

HARA Table

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A HARA Table allows you to define Hazardous Events as a combination of Hazards, Effects and an Accident Scenario. By default, the table shows seven columns. The rest of the columns are hidden, but you can show them if needed.

The screenshot shows a software window titled 'HARA' with a table of hazardous events. The table has the following columns: #, Name, Accident Scenario, Hazard, Vehicle Level Effect, System Level Effect, ASIL, and Safety Goal. Row 3 is highlighted in blue and has an orange arrow pointing to it from a callout box. The callout box contains the text: 'Show the description area to see all information about a Hazardous Event in one place'. Below the table, a detailed view of the selected event is shown, including System Function, Malfunctioning Behavior, Hazard, System Level Effect, Vehicle Level Effect, Safety Goal, ASIL (QM), and a table of conditions (Vehicle Usage, Traffic And People, Location, Road Condition, Environmental Condition).

#	Name	Accident Scenario	Hazard	Vehicle Level Effect	System Level Effect	ASIL	Safety Goal
1	HazardousEvent						
2	Steering Hazard	Potential for vehicle to depart the intended path/lane and collide with oncoming traffic or roadside objects before driver is able to control the situation. If steering produced unintended yaw momentum, could cause loss of control of the vehicle	Unintended Loss of Vehicle Lateral Motion Control Unintended Vehicle Lateral Motion/Unintended Yaw	Vehicle body tilts in wrong direction. Vehicle center of gravity is shifted towards the outside of the curve. High speed collision with another vehicle or object(s)	The steering system provides torque actuation unexpectedly when there is no driver request	D	1 Prevent Unintended Vehicle Lateral Motion
3	Delayed Tilt - Normal driving in curve	Vehicle entering a slight curve at approx. 0 degree vehicle body tilt angle. Low tilt angle is required but provided tilt is delayed.	Degraded Vehicle Stability	Vehicle body does not tilt (at first). Vehicle center of gravity does not move towards the center of the curve.	System tilts vehicle body after it is required	QM	
4	Inverted Tilt - Normal driving in curve	Vehicle entering a slight curve at approx. 0 degree vehicle body tilt angle. Low tilt angle is required but provided tilt is in opposite direction.	Degraded Vehicle Stability	Vehicle body tilts in wrong direction. Vehicle center of gravity is shifted towards the outside of the curve.	System tilts vehicle body in wrong direction.	A	

Delayed Tilt - Normal driving in curve

System Function: Tilt the Vehicle Body

Malfunctioning Behavior: Delayed vehicle body tilt

Guide Word: Late

Hazard: Degraded Vehicle Stability

System Level Effect: System tilts vehicle body after it is required

Vehicle Level Effect: Vehicle body does not tilt (at first). Vehicle center of gravity does not move towards the center of the curve.

Safety Goal:

ASIL QM

C1: Since the curve is minimal, it is relatively easy to maintain vehicle stability. Driver can recognize the lack of immediate vehicle tilt and reduce speed.

E2: Driving at high speed on slightly curvy roads is part of normal driving

S3: Vehicle may hit obstacles at high speed

Vehicle Usage	Traffic And People	Location	Road Condition	Environmental Condition
Normal driving in curve				
Driving at Speed	Traffic Free Flow	Highway City Roads	AnyRoadCondition	AnyEnvironmentalCondition

Filter is not applied. 4 rows are displayed in the table.

An example of a HARA Table.



Creating HARA Table

You can create a HARA Table as described below.

To create a HARA Table

ASIL returns a calculated value according to the specified values of **Exposure**, **Controllability** and **Severity**. If there are more than one values of **Severity**

1. In the Containment tree, select the element that you want to be the owner of the table.
2. Do one of the following:
 - In the main menu, go to **Diagrams > Create Diagram**, then select **HARA Table** in the open dialog.
 - In the Containment tree, right-click the owner of the table and select **Create Diagram > HARA Table** in an open dialog.

Severity	Exposure	Controllability			
		C0	C1	C2	C3
S0	E0	QM	QM	QM	QM
	E1	QM	QM	QM	QM
	E2	QM	QM	QM	QM
	E3	QM	QM	QM	QM
	E4	QM	QM	QM	QM
S1	E0	QM	QM	QM	QM
	E1	QM	QM	QM	QM
	E2	QM	QM	QM	QM
	E3	QM	QM	QM	A
	E4	QM	QM	A	B
S2	E0	QM	QM	QM	QM
	E1	QM	QM	QM	QM
	E2	QM	QM	QM	A
	E3	QM	QM	A	B
	E4	QM	A	B	C
S3	E0	QM	QM	QM	QM
	E1	QM	QM	QM	A
	E2	QM	QM	A	B
	E3	QM	A	B	C
	E4	QM	B	C	D

