EMESRT

Earth Moving Equipment Safety Round Table

EMESRT.ORG



Vehicle Interaction Operational Effectiveness

Learning Module 7:
Navigating the Incident Contributing Erosion Factors Assessment Tool

Working with industry since 2006.

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Introducing EMESRT

EMESRT is a global 'safety by design' initiative established by mining companies to identify and close the functional performance expectations gap between earth moving equipment users and equipment designers.

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1. Initial Insights

The EMESRT Vehicle Interaction Incident Investigation Contributing Factors Assessment tool offers a structured starting point for understanding the loss of operational requirements in an incident, identifying the contributing erosion factors, and determining the relevant causal pathways that may have contributed to the initiation of the unwanted event.

2. Module Purpose

The purpose of this module is to provide a tutorial on navigating and using the incident contributing erosion factors assessment tool and to develop an initial understanding of the incident using the structured incident assessment steps.

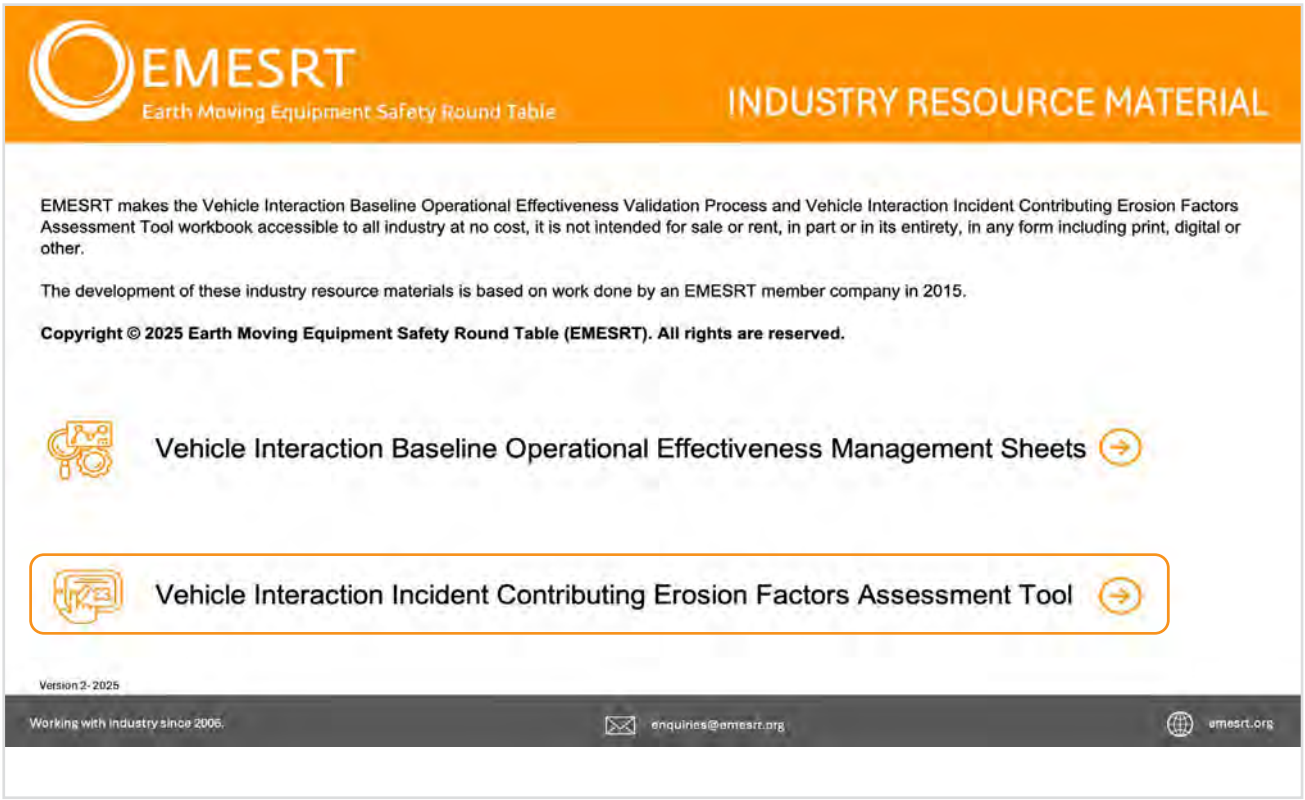


3. The Workbook

The Excel workbook contains two key components:

- Vehicle Interaction Baseline Operational Effectiveness Management Sheets
- Vehicle Interaction Incident Contributing Erosion Factors Assessment Tool

