/model_wizard.wzd
Task wizard file:	C:/Program Files/Altair/2017.1.0.6-raghpMauto_BVT_BW1-dev3/hw/mdl/mdllib/task_wizard.wzd
MDL standard include file:	C:/Program Files/Altair/2017.1.0.6-raghpMauto_BVT_BW1-dev3/hw/mdl/mdllib/std_inc.mdl
Wizard library directory:	C:/Program Files/Altair/2017.1.0.6-raghpMauto_BVT_BW1-dev3/hw/mdl/mdllib
Report log file:	G:/Users/swaaths/.reports
	OK Cancel

3. From the **Wizard library** drop-down menu, select the *Heavy Truck* option. Browse and locate the required paths from the installation folder and click **OK**.

💪 Set wizard library	×
Wizard library:	Heavy truck
Assembly wizard file:	Heavy truck User/Custom library
Task wizard file:	C:/Program Files/Altair/2017.1.0.11/hw/mdl/mdllib/truck_task_wizard.wzd
MDL standard include file:	C:/Program Files/Altair/2017.1.0.11/hw/mdl/mdllib/std_inc.mdl
Wizard library directory:	🖉 C:/Program Files/Altair/2017.1.0.11/hw/mdl/mdllib
Report log file:	C:/Users/swaaths/.reports
	OK Cancel



4. Click *Model* > *Assembly Wizard*.



The Heavy truck - Model Type window is displayed.

🛆 Heavy truck - Model Type		X
Select the model type Front end of truck Rear end of truck Eull truck with driver		Page 1 of 11
• Full truck with driver		
Reset Selection Message Log	< Back Next >	Cancel

Step 2: Building a Full Truck Model with Driver.

In MotionView, truck models are assembled from libraries of pre-defined systems using the **Heavy Truck library**. It guides you through the assembly process, ensuring that your selections are compatible. The **Full truck with driver** model type builds the model with steering, front suspension, rear suspension, powertrain, driveline, and driver signal generator.

1. Select the *Full truck with driver* option and click *Next*.

🛆 Heavy truck - Model Type		X
 Select the model type Front end of truck Rear end of truck Full truck with driver 		Page 1 of 11
Reset Selection Message Log	< Back Next >	Cancel

Primary Systems Selection

2. Select the *Body* and *Cab* from the **Truck body** and **Cabin body** drop-down menus respectively and click *Next*.

🛆 Heavy truck - Pr	imary Systems	s for Full truck with driver model	×
Select bodies			Page 2 of 11
Truck body	Body		•
Cabin body	Cab		•
Reset Selection Me	essage Log	<back next=""></back>	Cancel

3. Select *Front solid axle suspension* for the **Front suspension**, *Rear dual solid axle suspension* for the **Rear suspension**, *Linear Torque Map Powertrain* for the **Powertrain**, and *Driver Signal Generator* for the **Signal Generator** and click *Next*.

🛆 Heavy truck - Primary Systems for Full truck with driver model		X
Select primary s	systems	Page 3 of 11
Front suspension	Front solid axle suspension	•
Rear suspension	Rear dual solid axle suspension	•
Powertrain	Linear Torque Map Powertrain	•
Signal Generator	Driver Signal Generator	•
Reset Selection Mes	sage Log < Back Next >	Cancel

Steering Systems for a Full Truck Model

4. Select *Pitman Arm Steering* for the **Steering linkages**, *Steering column* for the **Steering column**, and *Steering boost* for the **Steering boost** in the steering subsystems page.

🛆 Heavy truck - Steering systems for Full truck with driver Model		×
Select steering s	subsystems	Page 4 of 11
Steering linkages	Pitman Arm Steering	•
Steering column	Steering column	•
Steering boost	Steering boost	•
Reset Selection Mes	sage Log < Back Next >	Cancel

Springs and Stabars for a Full Truck Model

5. Select *Leaf springs* for the **Front spring** and *Bell crank linked leaf spring* for the **Rear spring** for the model and click *Next*.

