Wolters Kluwer

Enablon

IncidentXP Software Manual

For IncidentXP 12.0 | Revision 32(22-January -2026)

Please note that this documentation is preliminary and subject to change without notice. The latest version of this document can be obtained via Enablon Wolters Kluwer or via an IncidentXP Value Added Reseller.

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1
INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

The purpose of this software manual is to provide an explanation of the IncidentXP software tool, which supports the Tripod Beta technique for incident analysis. It assumes basic familiarity with accident and incident investigation methods.

For Tripod: Familiarity, or preferably being an accredited Tripod professional, along with this manual, should be enough to get you going with the software.

For BFA & RCA: This manual should be sufficient for experienced investigators to use the software successfully.

1.2 STRUCTURE OF THIS DOCUMENT

1. Step by step guides to get you started:
   - Chapter 2, Quick installation guide: This guide quickly describes how to install and activate IncidentXP on your computer.
   - Chapter 3,
     Quick getting started guide: This guide briefly discusses how to work through an incident analysis. The configuration of timeline diagrams is also discussed in this chapter.

2. The four incident analysis methodologies available in IncidentXP:
   - Chapter 4, The Tripod Beta method.
   - Chapter 5,
     The Barrier Failure Analysis (BFA) method.
   - Chapter 6, The Root Cause Analysis (RCA) method.

3. Recommendations and feedback to bowtie risk assessment:
   - Chapter 8, Actions / recommendations.
   - Chapter 9, Linking incidents with bowtie.

4. Advanced functionality; Display settings, document links, export of data and bowtie methodology description:
   - Chapter 10,
     Configuring the diagram.
   - Chapter 11, Case file tools.
   - Chapter 12,
     Linking to documentation.
   - Chapter 13, Getting data out of the program.
   - Chapter 14,
     A brief description of a subset of bowtie methodology.

5. Support options:
   - Chapter 15,
     Support.

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2
QUICK INSTALLATION GUIDE

2.1 INTRODUCTION

Installing IncidentXP onto your computer is very simple. If, however, you run into trouble and need more detailed information about the installation procedure or the software prerequisites and compatibility, then this information is available in the full BowTieXP software manual.

Note: BowTieXP and IncidentXP are licensed modules within the same software application. Your license key will determine which module you will be able to access:

- IncidentXP,
- BowTieXP
- or both.

This is the reason why you will download the IncidentXP software from the BowTieXP downloads site.

2.2 INSTALLING INCIDENTXP

Note: IncidentXP can run on Windows 7 and newer. IncidentXP requires the .NET framework v4.7 or v4.8 to be installed. If you run BowTieXP and the .NET framework is too old, it BowTieXP tell you so. You can then download and install it:

https://dotnet.microsoft.com/download/dotnet-framework/thank-you/net48-web-installer

Note that Windows 10 Creators Update (1703) and later come with a new enough version of the framework already installed out of the box.

Open an internet browser and navigate to: https://www.bowtiexp.com/downloads/bowtiexp/
Download and run the BowTieXP installer (.msi).

2.3 ACTIVATING INCIDENTXP

When you start IncidentXP for the first time, you are asked for either a trial code or an activation code:

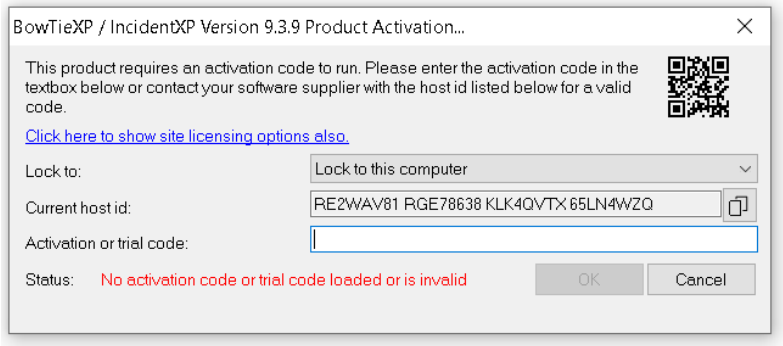

Figure 1 - Activation dialog

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If you have a valid trial code, you can enter it in the activation or trial code text box, and IncidentXP will run.

If you have purchased IncidentXP, you will need to obtain an activation code to perpetually activate IncidentXP. Please copy the code shown in the current host ID text box and paste it into to Enablon Wolters Kluwer support via ECP. We will then send you an activation code. After entering this code in the activation or trial code text box, the current version of IncidentXP will run on your desktop/laptop forever.

2.3.1 Activating with an old host-id

Sometimes, due to the use of a different laptop docking station, a switch in a Windows version, or changes in the computer hardware, it can happen that your host ID changes. If that happens, your activation code will no longer match with the host ID. If this happens, you will have to activate the software based on the original host-ID (the original host-ID that was used when creating the activation code, so the one you sent to the Enablon Wolters Kluwer support staff).

To do so, select the “Lock to this computer with an old host id” option from the “Lock to” drop-down menu in the Product Activation screen (see Figure 2). The screen will then display a field for the current, as well as the activated host-id (see Figure 3).

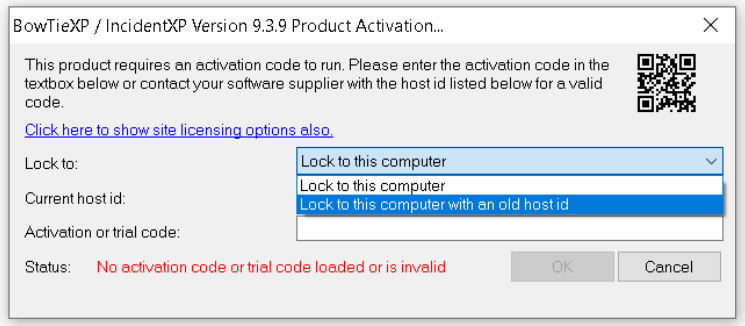

Figure 2 - Activate with original host id

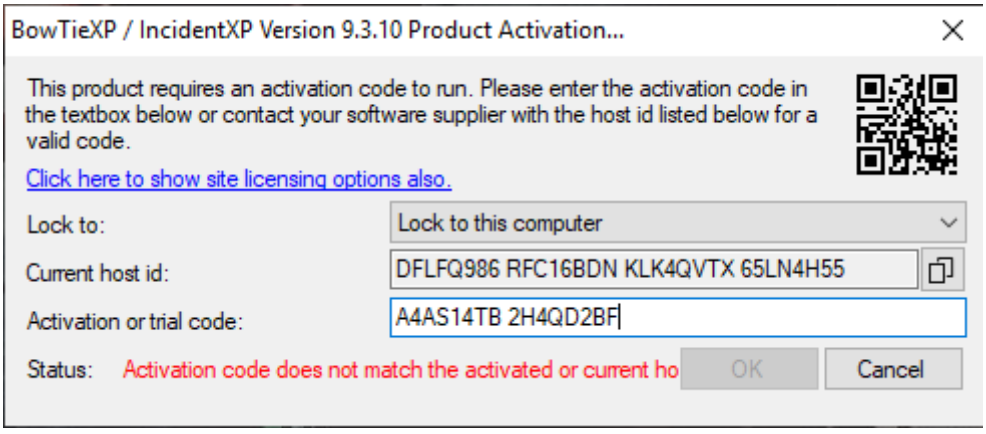

Figure 3 – Host id and activation code do not match anymore

We do not need to send you a new code. You just need to tell it the host id which belongs to the activation code. You can do this by copy/pasting the old host id which was used to generate the activation code into the “Activated host id” field. The host id that was used to generate the activation code is always included in the same email as the activation code, usually in a bit of text that looks like Figure 4:

```
Code Type:   BowTie Host Locked Code
Host ID:     RE2WAV81 RGE78638 KLK4QVTX 65LN4WZQ ←
Code:        A4AS14TB 2H4QD2BF
Features:    IncidentXP BSCAT Tripod Beta BFA TOP-SET RCA
Expiry:      None
```

Figure 4 - Activation code email message

The host-id that was used to generate the activation code is the one pointed out by the arrow in Figure 4. When this host-id is copied into the "Activated host id' field, the software will pick it up and then match it to the activation code. This should result in an accepted code, returning the status "OK". Now click the OK button, and the software should be activated once more.

Please note that IncidentXP will check what has changed on your computer. If too many parts have changed, or you are trying this on a different computer, the code will still not work, and you will need to contact us for an updated code.

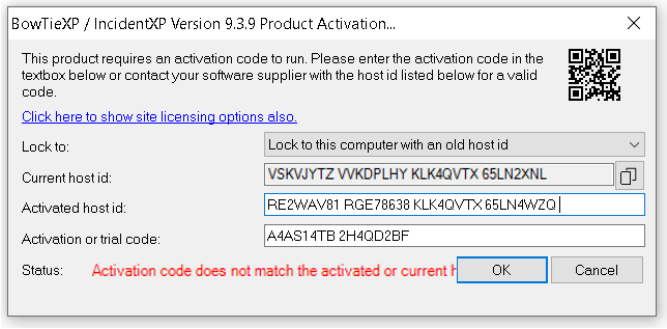

Figure 5 – Changed host-id

3
QUICK GETTING STARTED GUIDE

3.1 THE INCIDENTXP SCREEN

After starting IncidentXP, the following screen will appear:

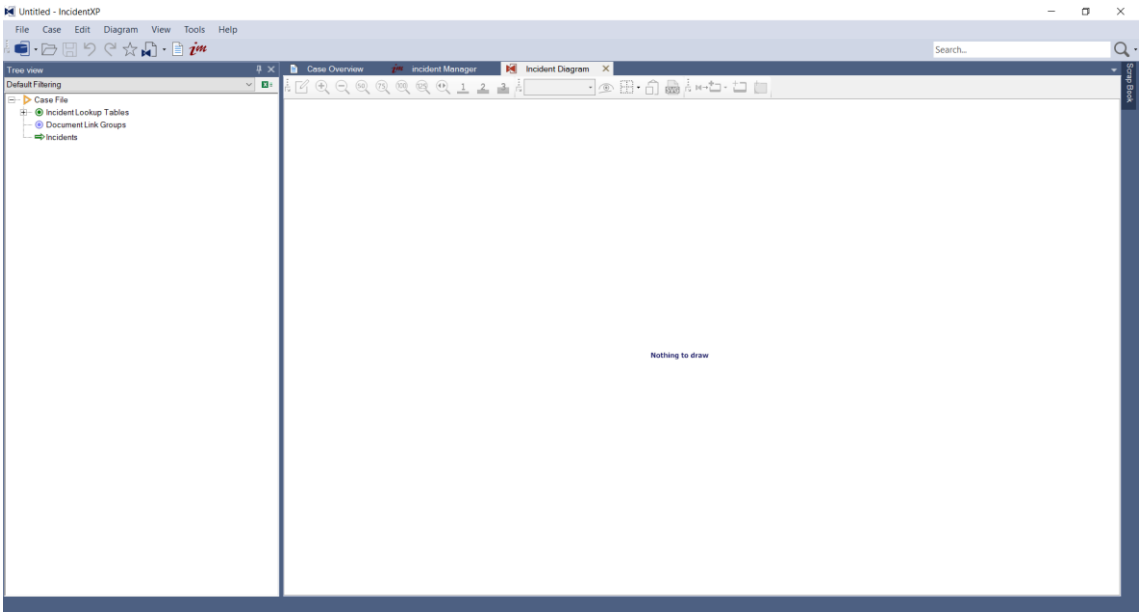

Figure 6 - Main application screen

This screen consists of several parts that you will need to familiarize yourself with before you will be able to start building analysis diagrams.

Along the top we find the menu bar and the main toolbar.

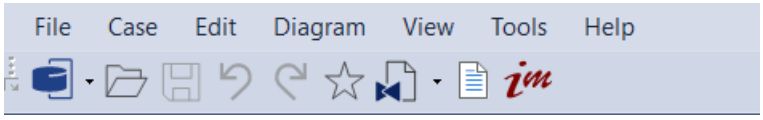

Figure 7 - Menu bar & main toolbar

Below those we have the diagram and the treeview.

3.1.1 The diagram

The biggest portion of the screen is taken up by the diagram.

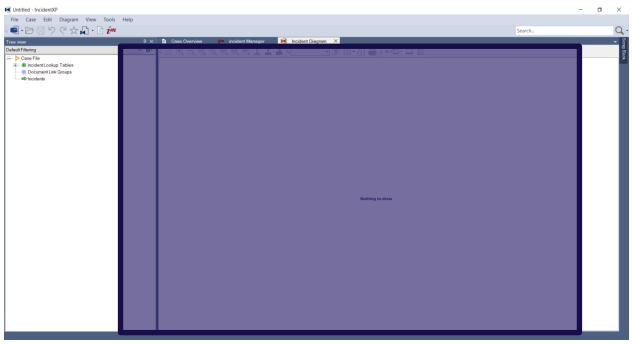

Figure 8 - Diagram window

The diagram window is where the visual portion of your diagram will take shape, think of the diagram window as your drawing board.

The diagram can show the timeline of an incident, the incident analysis diagram, or both. The analysis diagram can be either a Tripod, BFA or RCA diagram. When you start the software and no Incidents have been created yet, the diagram window will either show you the Case Overview, the Incident Manager, or an empty Incident Diagram sheet.

3.1.2 The treeview

The treeview is normally located on the left-hand side of the screen. This can be adjusted according to your preferences. The treeview displays all the information present in your case file and helps you navigate through your case file. Think of the treeview as your case file manager.

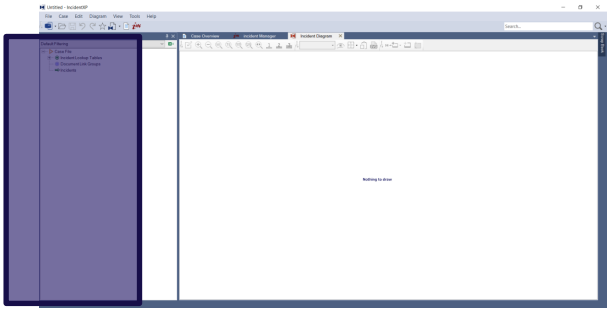

Figure 9 - Treeview window

Through this window you have access to all information in your file, such as the incidents itself, but also reference information such as

- The incident categorizations such as types and tiers (see Incident Lookup Tables),
- Other reference information such as document links and
- Method-specific reference information such Tripod BRF lists (also Incident Lookup Tables).