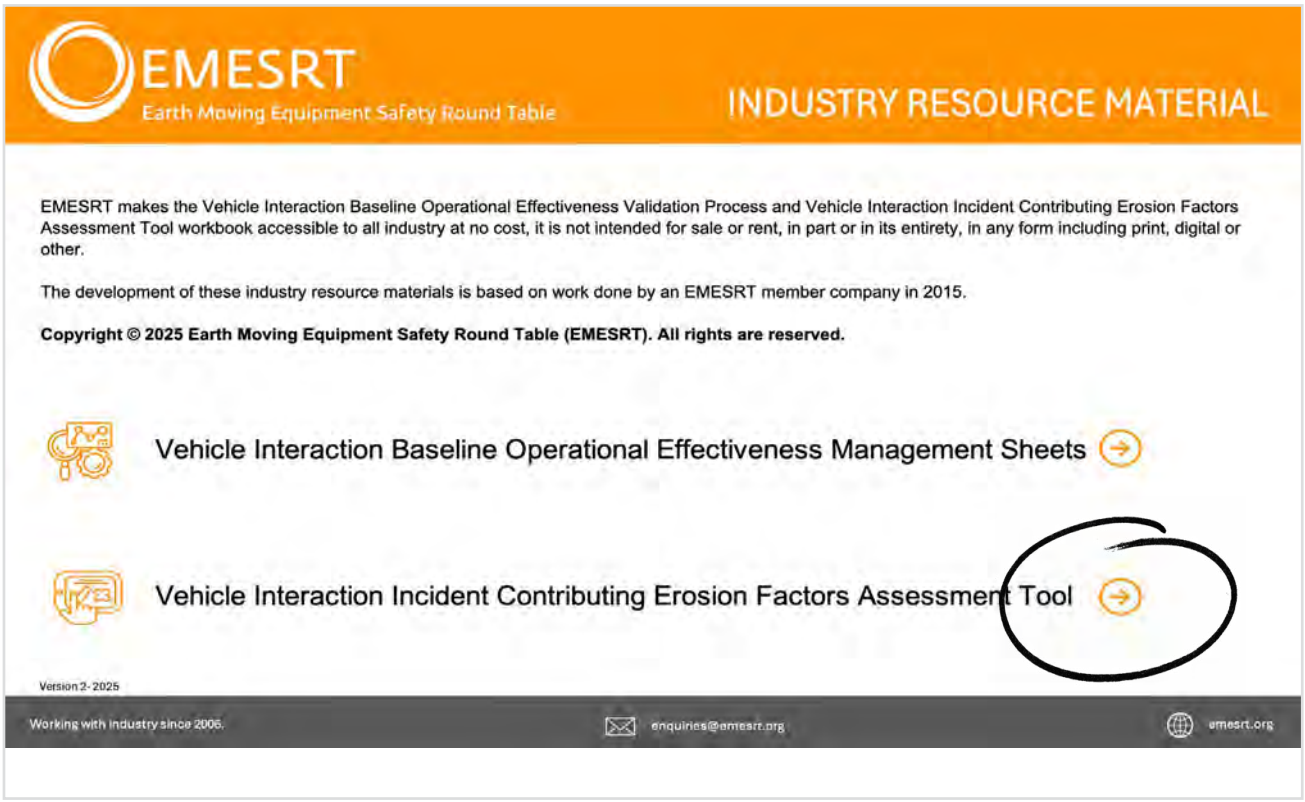
This learning module specifically focuses on the Vehicle Interaction Incident Contributing Erosion Factors Assessment Tool.



Note: To maintain data integrity, it is recommended to keep a master copy of the workbook and use duplicate copies for conducting baseline validation workshops and incident assessments.

4. Getting Started

1. Open the workbook
2. Click the arrow next to the Vehicle Interaction Incident Contributing Erosion Factors Assessment Tool title



5. Operational Requirement Elements

There are 13 Operational Requirements, each is Specifiable, Measurable and Auditable.

Each operational requirement includes:

- Number
- Title
- Classification
- Description
- Objective
- Is this operational requirement relevant to the incident
- Erosion factor incident assessment link

Classification types:

- An Act is a human action, to do something, e.g., operator maintains adequate clearance distances
- An Object is a material thing, an engineering device that works independently of human action, e.g., haul road berm
- And a Technological System is a combination of an act and an object which changes state to provide information for the operator to act on , e.g., a low steering or brake pressure alarm

Home

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EMESRT Vehicle Interaction Incident Contributing Erosion Factors Assessment Tool