3. When the table is created, type the name of the table and press Enter.

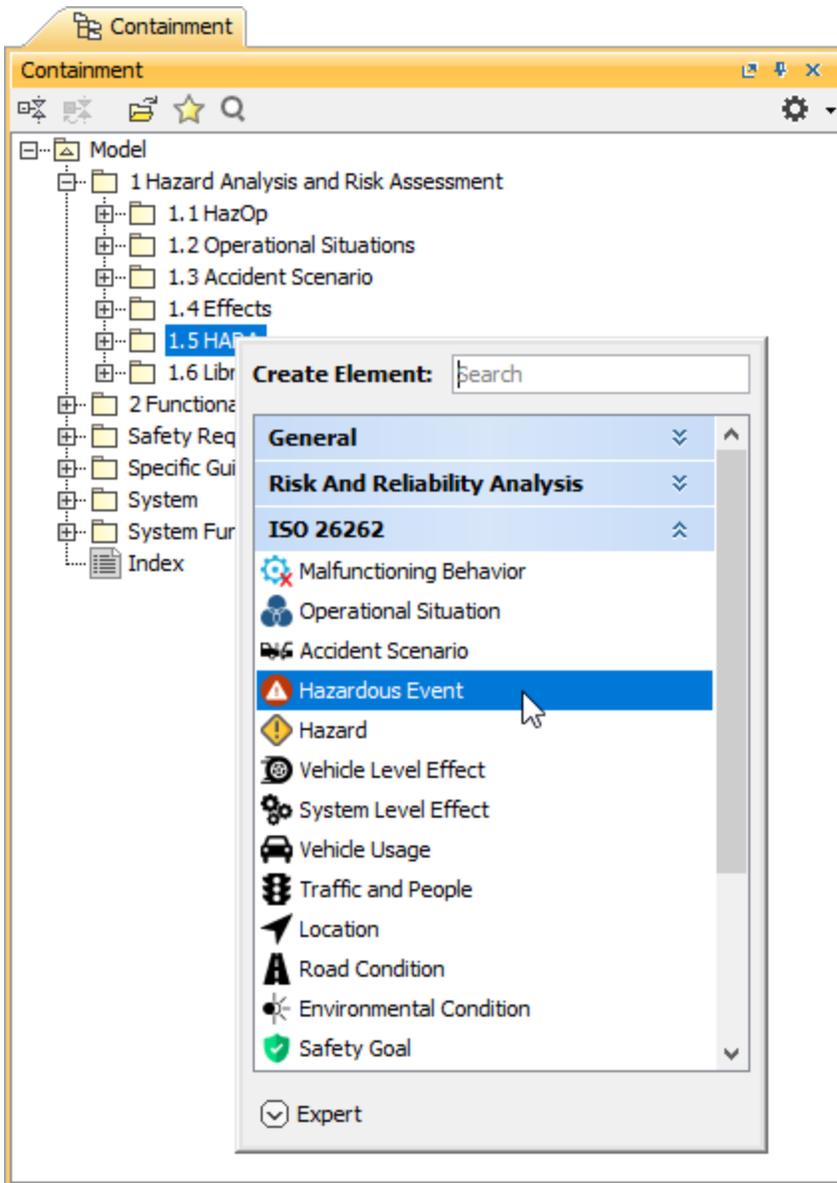
After completing the above steps, a HARA Table is created. The scope and element type of the table are already specified for you.

Creating Hazardous Events

There are two ways to create a Hazardous Event: you can do it right in a HARA Table or in the Containment tree.

To create a Hazardous Event in the Containment tree

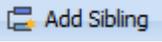
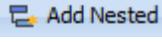
1. In the Containment tree, right-click the owner of a new element and select **Create Element**.
2. In the open window, select **Hazardous Event**.



3. When a Hazardous Event is created, type the name of the element and press Enter.

When you create a Hazardous Event in the model browser, it is automatically added to a HARA Table if it exists.