3.1.3 The editor

In an editor window you can submit and edit all written content within your case file.

When you want to add a new item, you enter the item's details into this window. When you want to change an item, you also have to do it in this window.

By double clicking items in the treeview or in your diagram window, the editor window will appear which allows you to edit the various fields and reference data of an item.

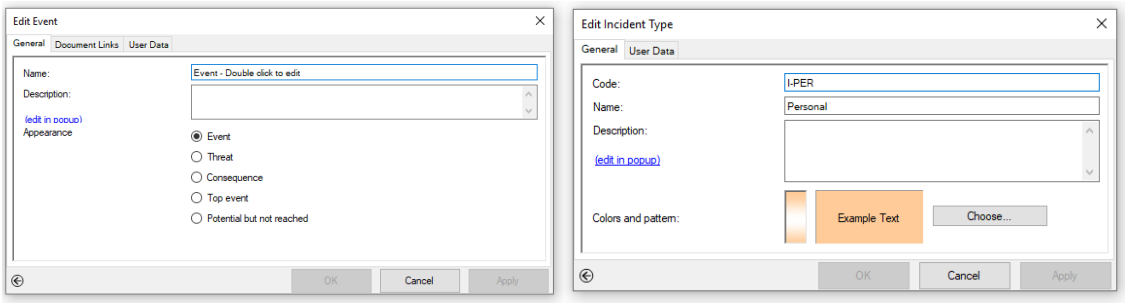

Figure 10 - Edit windows for an event item or tree view item

Along the top we have different tabs. The leftmost one is called 'General' and this is where we have all the basic data which is available for an item. In these examples, we are looking at items that have, amongst other properties, a name, and a description.

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The next tab is called ‘User Data’ and it is where you can define your own fields, if so required. Please see the BowTieXP software manual for more information regarding this tab.

The tab ‘Document Links’ will be discussed in chapter 12
Linking to documentation.

Some tips if you get lost:

Pressing F2 allows you to edit the name of the selected item.
Pressing F4 will bring up the editor window for the selected item.

If you can’t find your diagram, you either have not selected an incident, or you have selected a different tab such as the case overview tab instead of the diagram tab.

3.1.4 Add and remove buttons

The software allows you to remove buttons from the diagram toolbar and only display the buttons you frequently use. In the original software settings, some buttons will be hidden by default.

You can remove (hide) or add buttons from/to the diagram toolbar by clicking on the three tiny buttons with three small dots and an arrow on it.

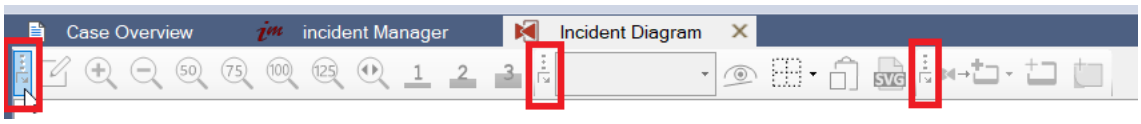

Figure 11 - Add or remove buttons from the toolbar (1/2)

Check the toolbar buttons that you want to visualize in the toolbar and uncheck the buttons that should be hidden.

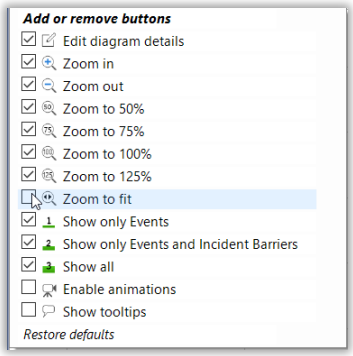

Figure 12 - Add or remove buttons from the toolbar (2/2)

3.2 CREATING AN INCIDENT & INCIDENT ANALYSIS DIAGRAM

When you start IncidentXP, the software automatically creates a blank file for you.

Note: The way IncidentXP works with files is very similar to how you open and save files in Microsoft Word. Similarly, you can attach your case files to your e-mail messages, transfer them to an USB stick, etc.

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To create a new incident in the software, right-click the incidents node in the treeview and subsequently select 'New Incident'. The editor will pop up allowing you to specify the name, date, incident type, category, and tier. In this window you should also decide which analysis method you want to use.

> Note: Depending on which methods are activated/licensed in the software, you will be offered a choice of method. If only one method is activated, that method is automatically selected.

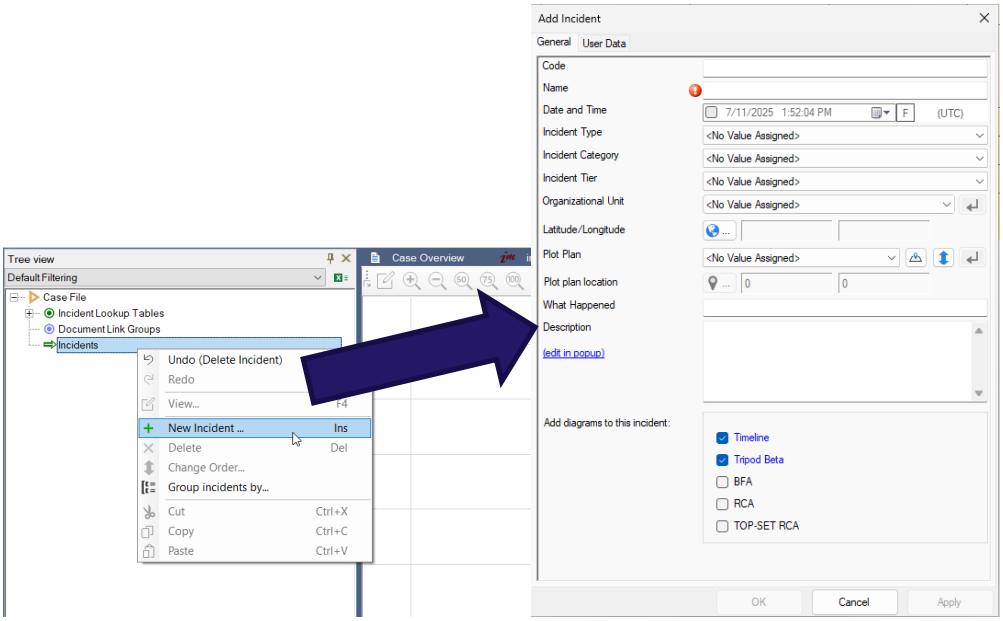

Figure 13 - Adding a new incident diagram in the treeview

After creating the new incident, the treeview presents us one or multiple empty diagrams underneath the incident node. These diagrams can be either incident analysis diagrams or timeline diagrams.

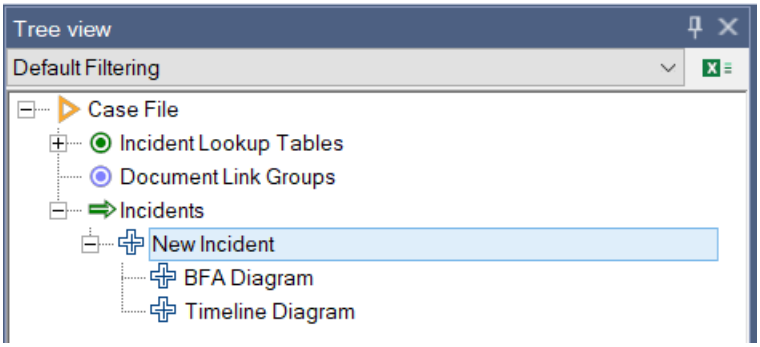

Figure 14 - An incident node which contains a Timeline diagram and BFA Diagram

In chapter 3 we will explain how to create the timeline, and thereafter in separate chapters discuss creation of, Tripod Beta diagrams, BFA diagrams, and RCA diagrams.

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3.3 THE INCIDENT MANAGER

Incident investigation can be chaotic at times, with different steps involved that are often being attended to interchangeably. The Incident Manager helps to guide you through the steps of incident investigation, providing you a more structured approach. From top to bottom there are 6 tabs present within the Incident Manager: Details, Investigation, Analysis, Recommendations, Attachments and Report. We believe these 6 tabs are best followed in this proposed order; however, the software allows you to switch back and forth as you see fit.

You can open the Incident Manager by going to 'View > Windows > Incident Manager', or use the hotkey Ctrl + Shift + J. Alternatively, if it has already been activated before, you can click on 'incident manager' in your diagram tabs, as illustrated in Figure 15 by the red circle.

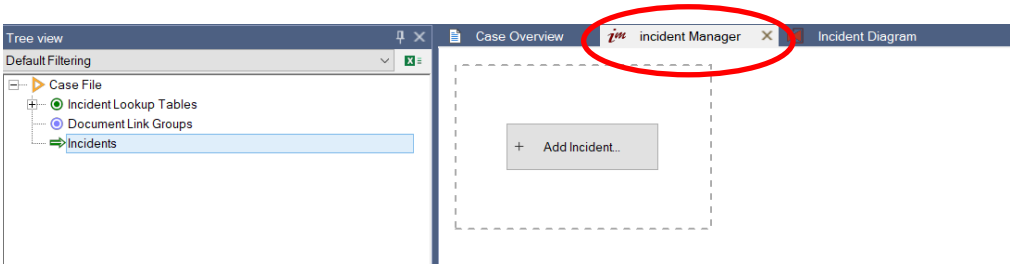

Figure 15 – The start screen of the Incident Manager

Once you've built multiple incidents, the start screen of your Incident Manager will look different. It will contain an overview of all the incidents within your case file, displayed as tiles. Clicking on one will directly take you to that particular incident.

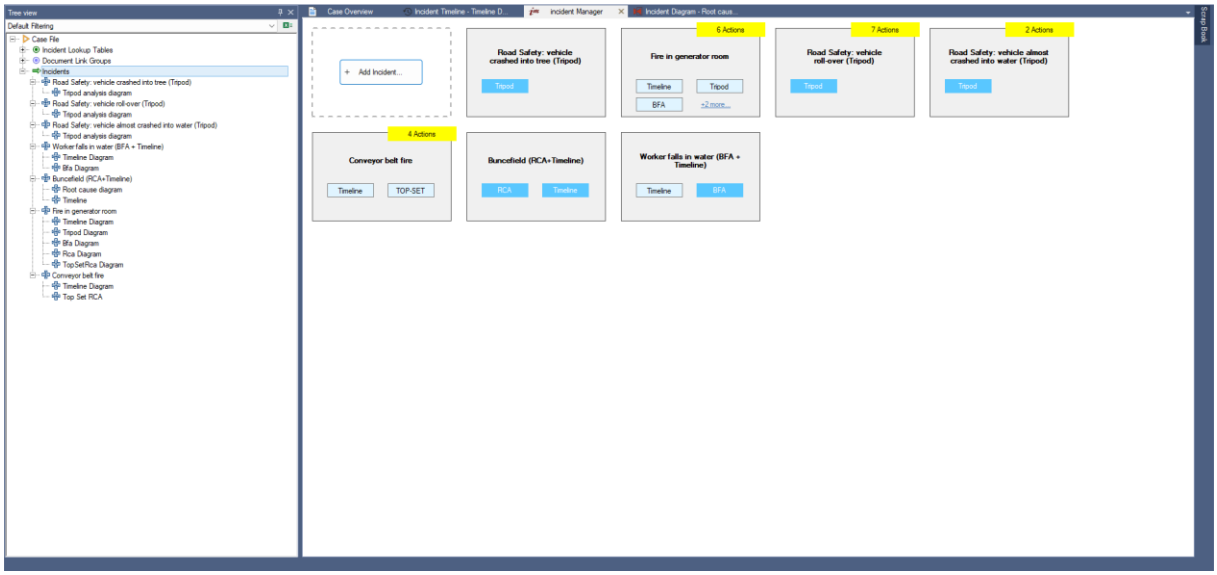

Figure 16 – The start screen of the Incident Manager holding multiple incidents

As an alternative way to create an incident you can click on 'Add Incident' within the Incident Manager to create a new incident. In this example, we used 'Conveyer belt fire' as a fictional incident taken from our test file. After creating a new incident and filling in its basic details, your screen will look like this:

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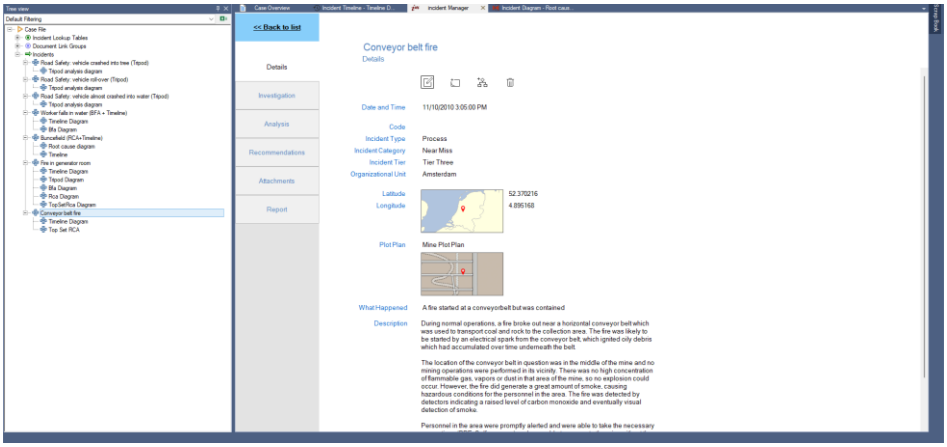

Figure 17 – The Details tab of the Incident Manager

3.3.1 Walking through the 6 tabs of the Incident Manager

The Incident Manager consists of 6 tabs, which can be walked through in any order:

- Details
- Investigation
- Analysis
- Recommendations
- Attachments
- Report

Details

The 'Details' tab gives you an overview of the information you have entered when creating a new incident (see Figure 18).

There are 4 grey buttons near the top of this page as shown in the image below.