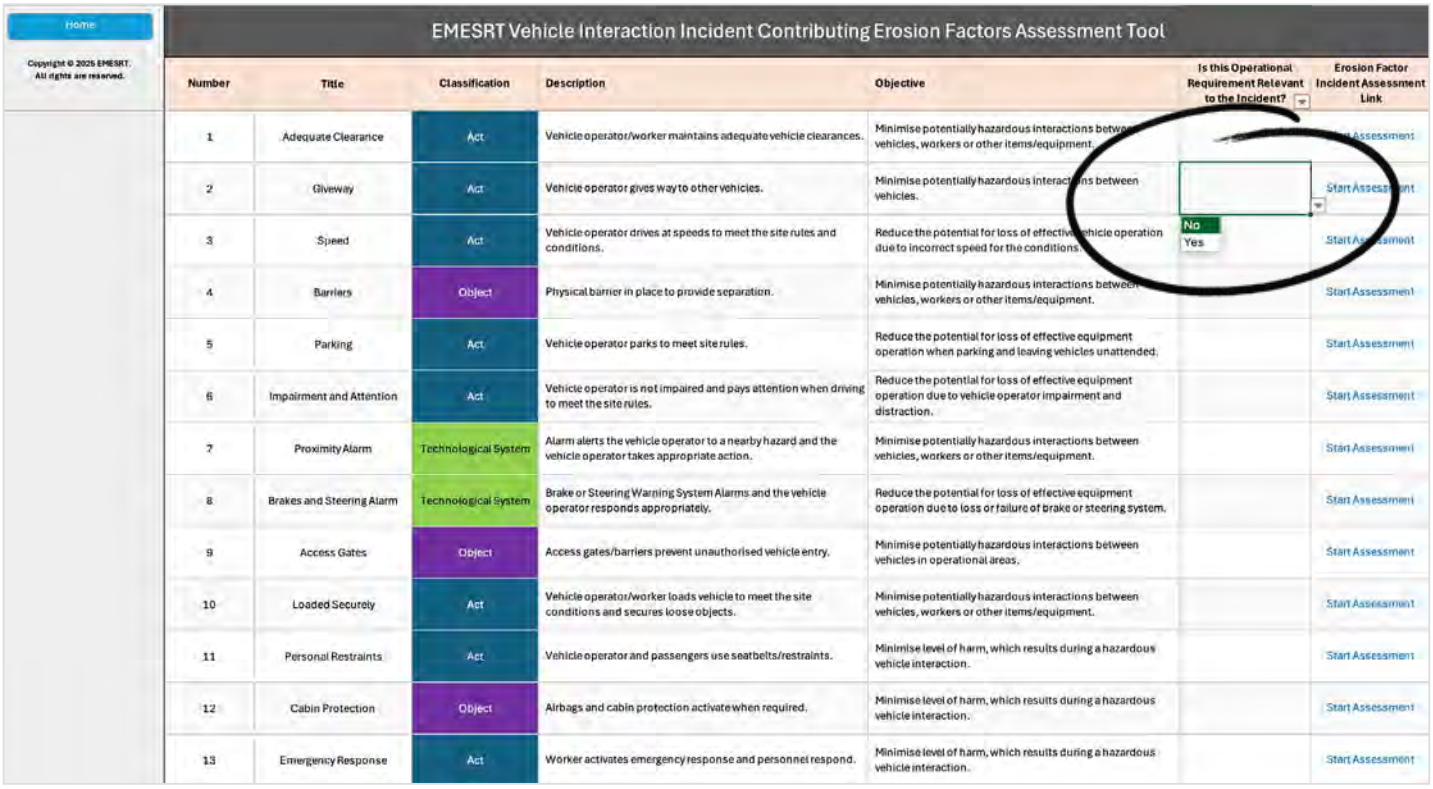
Number	Title	Classification	Description	Objective	Is this Operational Requirement Relevant to the Incident?	Erosion Factor Incident Assessment Link
1	Adequate Clearance	Act	Vehicle operator/worker maintains adequate vehicle clearances.	Minimise potentially hazardous interactions between vehicles, workers or other items/equipment.		Start Assessment
2	Giveway	Act	Vehicle operator gives way to other vehicles.	Minimise potentially hazardous interactions between vehicles.		Start Assessment
3	Speed	Act	Vehicle operator drives at speeds to meet the site rules and conditions.	Reduce the potential for loss of effective vehicle operation due to incorrect speed for the conditions.		Start Assessment
4	Barriers	Object	Physical barrier in place to provide separation.	Minimise potentially hazardous interactions between vehicles, workers or other items/equipment.		Start Assessment
5	Parking	Act	Vehicle operator parks to meet site rules.	Reduce the potential for loss of effective equipment operation when parking and leaving vehicles unattended.		Start Assessment
6	Impairment and Attention	Act	Vehicle operator is not impaired and pays attention when driving to meet the site rules.	Reduce the potential for loss of effective equipment operation due to vehicle operator impairment and distraction.		Start Assessment
7	Proximity Alarm	Technological System	Alarm alerts the vehicle operator to a nearby hazard and the vehicle operator takes appropriate action.	Minimise potentially hazardous interactions between vehicles, workers or other items/equipment.		Start Assessment
8	Brakes and Steering Alarm	Technological System	Brake or Steering Warning System Alarms and the vehicle operator responds appropriately.	Reduce the potential for loss of effective equipment operation due to loss or failure of brake or steering system.		Start Assessment
9	Access Gates	Object	Access gates/barriers prevent unauthorised vehicle entry.	Minimise potentially hazardous interactions between vehicles in operational areas.		Start Assessment
10	Loaded Securely	Act	Vehicle operator/worker loads vehicle to meet the site conditions and secures loose objects.	Minimise potentially hazardous interactions between vehicles, workers or other items/equipment.		Start Assessment
11	Personal Restraints	Act	Vehicle operator and passengers use seatbelts/restraints.	Minimise level of harm, which results during a hazardous vehicle interaction.		Start Assessment
12	Cabin Protection	Object	Airbags and cabin protection activate when required.	Minimise level of harm, which results during a hazardous vehicle interaction.		Start Assessment