🛆 Heavy truck - Springs and Stabars for Full truck with driver		
Select springs a	nd stabars	Page 5 of 11
Front spring	Leaf Springs	•
Front stabilizer bars	None	•
Rear spring	Bell crank linked leaf springs	•
Rear stabilizer bars	None	•
Reset Selection Mess	age Log < Back Next >	Cancel

Note Based on the suspension type selected for the **Front suspension** and **Rear suspension**, the **Front spring** and **Rear spring** options are modified accordingly.

Shock Absorbers

6. Select the required shock absorbers from the **Front shocks** and **Rear shocks** dropdown menus and click *Next*.

🛆 Heavy truck - Dampers for Full truck with driver model		X
Select Shock Absorbers		Page 6 of 11
Front shocks	Front shock absorber (with inline its)	•
Rear shocks	Rear shock absorbers (with inline its)	•
Reset Selection	Vessage Log < Back Next >	Cancel

Jounce/Rebound Bumpers

7. Select the following options for the Front and Rear Jounce/rebound bumpers and click **Next**.

🛆 Heavy truck - Joun	ce/Rebound Bumpers for Full truck with driver mo	odel X
Select jounce and	rebound bumpers	Page 7 of 11
Front jounce bumpers	Front external jounce bumpers	•
Front rebound bumpers	Front external reb bumpers	•
Rear jounce bumpers	Rear external jounce bumpers	•
Rear rebound bumpers	Rear external reb bumpers	•
Reset Selection Messe	ige Log < Back Next >	Cancel

Driveline Systems

8. In the next page, select *Disk Brakes* and *Two-axle driveline* from the Disc **Brakes** and **Rear driveline** drop-down menus respectively and click *Next*.

🛆 Heavy truck -		×
Select driveline s	systems	Page 8 of 11
Disk Brakes	Disk Brakes	•
Rear driveline	Two-axle driveline	•
Reset Selection Mess	sage Log < Back Next >	Cancel

Note Based on the suspension type selected, the **Rear driveline** options are modified accordingly.

9. For a full truck with advanced driver, you have to select the required driveshaft systems from the **Rear driveshaft** drop-down menu as shown in the image below.

🛆 Heavy truck - RW	D Driveshaft Systems for Full truck with	h driver Model X
Select driveshaf	tsystems	Page 9 of 11
Rear driveshaft	Rear driveshaft 1-piece	•
Auxiliary driveshaft	Secondary driveshaft	•
Reset Selection Mes	age Log < Back Nex	t > Cancel

10. Select the required **Driver system** for the full truck model as shown in the image below.

🛆 Heavy truck - F	ull vehicle Drive	r		x
Select a Drive	r system			Page 10 of 11
Driver system	Altair Driver			•
Reset Selection M	essage Log	< Back	Next >	Cancel

11. Now that you have selected all the required systems for the model, click the *Finish* button to complete the process and exit the custom library wizard.

🛆 Heavy truck - Full vehicle Driver	X
To complete the assembly process and exit the wizard, use the Finish button.	Page 11 of 11
To proceed to the Attachment Wizard, use the Attachments button.	
Reset Selection Message Log < Back Attachments > Finish	Cancel

12. The full truck with driver model is displayed in the MotionView window.

13. The subsystems that you have selected in the Custom library wizard to build the model are displayed in the **Project** browser.

Step 3: Adding Events to the Model.

The following steps outline how to add an event to the previously built model. Currently, sixteen event types are available in the advanced driver models:

- Constant Radius
- Single Lane Change
- Double Lane Change
- Swept Sine
- Straight Line Acceleration
- Straight Line Braking
- Sinusoidal Steering
- BrakeIn Turn
- J Turn
- Throttle off cornering
- Swept Steer
- Pulse Steer
- Throttle off TurnIn
- Step Steer
- Power off In Straight Line
- Altair Driver File

🛆 Altair

Each event type has different options that needs to be addressed. For example, in the following steps **Constant Radius** is explained.