Figure 19 – The 4 buttons of the Details tab of the Incident Manager

The first button will open the 'Edit Incident windows' and allows you to change the details of the incident. The second button allows you to add new actions, which can be viewed under 'Recommendations'. The third button allows you to add a new incident diagram. The fourth button completely deletes the incident from your case file. It will give you a warning before being able to delete an incident. Moreover, you can undo it using the undo button (or Ctrl + Z).

Investigation

The 'Investigation' tab contains a reference to your timeline diagram. See chapter 3.4 'Creating a timeline' for more information on the timeline. Left click on 'Timeline Diagram' to go to the timeline diagram.

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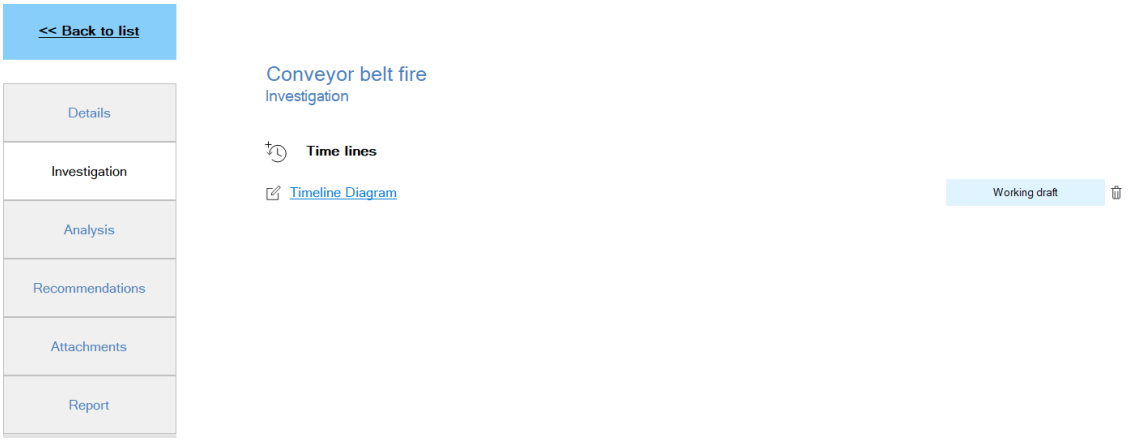

Figure 20 – The Investigation tab of the Incident Manager

Note that there is an add new timeline diagram button on this page as well.

Figure 2021 - Add new timeline diagram

Analysis

The analysis tab gives an overview of all the analysis diagrams you have of an incident. Left clicking on, for example, 'Top Set RCA' (or one of the other incident techniques), will take you to that respective incident diagram.

Note that there is an add new incident diagram button on this page as well.

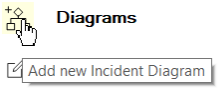

Figure 22 - Add new incident diagram

It is also possible to click on the pen on paper icon to change the original name of the incident and set its status to 'Completed'.

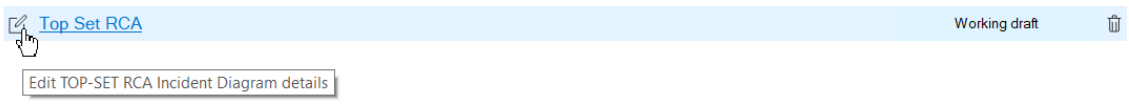

Figure 22 - Edit incident diagram details

For more information on the different incident analysis techniques, please see chapter **Error! Reference source not found.**, 4, 5, 6, or 7.

Recommendations

The ‘Recommendations’ tab gives an overview of all the actions concerned with the incident; completed as well as not completed. This list shows you both actions that belong to an Incident Diagram/Timeline shape as well as actions that do not belong to any specific element, but are instead related to the overall incident, diagram or timeline. The column “Belongs to” gives you this information. In this example, we have one action related to a diagram shape called ‘Eroded wiring, while the other 3 actions are not related to any shape. Clicking on the shape in the ‘Belongs to’ column, will take you directly to that specific element in the incident/timeline diagram.

Additionally, there are three buttons on this page (as shown in red). The first button lets you add additional general actions, i.e. actions that are not related to any shape of the incident/timeline diagram. The second button allows you to export your action list to Excel. The third button only shows up if you select an action and allows you to delete the selected action.

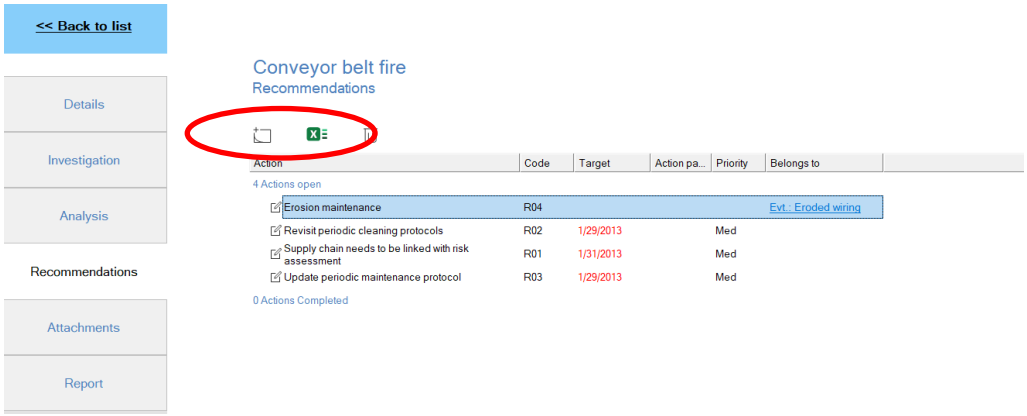

Figure 23 – The Recommendations tab of the Incident Manager

For more information on ‘Recommendations’, please see chapter 8.

Attachments

The ‘Attachments’ tab gives an overview of all the documents attached to this incident. For example, it is possible to add picture evidence, interview reports, building blueprints etc. The software allows for almost any type of file to be attached, from .jpeg to .pdf. ‘Attachments’ differs from ‘Document Links’: Be careful not to attach too many large documents, as this will add to the file size of your bowtie file. Clicking on the paper with paperclip button will allow
you to add attachments.

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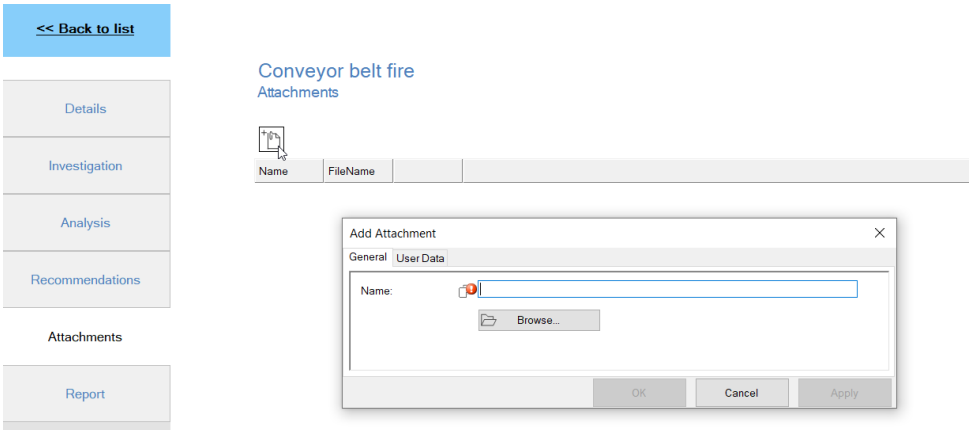

Figure 24 – The Attachments tab of the Incident Manager

Report

The 'Report' tab gives an overview of the reports of an incident. There are 5 buttons on this page (as shown in red).

Figure 25 – The Report tab of the Incident Manager

The first button will allow you to choose a template for your report. You can choose between the built-in template (see Figure 26) or a custom made one. The first page of the built-in template can be seen in
Figure 27. Templates use predefined tags that draw their information from IncidentXP to automatically fill in a report. For more information on how this works see chapter 13.2.2.

The second button creates a report based on the template we defined using the first button. Left click it to save it on your computer, and it will automatically open a word document. The third button uploads existing documents. For example, you can link the report you just made using the first two buttons. The fourth button refreshes the report that was saved on the computer. This is to ensure that the linked report you made using the third button can be updated when you have updated your existing incident analysis in IncidentXP.

The fifth button only shows up if you've selected a report and allows you to unlink the selected report, so you will not be able to see it in the reports list for updating. Note: There will be no warning nor can this be recovered by clicking "Undo" or Ctrl + Z.

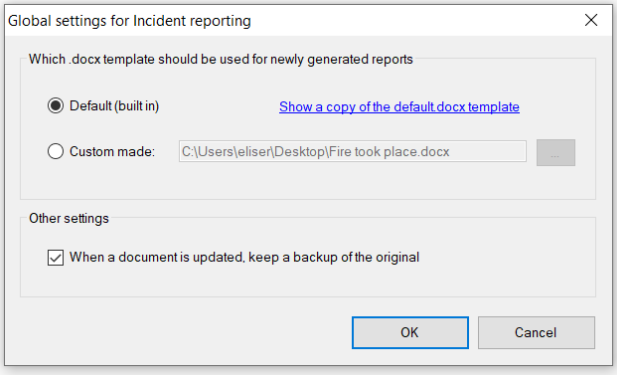

Figure 26 – Choosing what report template to use

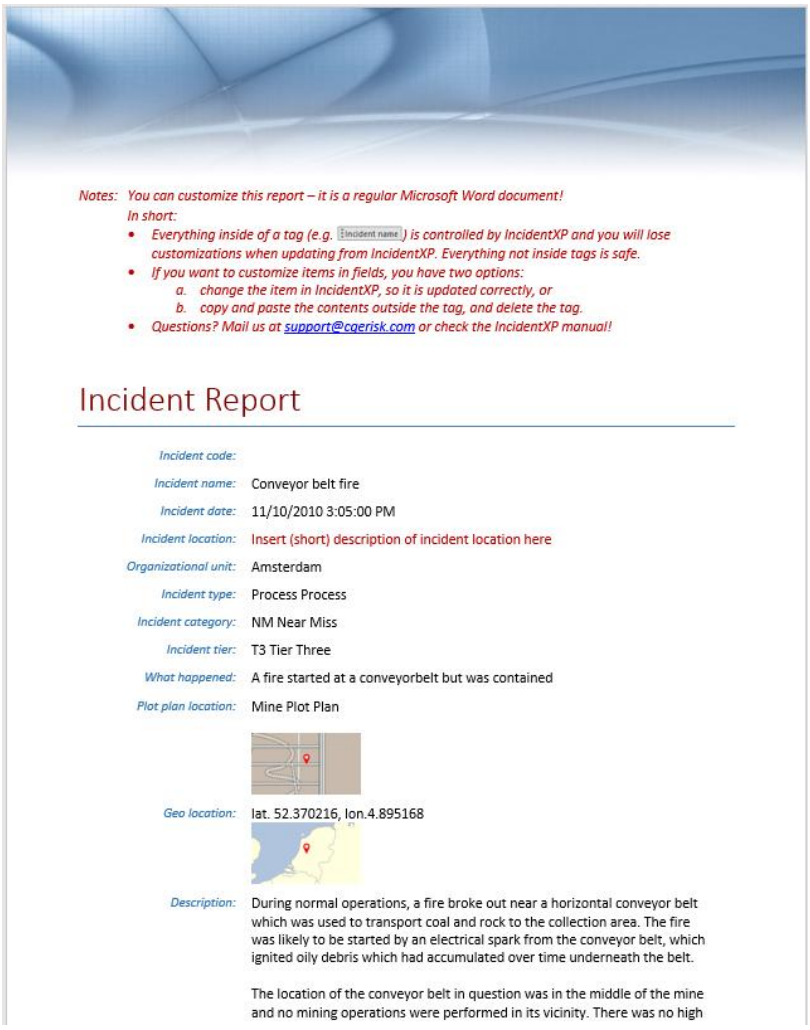

Figure 27 – Example of default built in report

The settings icon ⚙ will take you to a pop-up screen that will allow you to choose what diagram to use (you can choose only one) and what timeline diagrams to involve (you can choose multiple) in that particular report with every update.

3.4 CREATING A TIMELINE

The timeline allows you to enter all evidence/events and visually reorder them to fit your findings. The software automatically creates a basic timeline diagram from which you can start working immediately.

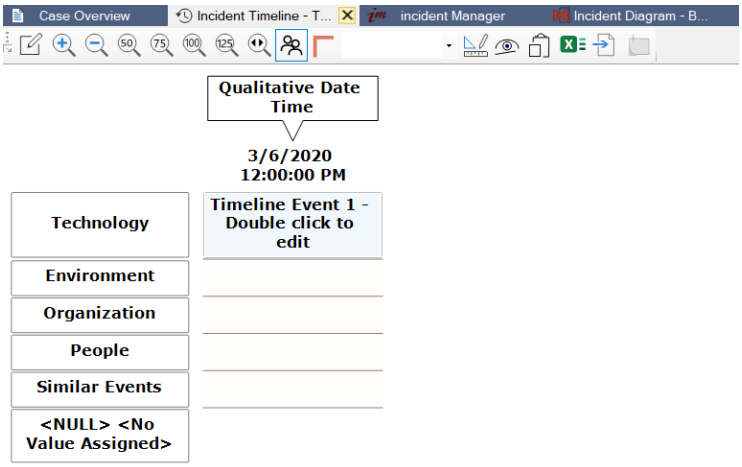

Figure 28 - Default start of timeline

To add a timeline diagram to an existing incident, right-click an incident in the treeview and select 'New Incident Diagram'. Select methodology 'Timeline' in the add incident diagram dialog and give the timeline a name.