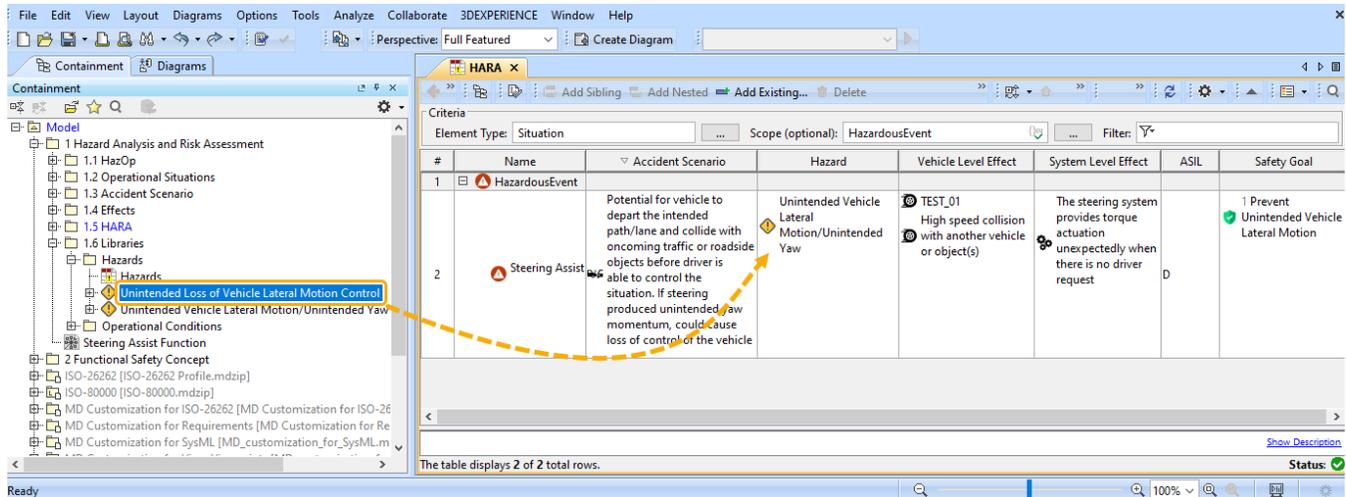
To create a Hazardous Event in a HARA Table

1. In a HARA Table, select a table row.
2. Do one of the following:
 - In the table toolbar, click  **Add Sibling** to create an element of the same level as the one you have selected.
 - In the table toolbar, click  **Add Nested** to create an element nested under the selected element.
3. Type the name of the new element and press Enter.

When you create a Hazardous Event and add it to a HARA Table, you need to define the element as described in the section below.

Defining Hazardous Events

After creating a Hazardous Event, you need to define it by assigning an Accident Scenario, Hazards, and Effects to the element. You also need to create and assign a Safety Goal. The Accident Scenario, Hazards, Effects and Safety Goal also can be dragged from the Containment tree.



Dragging and dropping the Hazard in the HARA Table

To assign an Accident Scenario

1. In a HARA Table, double-click the cell the **Accident Scenario** column and click **...**.
2. On the left side of the **Select Element** dialog, open the **List** tab.
3. Select the Accident Scenario you want to assign.
4. Click **OK**.

Use filters to find elements quicker

After assigning an Accident Scenario to a Hazardous Event, the Automotive Safety Integrity Level (ASIL) is calculated automatically.

Assigning Hazards

1. In a HARA Table, double-click the cell of the **Hazard** column and click **...**.
2. On the left side of the **Select Element** dialog, open the **List** tab.
3. Double-click the Hazards you want to assign. The elements should be added to the selected elements area.
4. Click **OK**.

To assign an Effect

1. In a HARA Table, double-click the cell of the column representing the group of Effects (**Vehicle Level Effects** or **System Level Effects**) you want to assign and click **...**.
2. On the left side of the **Select Element** dialog, open the **List** tab.
3. Double-click the Effects you want to assign. The elements should be added to the selected elements area.
4. Click **OK**.

To create and assign Safety Goal

1. In a HARA Table, double-click the cell of the **Safety Goal** column and click **...**.
2. In the **Select Elements** dialog, enable the **Creation Mode** if it is not enabled yet.
3. In the element tree on the left side of the dialog, select the owner of a Safety Goal and click the **Create** button.

4. When the Specification window of the created element opens, enter the element name and close the Specification window. The element is created and automatically added to the selected elements area on the right side of the **Select Elements** dialog.

In the **Select Elements** dialog, click **Filter by ISO properties** box.

b. In the **Select Properties** dialog, click the **Value** box of a property and select the desired property value from the list.

Select, search for, or create elements

Use the List or Tree view to search for an element. To find the element, type a name in the "Search by Name" box. You can also use wildcards (* ?). Click the magnifying icon to select searching for elements by qualified names, or use camel case.

Select Properties

Select properties and specify values for them. Selected properties will be included into filter query.

Is Applied	Name	Value
ISO 26262 properties		
<input type="checkbox"/>	System Behavior	
<input type="checkbox"/>	Controllability	
<input type="checkbox"/>	Exposure	
<input type="checkbox"/>	Malfunctioning Behavior	
<input type="checkbox"/>	Operational Situation	
<input type="checkbox"/>	Environmental Condition	
<input type="checkbox"/>	Location	
<input type="checkbox"/>	Road Condition	
<input type="checkbox"/>	Traffic And People	
<input type="checkbox"/>	Vehicle Usage	

Search by Name

5 matches found

- E0
- E1
- E2
- E3
- E4

5. Click **OK** to

c. Click **OK**.

Now the **List** tab displays the elements with the selected property value.