6. Assessment process

Review each Operational Requirement, its title, description and objective. This helps understand the context and relevance of each operational requirement to the incident.

In the column labeled Is this Operational Requirement relevant to the incident?, Click the drop -down arrow and select either Yes or No.

Work through all 13 Operational Requirements and select all that are relevant to the incident. For this tutorial, we have selected Give Way and Speed as examples.



Home

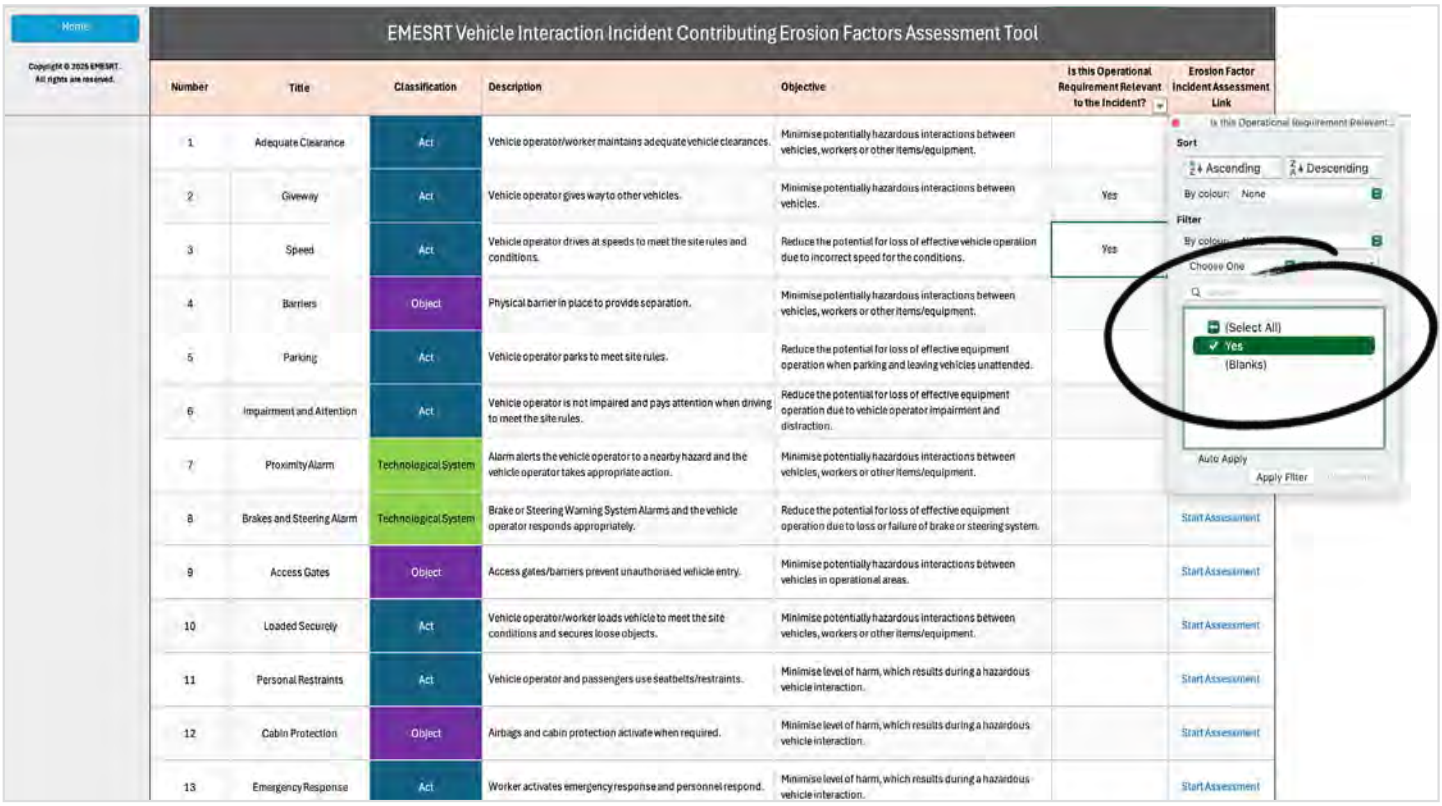
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EMESRT Vehicle Interaction Incident Contributing Erosion Factors Assessment Tool