1. Right-click on *Model* in the **Project** browser and select *Add Events* from the context menu.

2. The Add Scripted Driver Task dialog is displayed.

🛆 Add So	ripted Driver Task
Parent	System
Type:	ConstantRadius
Label:	ConstantRadius 0
Variable:	event_0
Note (Liter	al):
	<u> </u>
	•
-	
	OK Apply Cancel

From the Type drop-down menu, select the *Constant Radius* event and click *OK*.
 The Constant Radius event is added in the Project browser.

4. The **Event Editor** is displayed in the panel area.

5. The **Event Editor** window can be invoked by right-clicking on the event type in the **Project** browser and selecting **Event Editor** from the context menu.

 ⊕	Expand All Children	
	Collapse All Children	
	Filter Using Toolbar	
	Show Analyses Only	
	Save	
	Save As	
	Activate	
	Deactivate	
	Rename	F2
	Apply Attachment Candidates	
	Show Shared Instances	
	Separate Definition	
	Add	•
	Delete	Del
	Cut	Ctrl+X
	Paste	Ctrl+V
	Run Event	
	Run All	
	Event Editor	
	Event Menu	•
	Data Summary	
£	💎 Find	Ctrl+F

OR

- You can click on the **Event Editor** button in the panel area.
- 6. Click the *Event Editor* button from the panel area (or from the list).

The Constant Radius event's parameter is displayed.

🛆 Constant Radius (event_0)	X
Parameters Radius [m] : Initial straight [m] : Turn direction : Initial velocity [m/s] : Final velocity [m/s] : Time in circular track [s] : Initial lateral acc [g's] : Final lateral acc [g's] : Look ahead time [s] : Prediction step size : Print interval [s] :	40.0 20.0 Left ▼ 12.0 10.0 0.064 0.367 0.5 0.01 0.05	Radius Initial Straight
Show Driver Output So Output XML File Simulation Settings	ettings Output Options	Run Apply Cancel

- 7. Enter the above information in the **Parameters** section and browse and locate the file path in the **Output XML File**.
- 8. After entering all the required data, the event is ready to run. Click the *Run* button.
 - **Note** An ADF (Altair Driver File) is generated with all the event parameters at the XML file path (**Output XML File**) location. The model is exported and MotionSolve starts to generate the result files.

Hyperworks MotionSolve is invoked in the background.

Solver:	mbd_d.exe			
Input file:	: driver-test.xml		Progress for PID: 7300	
Run comn	nand:/hwsolver.tcl -solver M	MS -screen/driver-test.xi	ml -dir	
Readir Readir Readir	ig 1 event sensors ig 16 marker displa ig 10 user-express	acement requests. ions requests	Find: ^	
Readin INFO: S INFO: U	g 376 graphics Starting SMP run wit Jsersub library [C:)	th up to 4 thread \Program Files\Al	s. tair\2017.0.0.17-raghpMauto_17	
USRMES: INFO: N << ALT#	USER1 No Drag Info found NIR DRIVER :: Check:	ing MotionSolve 1	icense.	
USRMES: INFO: N << ALT# Checkir	USER1 No Drag Info found AIR DRIVER :: Check: Ng out license featu	ing MotionSolve 1 ure 16	icense.	
USRMES: INFO: M << ALTA Checkir	USER1 No Drag Info found AIR DRIVER :: Check: Ng out license featu	ing MotionSolve 1 ure 16	icense. V	

9. After the MotionSolve run is completed, close the window and return to the MotionView interface. The generated file types include: .adf, .plt, and .h3d files.

Step 4: Viewing Reports.

Report templates are a series of pre-defined plots that apply the standard set of plots required for an event. A report template generates all of the plots and properly labels them.

1. Click *Analysis* > *View Reports*.

The **View Reports** wizard is displayed.

2. Select the *Driver Output Report* option from the **View Reports** window and click *OK*.

3. A series of report templates are displayed in the **Plot** browser. You can select the required report template to view in detail.