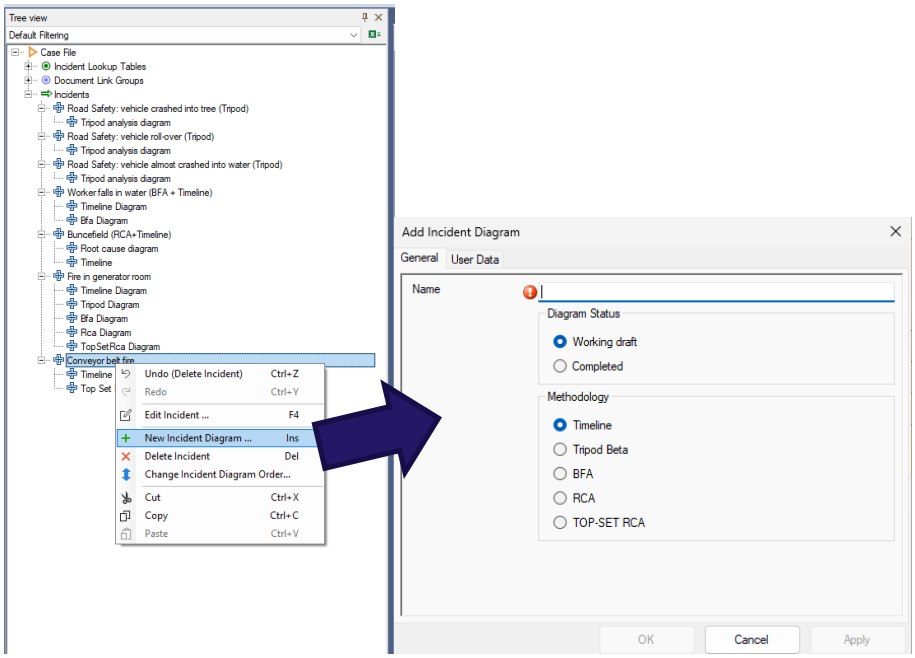

Figure 29 - Add new timeline to existing incident

In this window you will also be able to select the 'Diagram Status', which is linked to a functionality in BowTieServer. You can choose to ignore this when you are not a BowTieServer user. You can filter out the data of draft incident diagrams on bowtie diagrams by means of the incident filter when using IncidentXP in combination with BowTieXP.

3.4.1 Add a timeline column

To add a new timeline column, move your mouse over the right- or left-hand side of an existing timeline column and click the green plus button which appears.

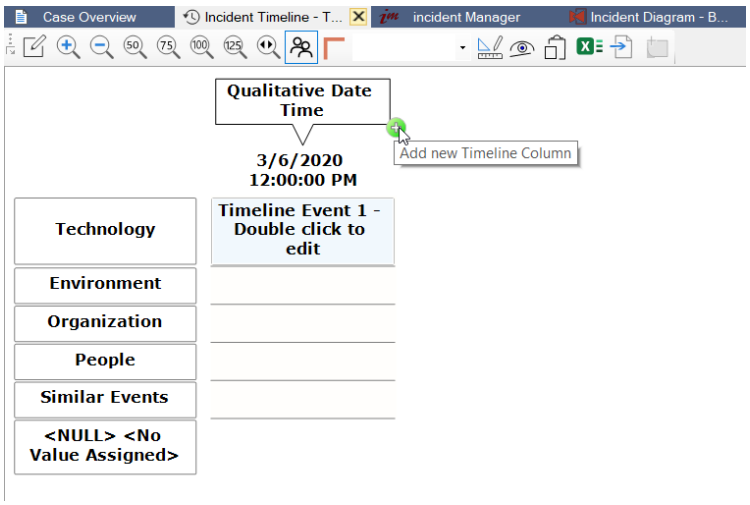

Figure 30 – Add timeline column

Select a date and time and a date/time format. Subsequently select 'OK' to add the column. A qualitative date and time can optionally be inserted to highlight a particular moment with a qualitative description (e.g. First Deviation) that will be shown at the top of the column.

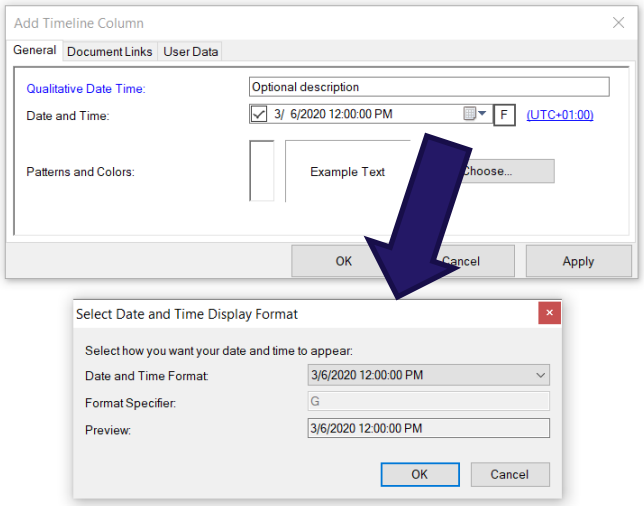

Figure 31 – Enter timeline column details

Another way of adding a timeline column is to drag an existing timeline column to the right or left side of the diagram.

Note: A red exclamation mark will appear when timeline columns are not in chronological order.

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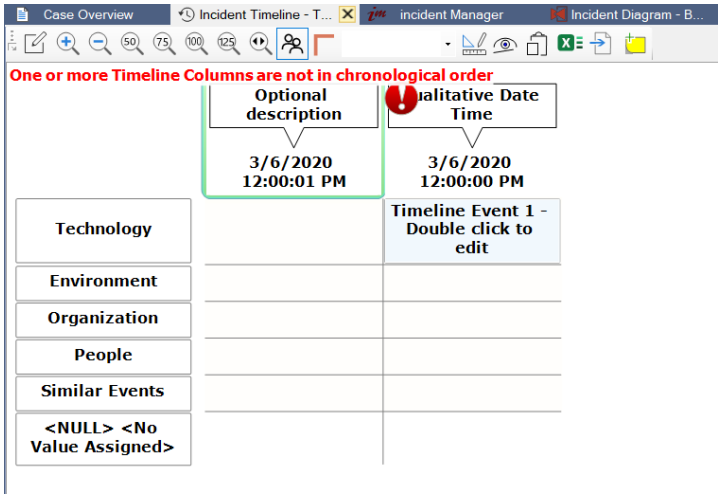

Figure 32 - Exclamation mark in the timeline (non-chronological order)

3.4.2 Add a timeline actor

> Note: The term actor can refer to a person but also to an item, machine, system, or other item which can cause actions (or influence the flow of events).

To add a new timeline actor, move your mouse over the top (or bottom) of an existing timeline actor and click the green plus button that appears. Add a name in the field that appears and press 'Enter'.

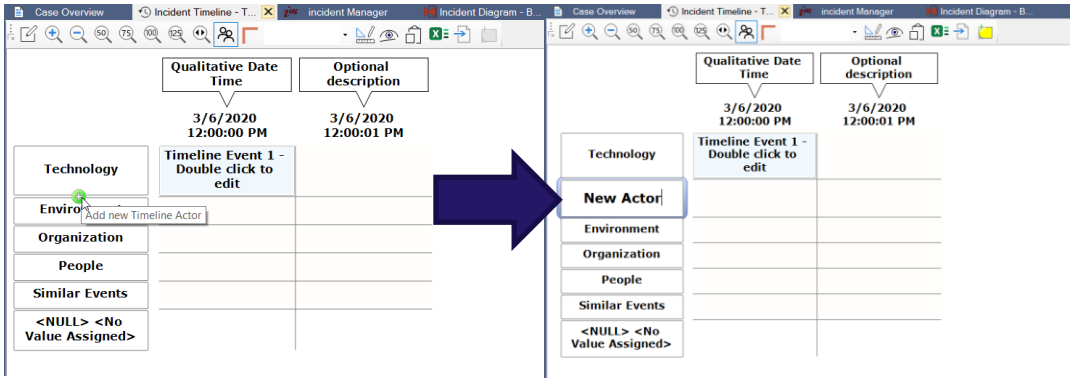

Figure 33 - Add timeline actor

3.4.3 Add a timeline event

To add a new timeline event, move your mouse over one of the cells (where the time column and the actor row cross each other) and click the green plus button.

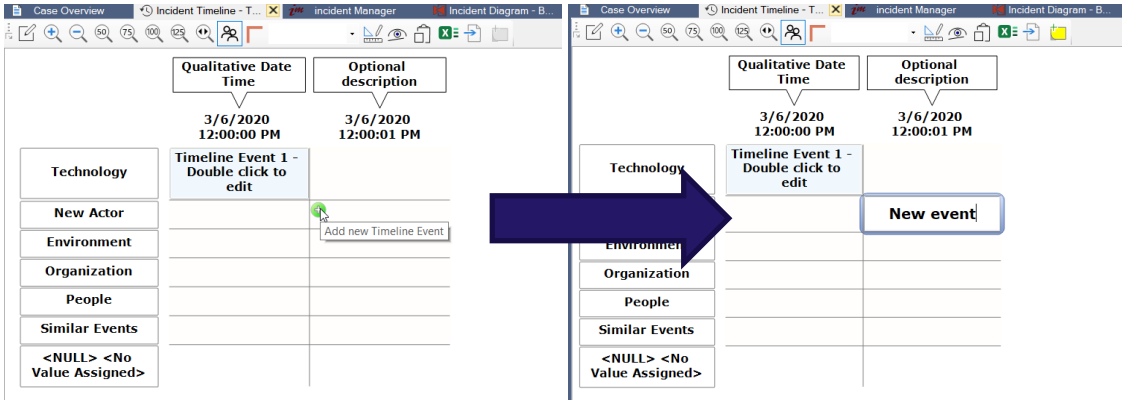

Figure 34 - Add a new timeline event

Double click a timeline event to specify the name, description, actor, location, category and confidence level. See next paragraph for more information on editing different elements.

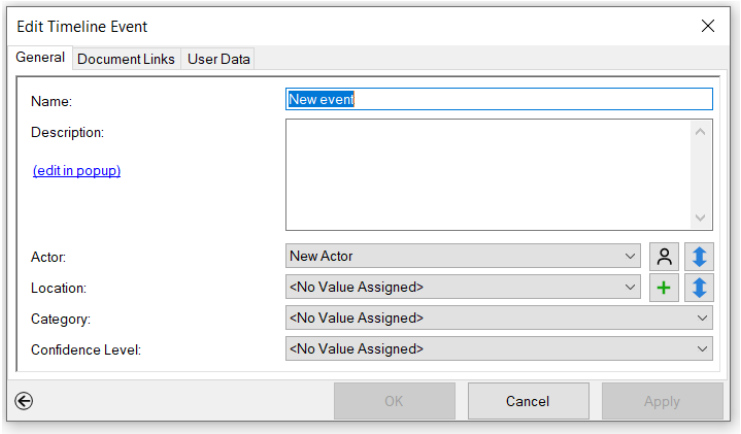

Figure 35 - Specify a timeline event

Note: There will be a new actor row added to the timeline diagram when a new actor is created in the timeline event editor. An actor can be added in the timeline event editor by selecting this icon

3.4.4 Edit timeline

We can open the editor of the time column, actor row or event by double clicking them, or by clicking the pencil icon on an element . For communicative purposes it is also possible to change colors of elements or entire columns.

We can also drag timeline events to other positions within the diagram. Dropping it onto a different cell will implicitly alter the timestamp and actor accordingly.

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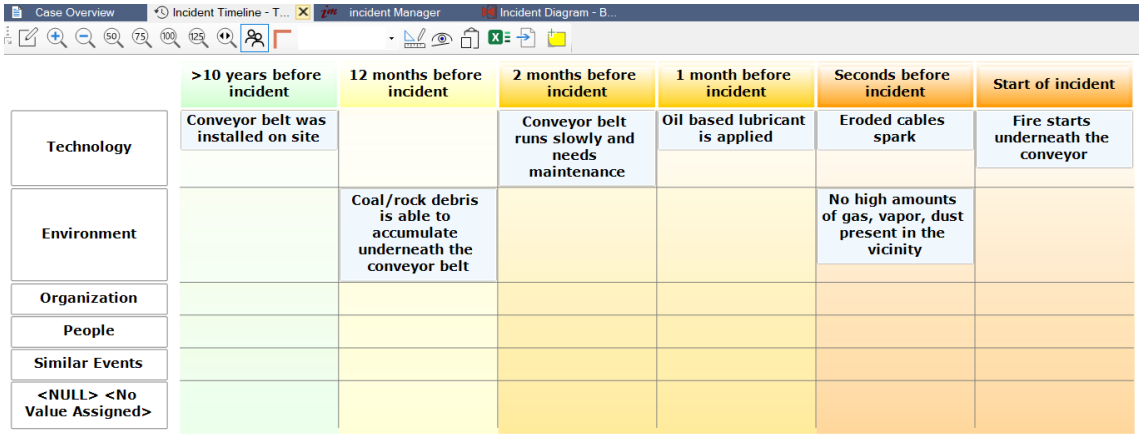

Figure 36 - Example of a timeline

Unused actors will be hidden from the diagram by clicking this button  in the toolbar. If you cannot find this button in the toolbar you have to add it first to the toolbar using the 'add or remove buttons', see chapter 3.1.4.

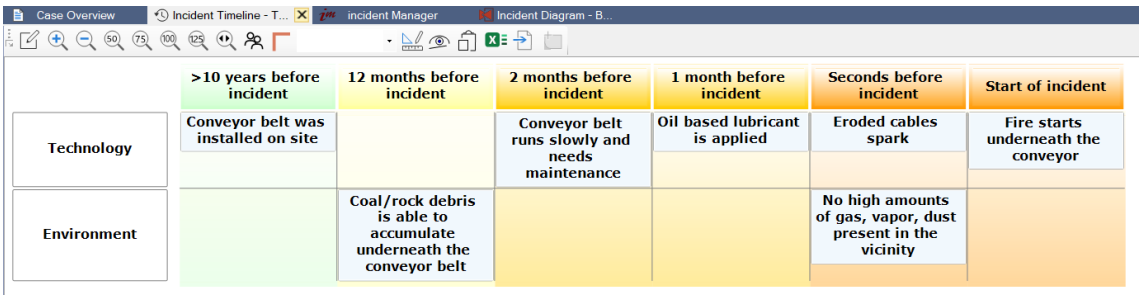

Figure 37 – Timeline without unused actors

3.4.5 Copy/paste of timeline events to other diagrams

It is also possible to copy an event from the timeline and paste it directly into an analysis diagram. This applies to all methods within IncidentXP. Copy/pasting can be done via the 'traditional' way (using ctrl+C on a timeline event and using ctrl+V in an analysis diagram). Additionally, you can drag and drop an event while holding the ALT key. Lastly, you can drag and drop through the Tree view. Make sure to drop an event as a 'child' on the correct 'parent' (the diagram name) item.