Number	Title	Classification	Description	Objective	Is this Operational Requirement Relevant to the Incident?	Erosion Factor Incident Assessment Link
1	Adequate Clearance	Act	Vehicle operator/worker maintains adequate vehicle clearances.	Minimise potentially hazardous interactions between vehicles, workers or other items/equipment.		Start Assessment
2	Giveway	Act	Vehicle operator gives way to other vehicles.	Minimise potentially hazardous interactions between vehicles.		Start Assessment
3	Speed	Act	Vehicle operator drives at speeds to meet the site rules and conditions.	Reduce the potential for loss of effective vehicle operation due to incorrect speed for the conditions.	No / Yes	Start Assessment
4	Barriers	Object	Physical barrier in place to provide separation.	Minimise potentially hazardous interactions between vehicles, workers or other items/equipment.		Start Assessment
5	Parking	Act	Vehicle operator parks to meet site rules.	Reduce the potential for loss of effective equipment operation when parking and leaving vehicles unattended.		Start Assessment
6	Impairment and Attention	Act	Vehicle operator is not impaired and pays attention when driving to meet the site rules.	Reduce the potential for loss of effective equipment operation due to vehicle operator impairment and distraction.		Start Assessment
7	Proximity Alarm	Technological System	Alarm alerts the vehicle operator to a nearby hazard and the vehicle operator takes appropriate action.	Minimise potentially hazardous interactions between vehicles, workers or other items/equipment.		Start Assessment
8	Brakes and Steering Alarm	Technological System	Brake or Steering Warning System Alarms and the vehicle operator responds appropriately.	Reduce the potential for loss of effective equipment operation due to loss or failure of brake or steering system.		Start Assessment
9	Access Gates	Object	Access gates/barriers prevent unauthorised vehicle entry.	Minimise potentially hazardous interactions between vehicles in operational areas.		Start Assessment
10	Loaded Securely	Act	Vehicle operator/worker loads vehicle to meet the site conditions and secures loose objects.	Minimise potentially hazardous interactions between vehicles, workers or other items/equipment.		Start Assessment
11	Personal Restraints	Act	Vehicle operator and passengers use seatbelts/restraints.	Minimise level of harm, which results during a hazardous vehicle interaction.		Start Assessment
12	Cabin Protection	Object	Airbags and cabin protection activate when required.	Minimise level of harm, which results during a hazardous vehicle interaction.		Start Assessment
13	Emergency Response	Act	Worker activates emergency response and personnel respond.	Minimise level of harm, which results during a hazardous vehicle interaction.		Start Assessment

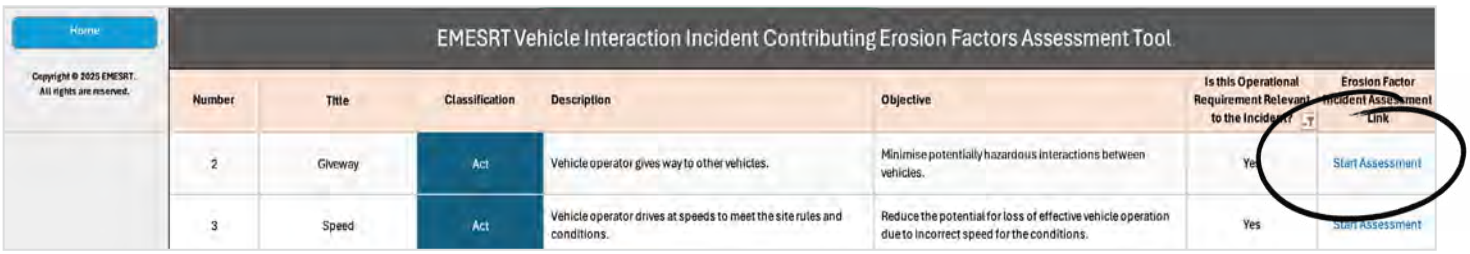
6. Assessment process *cont...*

To focus on these, use the filter option to display only the operational requirements marked as relevant by selecting Yes in the filter option, an click the Apply Filter button.



This provides a clear visual of the requirements relevant to the incident.

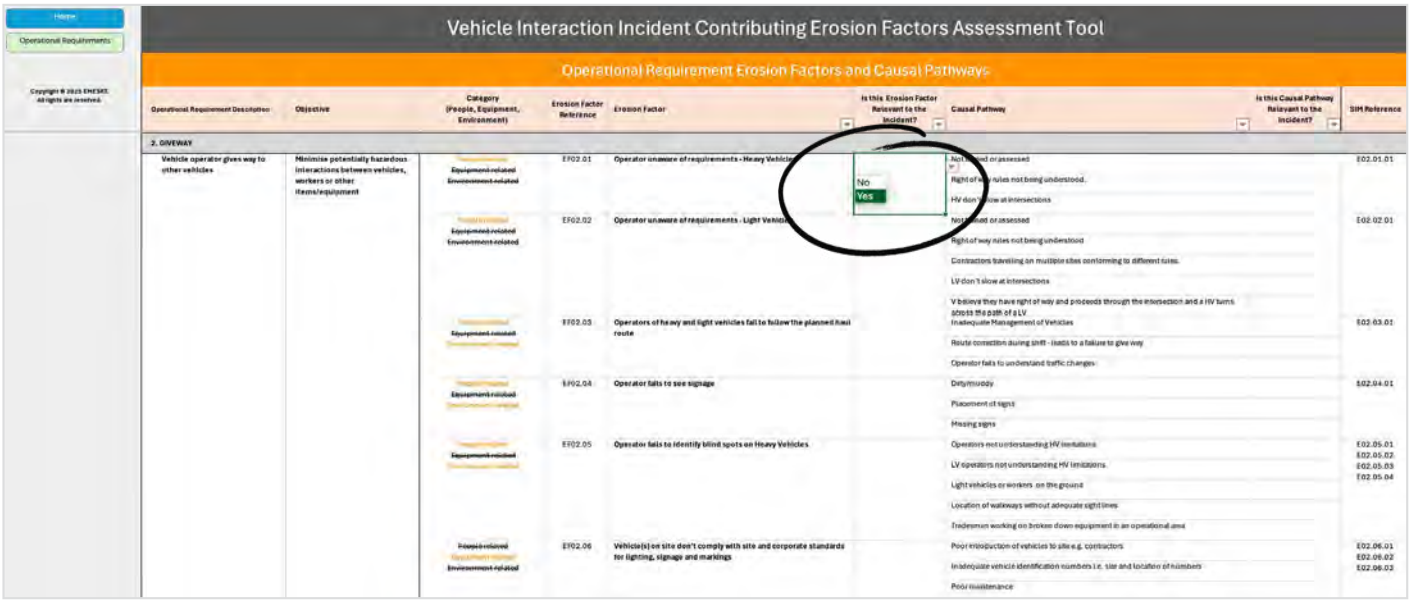
Next, click the Start Assessment link.