Copying an event from an analysis diagram to the timeline is also possible. Make sure that you select the header of a timeline column to paste an element into the timeline. It will automatically snap onto the NULL or No Value Assigned row at the bottom of the timeline.

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4

THE TRIPOD BETA METHOD

4.1 A BRIEF DESCRIPTION OF TRIPOD BETA METHODOLOGY

Note: Please see Stichting Tripod Foundation's Tripod Beta User Guide for a more thorough elaboration.

4.1.1 Introduction

Developed in the early 1990s, Tripod Beta is an incident investigation methodology designed in line with the human behavior model. It was explicitly created to help accident investigators model incidents in a way that allows them to understand the influencing environment, and to uncover the root organizational deficiencies that allowed an incident to happen.

Using Tripod Beta, incident investigators model incidents in terms of:

- Objects (something acted upon, such as a flammable substance or a piece of equipment),
- Agent of change (something –often an energy- that acts upon objects, such as a person or a fire) and
- Events (the result of an agent acting upon an object, such as an explosion).

Working back from the 'main event' (the incident) allows us to fully understand what happened and how an incident happened.

A set of shapes consisting of an agent, an object and an event is called a trio and is the basic building block of the Tripod beta method. Events themselves can also be objects or agents, allowing us to chain these trios into a contextual diagram.

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To understand *why* the incident happened, the next step is to determine what barriers were in place that should have prevented the objects' and agents' outcome, and also why these barriers failed to do so. Tripod Beta teaches us to look at the immediate causes of the act that led to the incident, the psychological precursors to that immediate cause, and ultimately the underlying organizational deficiencies that allowed those precursors to exist.

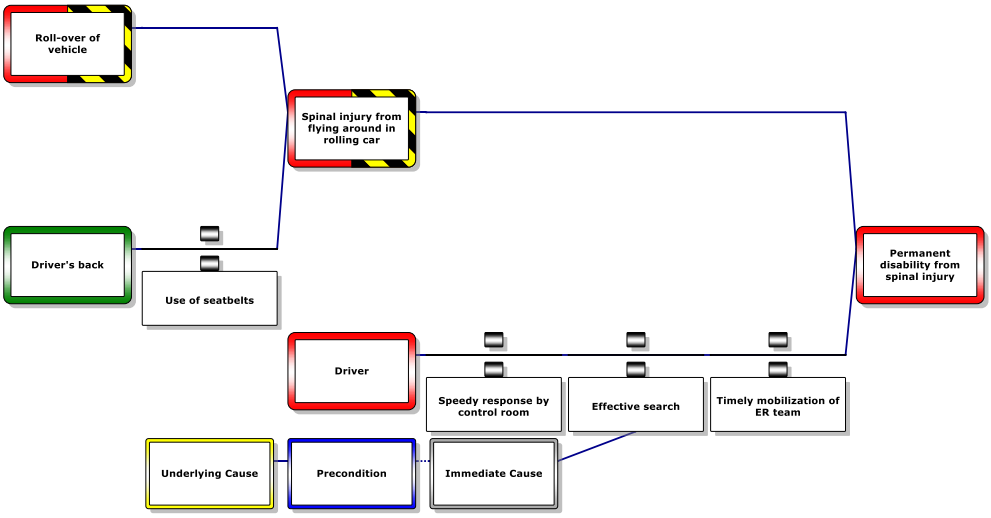

Figure 38 - A sample Tripod Beta diagram[1]

4.1.2 Tripod Beta analysis work process

Doing Tripod Beta analysis consists of the following steps.

1. Evidence is collected and preserved.

Evidence collection is done offline (not in the software).

2. A timeline/storyboard of events is built. At its simplest, a timeline is a listing of all relevant events or factors in a time-based sequence. Simple incidents may not require a timeline, but this tool often helps understand complex incidents involving many people, different systems, and how latent issues (such as design or construction deficiencies or unrevealed failures) affect the outcome.

As already seen, the software supports building the timeline in a user-friendly manner. See section 3.4, Creating a timeline.

3. After creating the timeline, the trio's (agent, object, and event) are identified and linked to each other which forms an event flow diagram. Linking an event to an agent results in a combined node called 'event-agent'. Linking an event to an object results in a combined node called 'event-object'.

The software supports building these diagrams in two manners – in the completely free form, but also using pro-active bowtie risk analysis as a source for event flow information – this is known as building a templated Tripod Beta diagram.

[1] Source: Stichting Tripod Foundation.

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For free-form building of a Tripod Beta diagram, see section 4.2, Creating a Tripod Beta diagram and section 4.3 Add a Tripod trio (Event – Agent – Object). For templated building of a Tripod Beta diagram, see section 9, Linking incidents with bowtie.

4. Barriers are identified and inserted between the event and agent or object.

See section 4.4 Add a Tripod Beta incident barrier.

5. Barriers are analyzed; Which have failed? How did they fail? Which were missing?.

Please see Stichting Tripod Foundation's Tripod Beta User Guide for a thorough elaboration on this.

6. A Tripod Beta causation assessment is done on each barrier.

See section 4.5, Add a Tripod Beta causation assessment.

7. Finally, a report is generated.

The Tripod Beta tool supports many different reports and output methods to provide you with all information needed to create a full report. See chapter 13, Getting data out of the program.

Optionally, the barriers identified in the investigation can be linked to barriers on pro-active bowtie risk analyses to provide aggregation and insight into how barriers relate to real life events. If applicable bowties do not (yet) exist they can be created (given that you have a Tripod IncidentXP + BowTieXP license). For a templated building of a Tripod Beta diagram, see section 9, Linking incidents with bowtie.

4.2 CREATING A TRIPOD BETA DIAGRAM

Note: The Tripod Beta diagrams shown in this manual may slightly deviate from the Tripod Beta rules which are set by the Stichting Tripod Foundation. These differences may especially occur within the description of barriers. This manual will often use the bowtie risk assessment guidelines for describing barriers.

The Tripod diagram consists of events, agents and objects, which are connected through connectors. To start a diagram, we must start with a single event.

To create a new Tripod Beta diagram, right-click the incident node in the treeview and select 'New Incident'. Name the Tripod diagram and select methodology 'Tripod Beta'.

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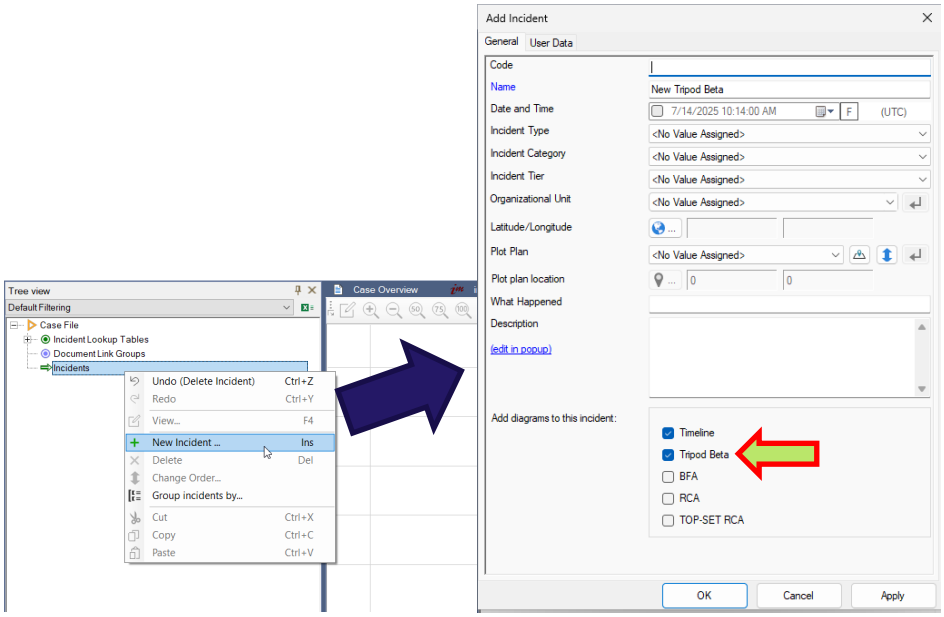

Figure 39 – Creating a new Tripod diagram

When the method 'Tripod Beta' is selected whenever an incident is created (see section 0, Creating an incident & incident analysis diagram), the software automatically creates the first event of a Tripod diagram, so you can get started on the Tripod diagram immediately.

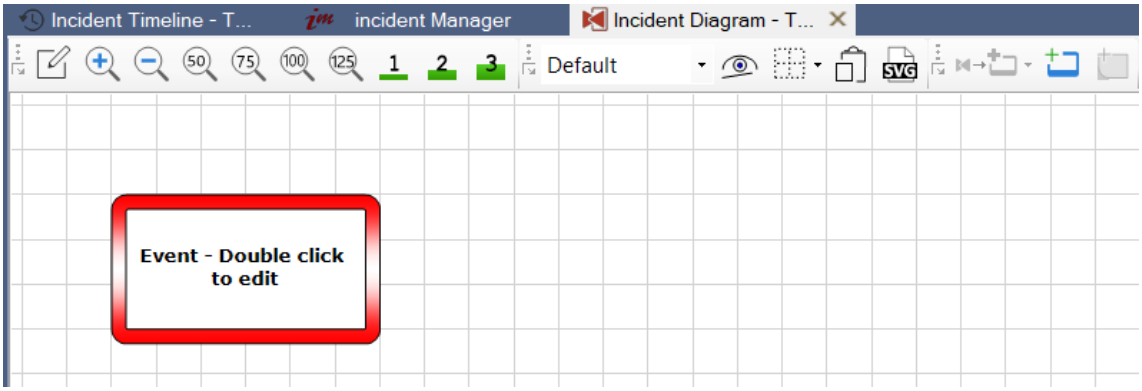

Figure 40 - Default start of a Tripod Beta diagram

4.3 ADD A TRIPOD TRIO (EVENT – AGENT – OBJECT)

To add a new Tripod trio, move your mouse over the left side of an existing Tripod event and click the button that appears. The left button will allow you to add a tripod trio (new Agent & Object). The right button will add an outgoing event (an event which happened after the initial event).

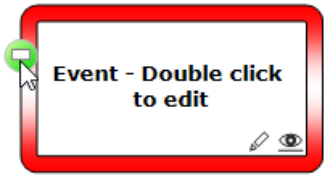

Figure 41 - Add a new Tripod trio

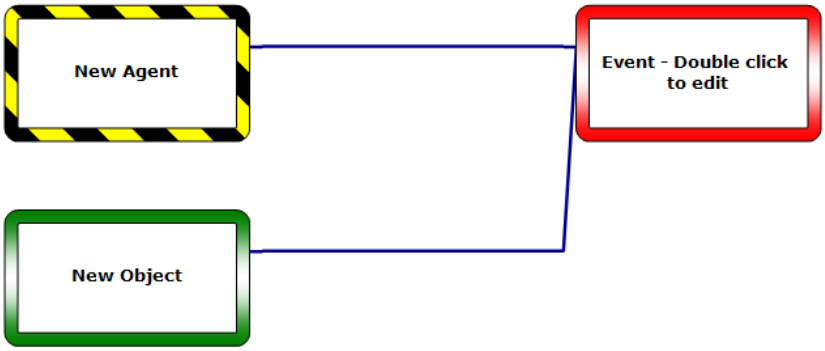

Figure 42- Added Tripod trio

Double click the outlines of the Agent and Object to open the editor and edit the elements' name and appearance:

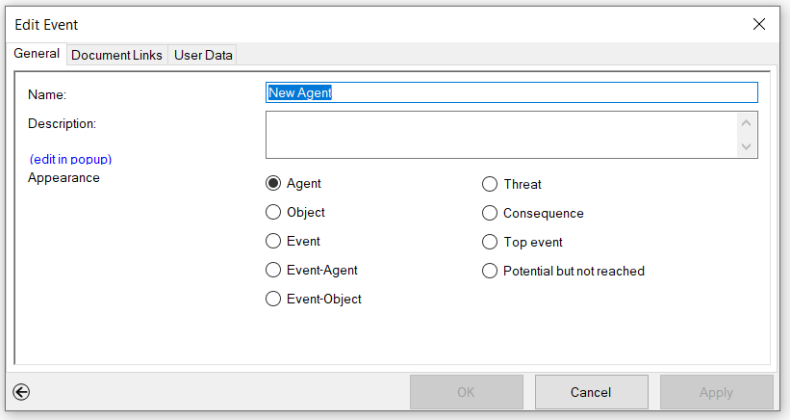

Figure 43 - Tripod event editor

This dialog box also allows you to change the appearance of the element – which can be shown as Agent, Object, Event, Event-Agent, Event-Object as well as a Potential event (an event that did not happen, but could have occurred). You can also convert shapes into bowtie appearances: Threat, Consequence, and Top event. Please refer to chapter 14 for details on this.

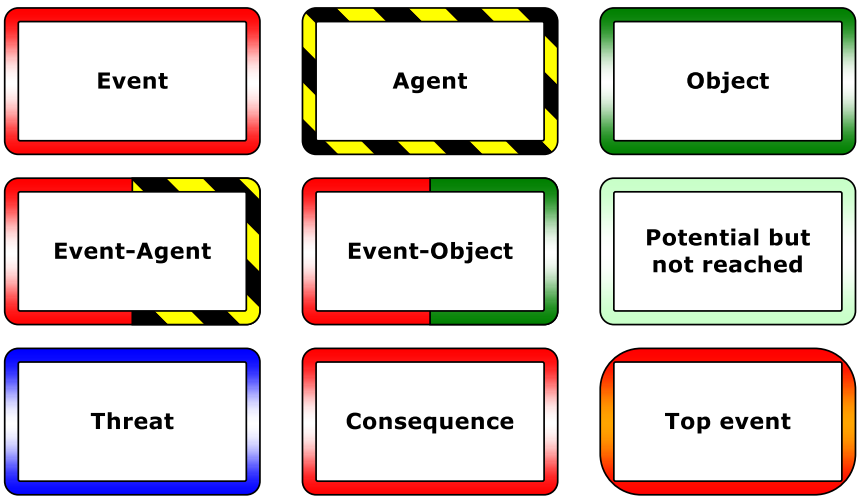

Figure 65 - All possible Tripod beta appearance options

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Creating a Tripod-Beta incident analysis diagram is an iterative process. Because of this, the software allows you to reposition the events by dragging them around the diagram. A grid will be shown while doing so. By default, Tripod-Beta diagrams use a free layout grid. The free layout allows the user to distribute the diagram shapes freely on the diagram space by simply moving them or using cutting and pasting movements. In this way, Tripod diagrams can easily be rearranged.