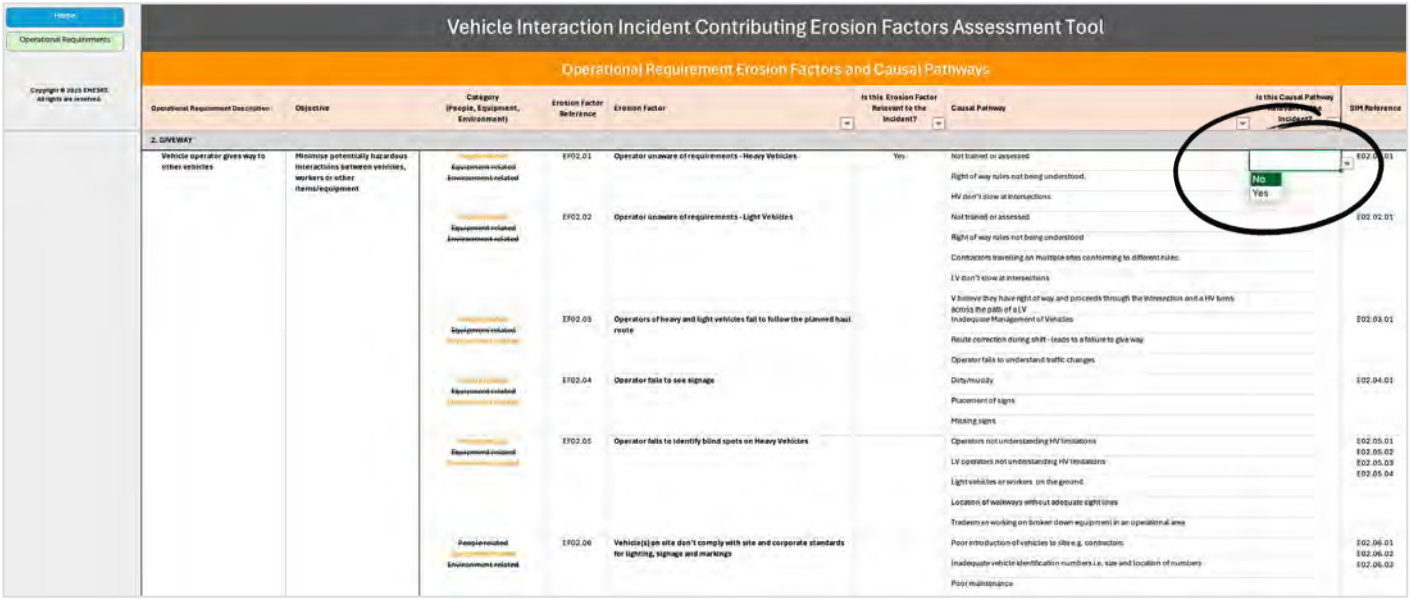
6. Assessment process *cont...*

The Start Assessment link will take you to the Erosion Factors associated with the selected operational requirements.

Go through each Erosion Factor and select those that are relevant to the incident by clicking the drop-down arrow and selecting Yes.

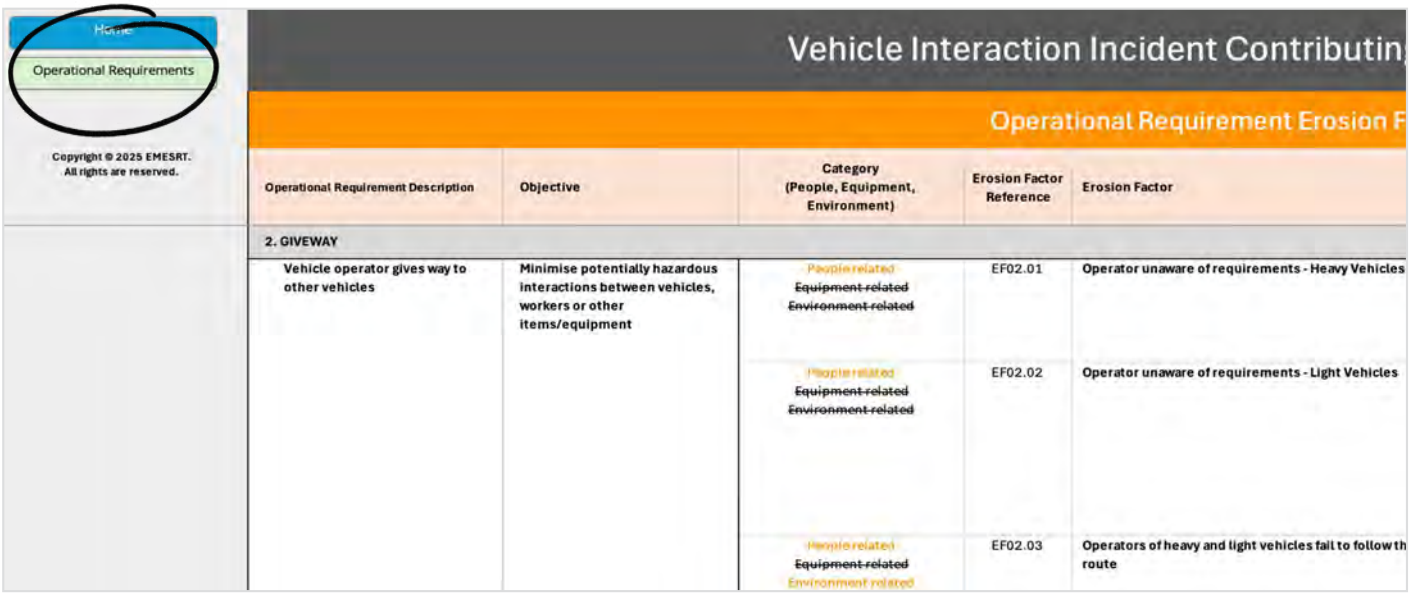


For each Erosion Factor, review the list of Causal Pathways and select all that apply.

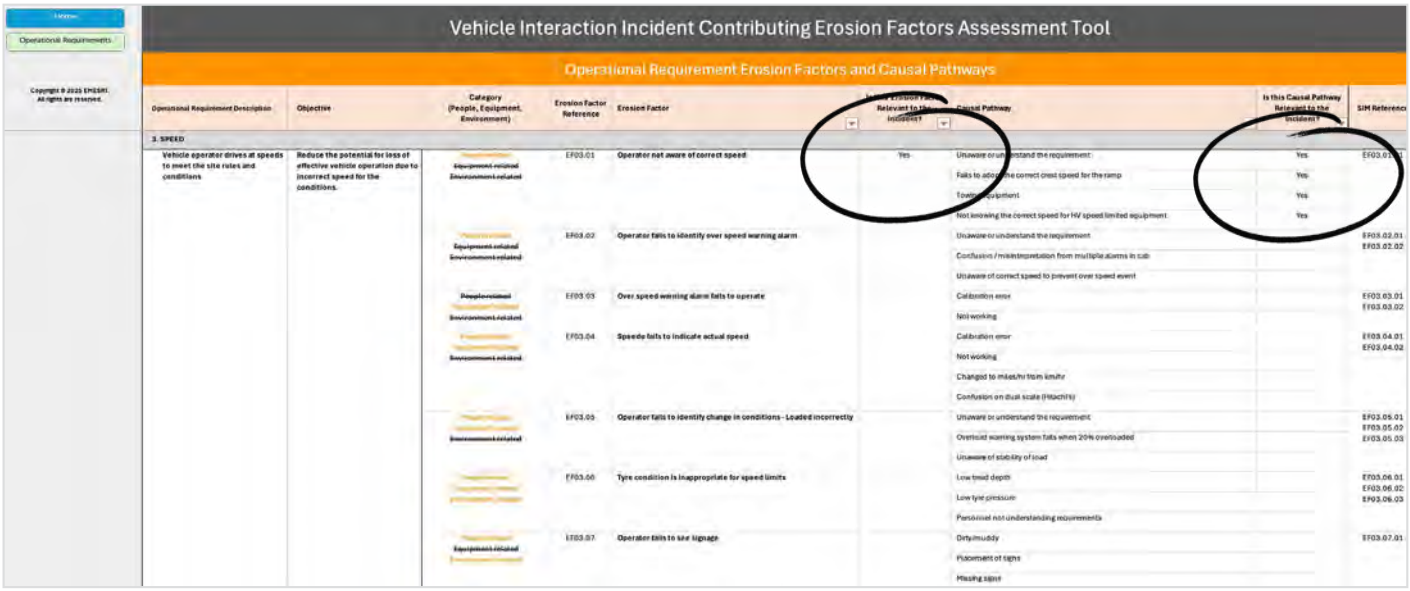


6. Assessment process *cont...*

Once you have completed this step, click on the Operational Requirements tab located in the main menu on the left-hand side of the screen.



Repeat the same process for the next operational requirement selected by reviewing erosion factors and selecting the relevant causal pathways.

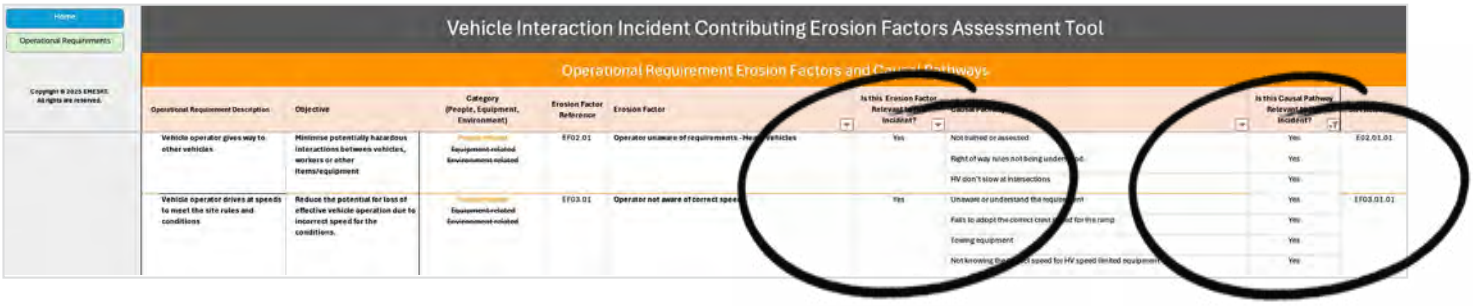


6. Assessment process *cont...*

After all of the operational requirements assessments have been completed, use the filter option to display only the Causal Pathways marked as relevant to the incident by clicking the drop-down arrow and selecting Yes.



This provides a visual overview of the Erosion and Causal Pathways selected as contributing to the unwanted incident.



6. Assessment process *cont...*

To take a deeper dive into the Erosion Factors review the Baseline Operational Effectiveness Validation Process Management Sheets available on the Home screen in the workbook.

Keep in mind that a single Erosion Factor may apply to multiple Operational Requirements so you only need to review each erosion factor once.



7. Vehicle Interaction Improvement Body of Knowledge

This module is part of a broader learning pathway.

Additional modules, and related industry resources, are available through the Vehicle Interaction Improvement Body of Knowledge on the EMESRT website - emesrt.org.

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