4.3.1 Add a Tripod Object in parallel to an existing trio

Note: this sub-chapter describes IncidentXP functionality that is not part of the official Tripod Beta guidelines that are issued by the Energy Institute. In the official guidelines, there can be only one object against an agent.

If you want to add a second object to an existing Tripod trio, move the mouse over the left side of the event, and a green button will appear. When we click this button, a second object will automatically be added. Alternatively, you can right-click on an event and select “Add Event to the left”. The editor pops up and we can enter the details of the object and change the appearance, for instance to Object or Agent.

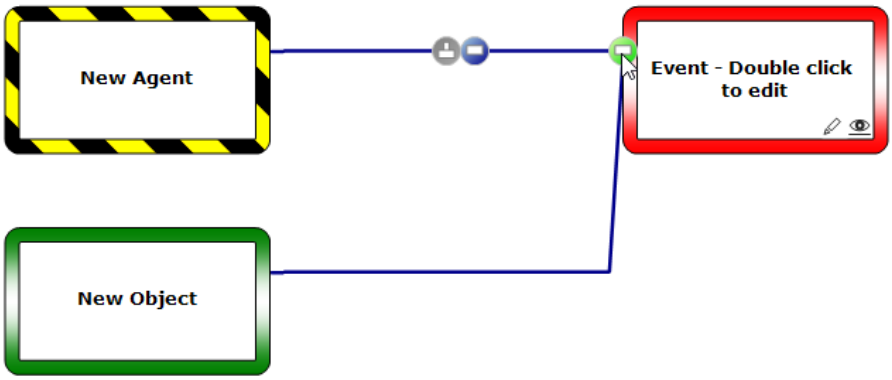

Figure 66 - Add an event in parallel to another event

Note: the newly added element(s) might be partially placed over existing element(s). Use the free layout to drag and drop the elements to the preferred position.

Note: It is also possible to add Tripod elements by selecting events (top event, threats, or consequences) from a bowtie diagram. In section 9, Linking incidents with bowtie you can read how to do this.

4.4 ADD A TRIPOD BETA INCIDENT BARRIER

To add a barrier in between two elements, we must first create some space when the shapes are placed in close proximity of each other. To create space between elements, drag the rightmost shape to the right.

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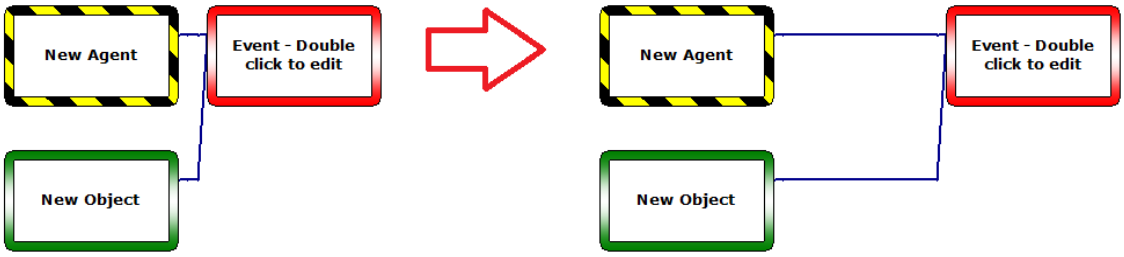

Figure 44 - Creating space between elements

When we hover with the mouse over a connector, we can see both a grey barrier button and a blue event button. If we click the grey barrier button, we can add a barrier to the connector.

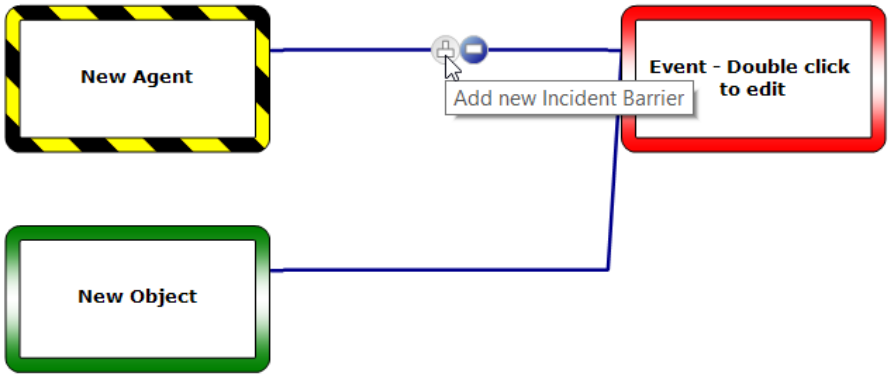

Figure 45 - Add an incident barrier

Right click on a barrier and click Edit Incident Barrier. In this editor box, we can give the barrier a name, enter a description, choose a barrier type, enter how the barrier failed, both in a short description and in a longer multiline format, as well as choose a barrier status – also known as the failure state: failed, missing, unreliable, inadequate (or effective when not failed). We can provide the barrier challenge and response in the 'Barrier Challenge/Barrier Response' tab. Additionally, we can add information in a tab called 'User Data' where we can define our own fields, if so required. Please see the BowTieXP software manual for more information regarding the 'User Data' tab. More information regarding the 'Document Links' tab is available in chapter 12
Linking to documentation.

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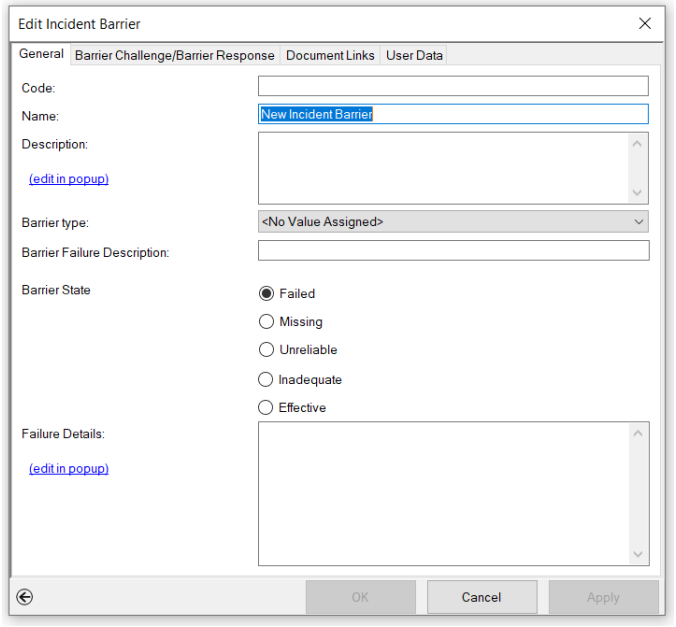

Figure 46 - Incident barrier editor

The incident barrier states are shown on the diagram as follows:

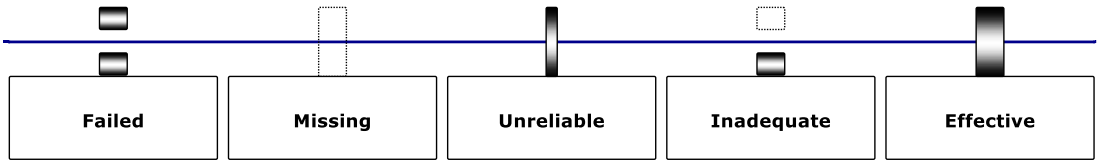

Figure 47 - Incident barrier states

Using these software options allows you to quickly build complex diagrams such as:

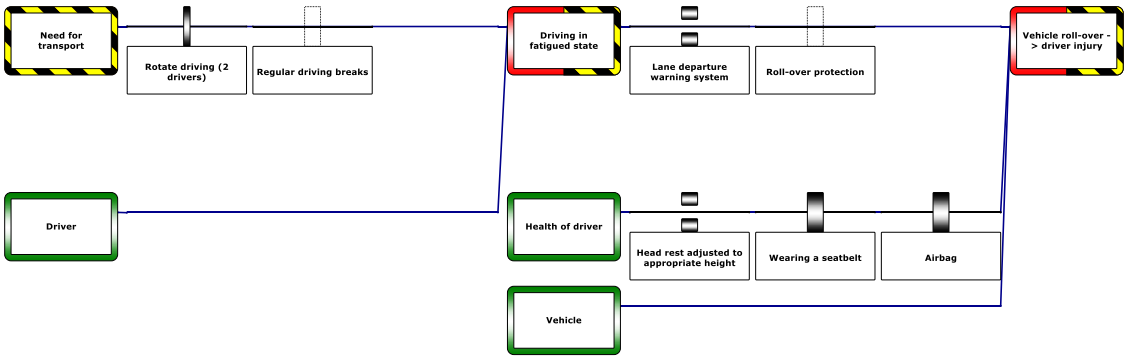

Figure 48 - Example of Tripod Beta diagram (without causation assessment)

Note: The 'Unreliable' barrier state is not part of the official Tripod Beta guidelines that are issued by the Energy Institute. In the official guidelines, this state does not exist. It is however part of IncidentXP for it is used within other methods that IncidentXP supports (i.e. BFA)

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4.5 ADD A TRIPOD BETA CAUSATION ASSESSMENT

Once you complete the diagram it is time to assess all the barriers using the Tripod Beta method. As mentioned earlier, Tripod Beta uses three levels of causation: Immediate causes, Preconditions, and Underlying causes.

To add a new Tripod causation path, move your mouse over the bottom of an existing incident barrier and click the grey button that appears.

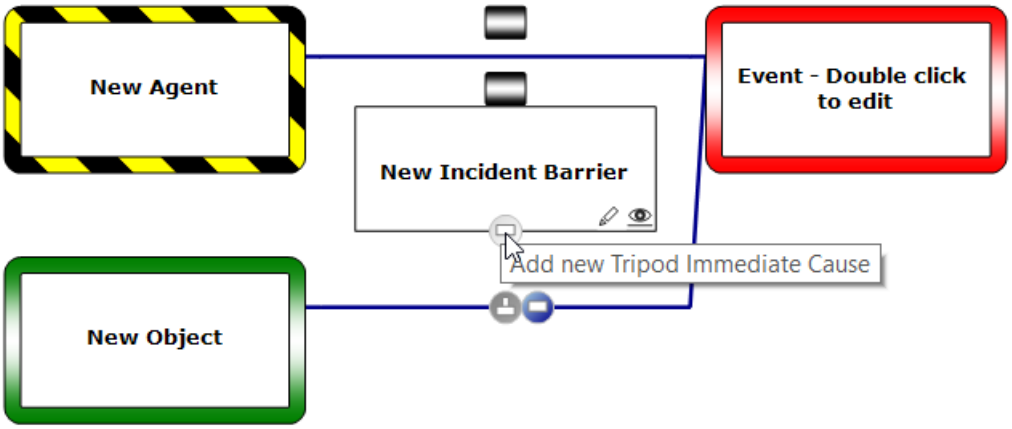

Figure 49 - Add new Tripod causation assessment

Right click on the Immediate Cause that appeared in the diagram, and select Edit Tripod Immediate Cause. In the Immediate Cause editor window we can fill in the details of the immediate cause.

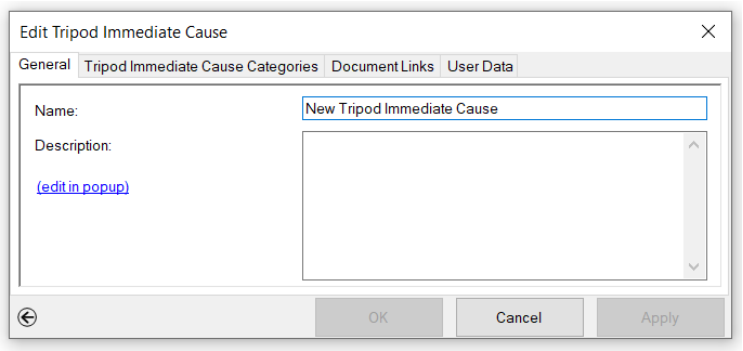

Figure 50 - Add descriptions in the Tripod Immediate Cause editor

When we click OK the immediate cause is added to the barrier. You can drag the immediate cause to position its place above or below the barrier:

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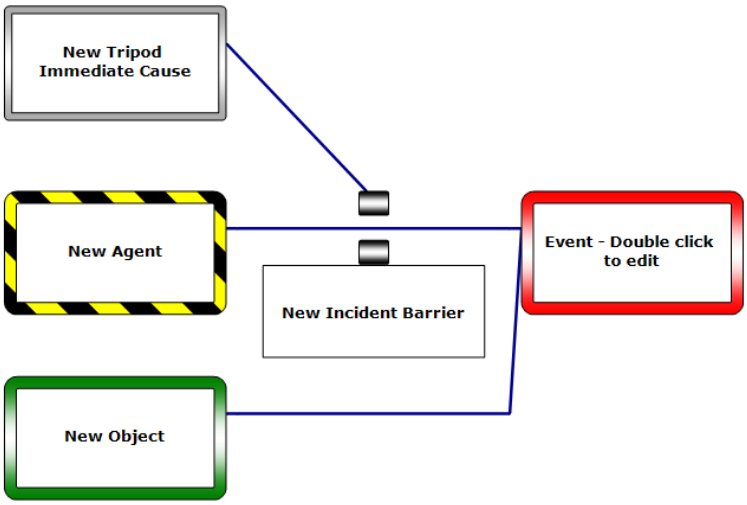

Figure 51 - Added Tripod Immediate Cause

You can add one or more precondition(s) and underlying cause(s) by following the same steps. This time move the mouse over the left side of the immediate cause and precondition to let a blue and yellow button appear instead.

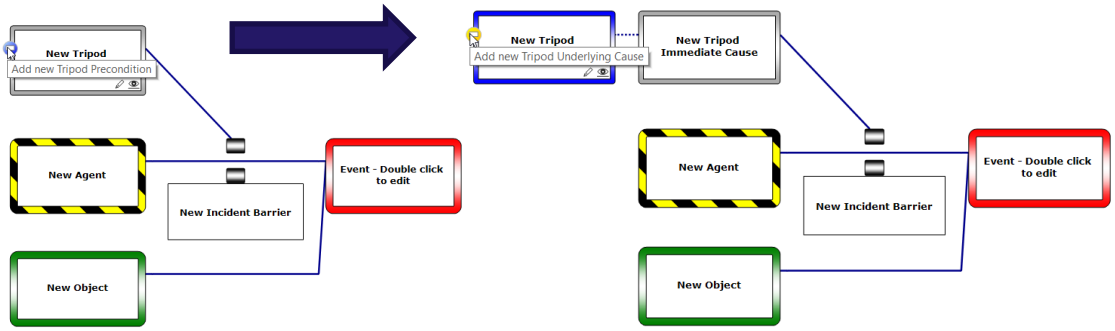

Figure 52 - Add a new Precondition and Underlying Cause

The Tripod Beta causation path is completed after adding the underlying cause.

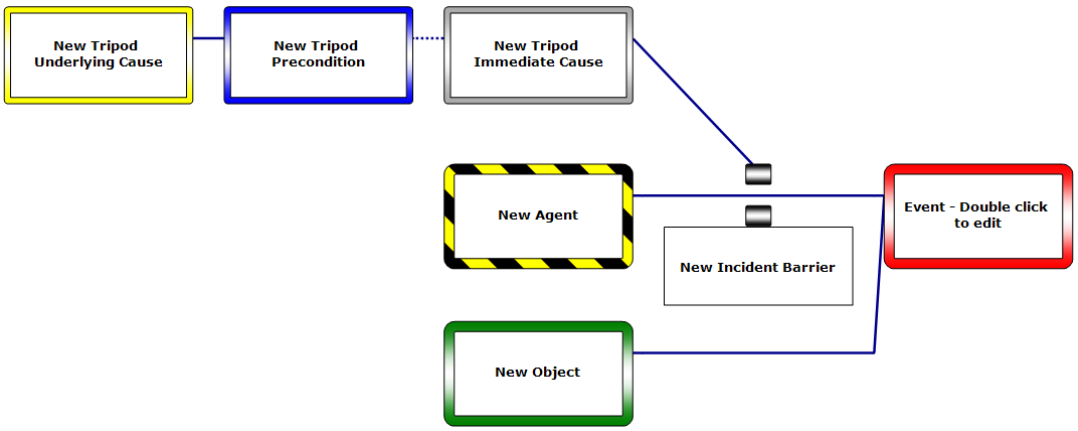

Figure 53 - Completed Tripod causation assessment

Note #1: Officially missing barriers can only have underlying causes linked to it. However, this rule has recently been changed (allowing also immediate cause and preconditions on missing barriers). IncidentXP supports the original rule and the revised rule.

Note #2: IncidentXP supports categorizing your immediate causes, preconditions, and underlying causes. The list of categories can be defined within the Incident Lookup Tables node of your case file.

4.5.1 Add a Basic Risk Factor (BRF)

In the Underlying Cause editor, you can define a basic risk factor (BRF) code. This categorization can be used to perform a trend analysis on your underlying causes. Aggregating BRF codes can provide valuable insights, for instance to highlight weaknesses within the organization for multiple incidents and over longer periods of time. BRF codes can be customized in the tree view.

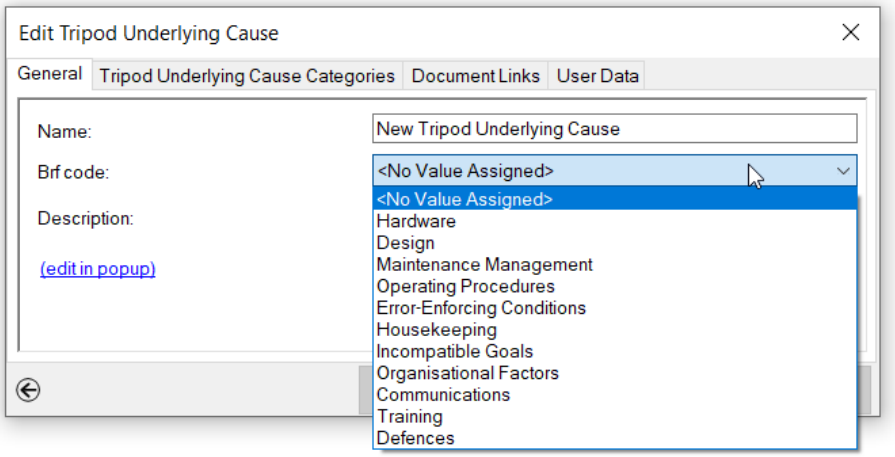

Figure 54 - Add BRF code

A BRF code can be visualized on an underlying cause by using the small eye icon on the causation element:

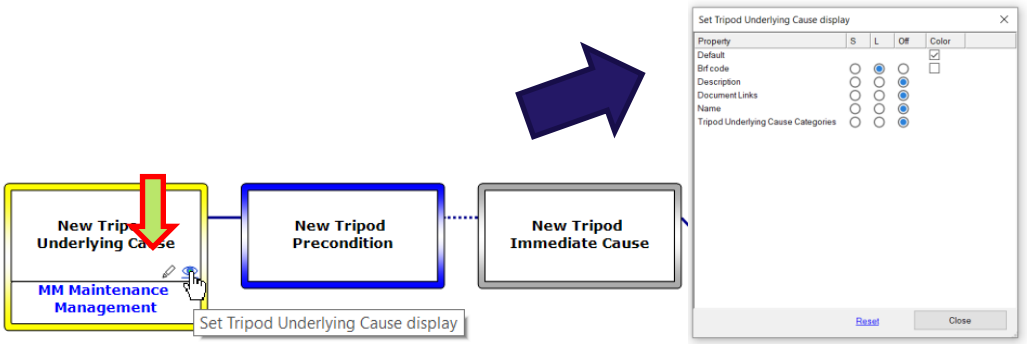

Figure 55 - Visualization of BRF code

4.6 THE CONNECTOR

The incident connector is the line which connects the incidents' events. To create a new connector, right click on some empty space and select Add, Connector, and then select the events you want to connect. Alternatively, to add a new connector, move your mouse over the right or left side of an existing event and hold on the green button that appears. While holding, drag the line to another event to connect both events.

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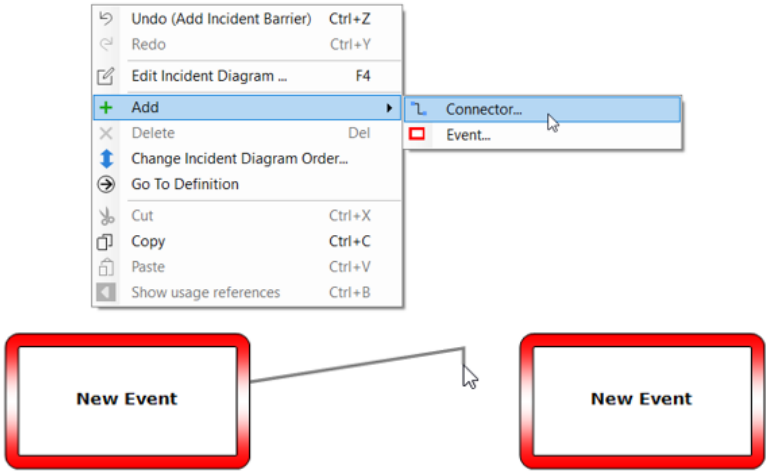

Figure 56 - Add new connector (two alternatives)

4.7 EDITING YOUR TRIPOD BETA DIAGRAM

Here is a list of all methods for editing the diagram shapes:

- To edit a shape, double click it or select it and press F2.
- To change the order of barriers, drag them left or right beyond its neighbor.
- Hold down SHIFT to also move connecting shapes.
- It is possible to copy (CTRL+C) and paste (CTRL+V) shapes with the clipboard.
- To copy some properties, Use paste special. This allows you to select which items to paste over the selection.
- To remove an item, select it and press DEL.

5 THE BARRIER FAILURE ANALYSIS (BFA) METHOD

5.1 A BRIEF DESCRIPTION OF BFA METHODOLOGY

Barrier Failure Analysis (BFA) is a pragmatic, un-opinionated, general-purpose incident analysis method. It has no affiliation with any particular bureau, authority or organization.

BFA is a way to structure incidents and to categorize certain parts of incident taxonomy. The structure consists of events, barriers and causation paths. Events are used to describe a causal sequence of events that we want to prevent from cascading. This means that each event causes the occurrence of a next event. There can also be parallel events that combined cause the next event to happen.

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The barriers in a BFA are designed to stop a chain of events. They are not necessarily independent or sufficient, as would be the case in official bowtie guidelines. Since a barrier failure is presumed in this technique, causation paths are determined to explain why the barriers did not perform according to function.

The causation consists of three steps, which are respectively called Primary, Secondary and Tertiary level. These labels can be customized. The method does not specify whether the analysis should end on an organizational level or not, this is merely what the software allows you to do. Each level in the causation path can additionally be categorized to your own fit. By default there are no categories defined in the software. This allows you as a user the flexibility to create relevant, custom categories specific to your own organizational context.

Any organization should go through an initial period of testing and iterating these categories. At some point a steady state should emerge that will capture most incidents and provide relevant insights. Whenever diversions from this structure were to occur more often, it is possible to keep this learning process alive and reconsider the initial categorization.

5.2 CREATING A BFA DIAGRAM

The BFA diagram consists of events, which are connected through connectors. To start a diagram we must begin with a single event.

If the method BFA is selected when creating an incident (section 3.2, Creating an incident & incident analysis diagram), the software automatically creates the first event of a BFA diagram, in order for you to get started on the BFA diagram immediately.

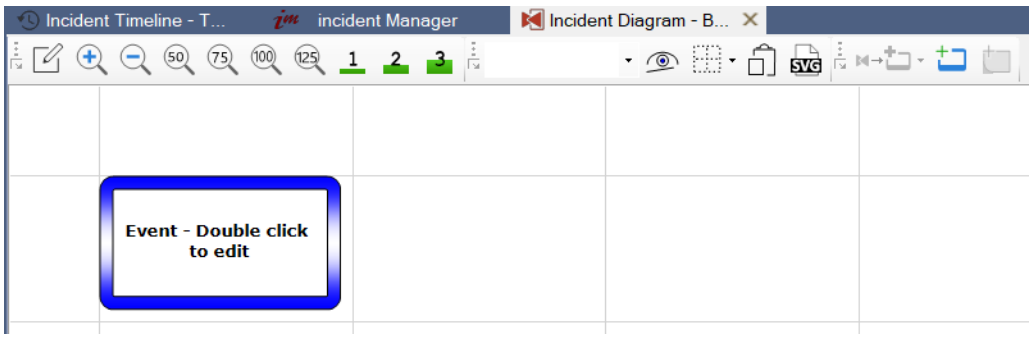

Figure 57 - Default start of a BFA diagram

To create a new BFA diagram, you have to right-click the incident node in the treeview and select ‘New Incident’. Name the diagram and select the ‘BFA’ as your analysis methodology.

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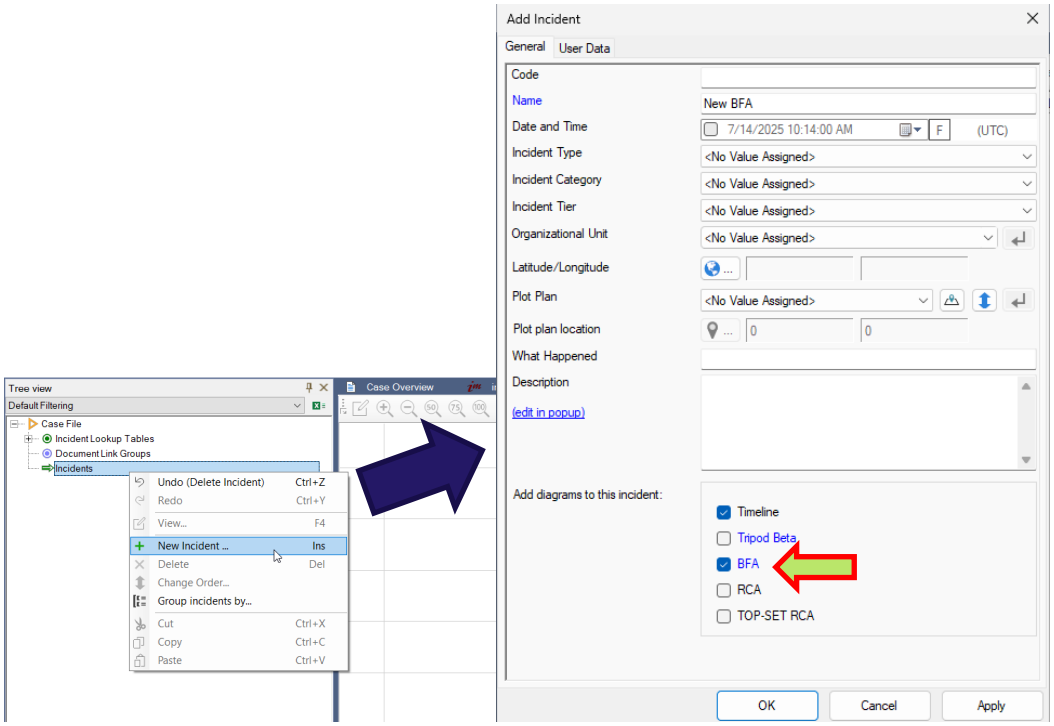

Figure 58 – Creating a new BFA diagram

5.3 ADD A BFA EVENT

Note: It is also possible to add BFA events by selecting events from a bowtie diagram (top event, threats, or consequences). In section 9, Linking incidents with bowtie you can read how to do this.

To add a new BFA event move your mouse over the right or left side of an existing BFA event and click the green button that appears. The left button will add an incoming event (a previous event leading to this one). The right button will add an outgoing event (an event which happened after this one). Alternatively, you can right-click on an event and select “Add - Event to the left (or right)”.

Figure 59 - Add a new BFA event

It is also possible to add a new BFA event by clicking this button in the toolbar: 

Right-click on an existing event and choose Edit Event to give the BFA event its name and appearance – it can be altered into an event, a threat, a consequence, a top event as well as a potential event (something that did not happen, but could have happened).

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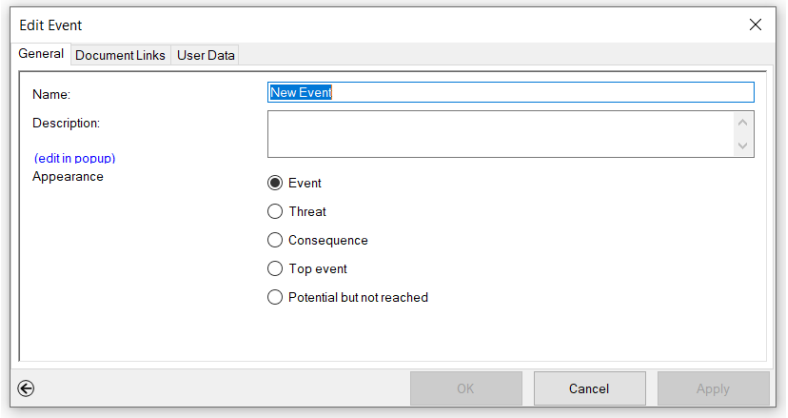

Figure 60 - BFA event editor

These are the different appearance options for BFA events:

These appearance options are to differentiate what kind of event we are considering. The first appearance (event) is the default BFA event appearance. The appearances threat, consequence and top event refer to the bowtie theory. Potential but not reached is an addition to highlight possible outcomes that did not happen in the incident.

When you click OK an event is added to the diagram:

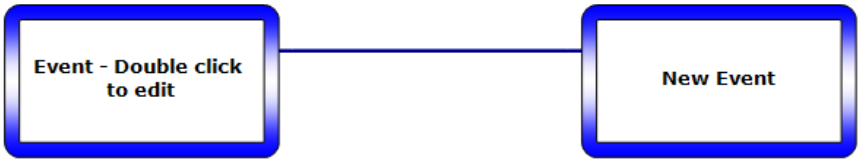

Figure 61 - Added BFA event

We can reposition the events by dragging them around the diagram. A background grid is shown to assist you in spacing your diagram. Shapes will automatically snap to the grid when dropping them. This is called the assisted layout and is used by BFA diagrams by default. There is also a free grid layout. This means that the diagram shapes can freely be distributed across the diagram space. To change the layout grid, please see section 10.4 Layout grid.

5.3.1 Add a BFA event between two events

To add an event in between the two events, we must first create some space in case the events are placed in close proximity of each other. To achieve this, drag the rightmost event one (or more) slot(s) to the right.

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Figure 62 - Creating space between events

When we move the mouse over the connector, we see two buttons appearing. When clicking the blue icon, an event is automatically created in between the other events.

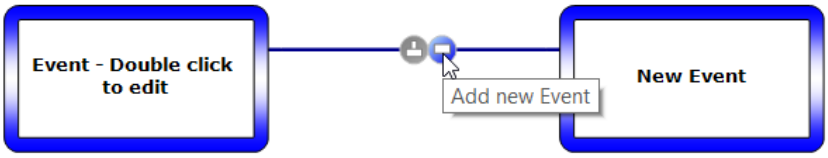

Figure 63 - Add an event between two events

5.3.2 Add a BFA event in parallel to another event

When one event results into multiple events, we need to add different events in parallel. Move the mouse over the right side of the first (outmost left) event, and a green button will appear. When we click this green button, we can add an event parallel to the initial event. The editor pops up after double clicking the event. You can now again enter the details of this event.

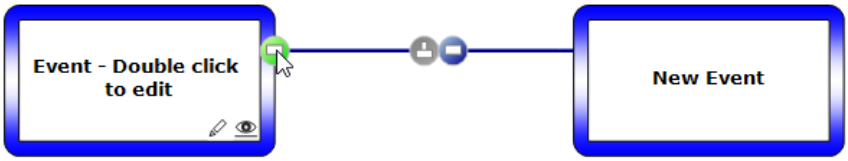

Figure 64 - Add an event in parallel to another event

The result can look like this:

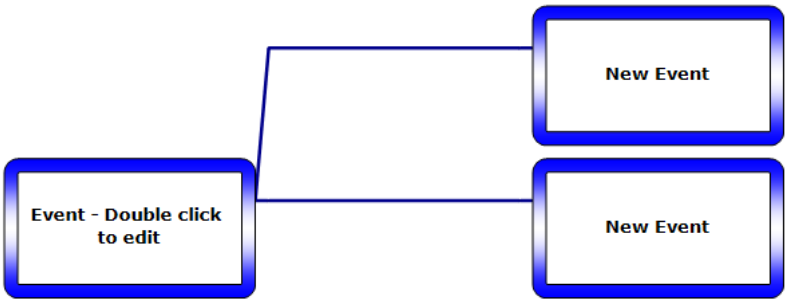

Figure 65 - A parallel BFA event

A similar exercise can be performed the other way around when multiple events result in one event.

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5.4 ADD A BFA INCIDENT BARRIER

To add an incident barrier in between two events, we again must create some space. Drag the rightmost event one (or more) slot(s) to the right, such as in Error! Reference source not found.. When we move the mouse over the connector, we again see two buttons appearing. When clicking the grey icon, a barrier is automatically created on the connector between the two events.

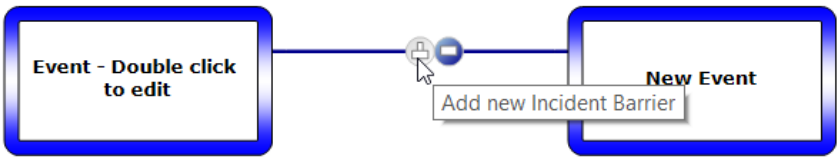

Figure 66 - Add an incident barrier

Besides giving the barrier a title, we can enter a description, barrier type, enter how the barrier failed, both in a short description and in a longer multiline format, as well as choose the barrier state – also known as the failure state: failed, missing, unreliable, inadequate or effective. We can enter the barrier challenge and response in the 'Barrier Challenge/Barrier Response' tab. Besides that you can add information in a tab called 'User Data' where we can define our own fields, if so required. Please see the BowTieXP software manual for more information regarding this tab. More information regarding the 'Document Links' tab is available in chapter 12
Linking to documentation.

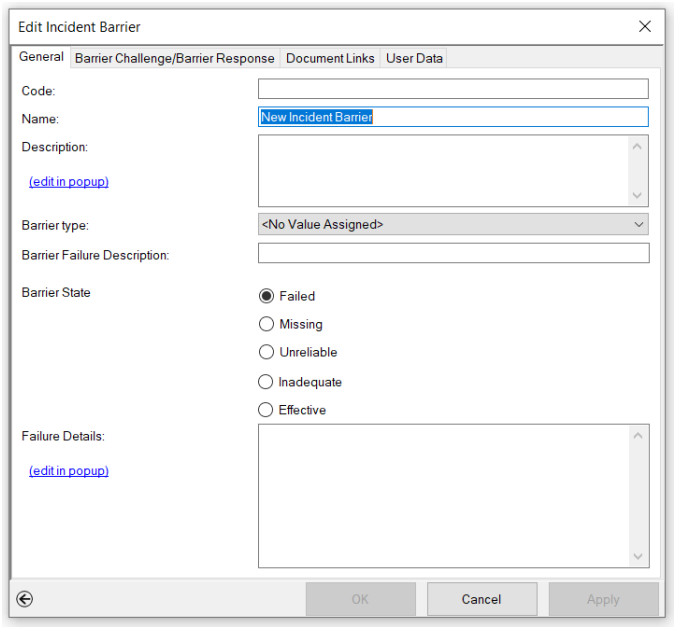

Figure 67 - Incident barrier editor

The incident barrier states are drawn on the diagram as follows:

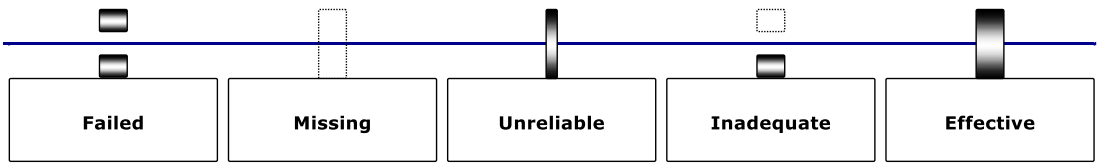

Figure 68 - Incident barrier states

Using these building techniques, we can quickly constitute complex diagrams such as these:

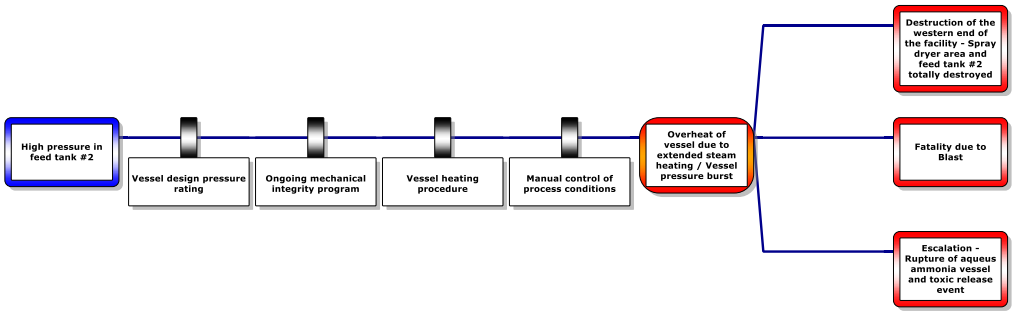

Figure 69 - Example BFA diagram (1/2)

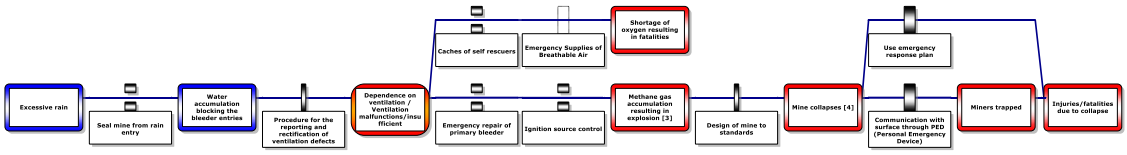

Figure 70 - Example BFA diagram (2/2)

5.5 ADD A BFA CAUSATION ASSESSMENT

Once the diagram has been fully constructed, we need to assess all its barriers using the three step causation method.

To add a new BFA causation move your mouse over the bottom of an existing incident barrier and click the grey button that appears.

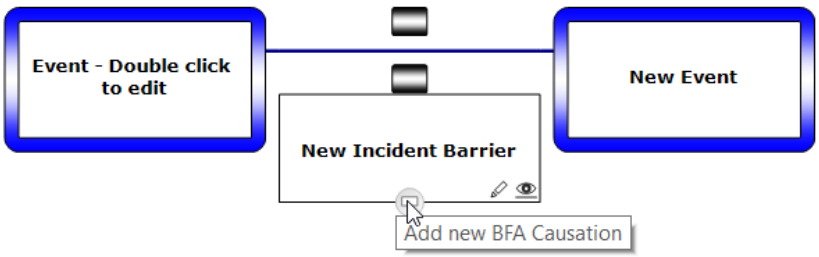

Figure 71 - Add new BFA causation

The BFA causation editor will allow you to do two things:

- Add a description of the three step causation - why the barrier failed/was missing/unreliable/inadequate.
- Link your company incident causation chart values to the description of the three-step causation.

Note: How to import your own company's incident causation chart is described in section 5.5.1 Incident causation chart. By default, this list will be empty for the BFA categories within the software.

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Some users like to add both the flexible description and link the incident causation chart too, while other users choose one of these two options. The editor tab in the BFA causation editor allows you to add a description of the primary cause, secondary cause and tertiary cause.

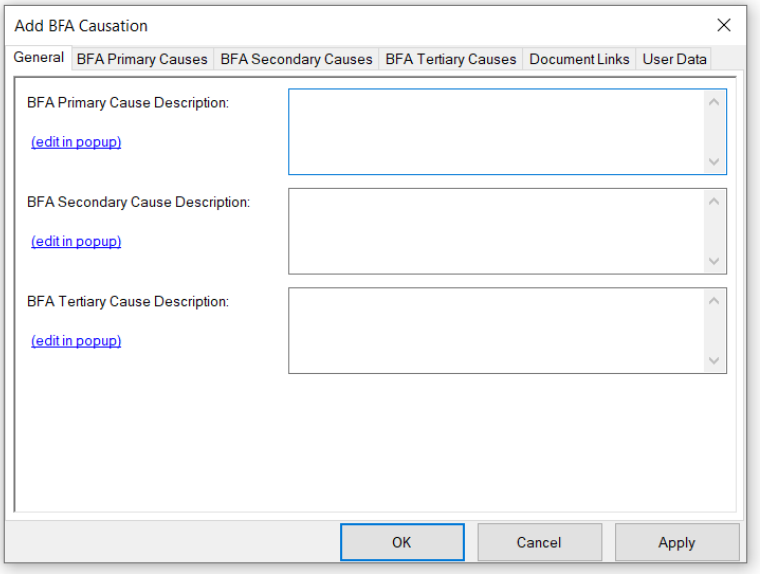

Figure 72 - Add descriptions in the BFA causation editor

Accordingly, custom incident causation charts can be found under the BFA Primary causes, BFA Secondary causes and BFA Tertiary causes tabs in the BFA causation editor. These tabs allow you to link the BFA chart values to the causation descriptions. Select one of these tabs and move the applicable chart value from the left to the right window, using either the appointed arrows or by dragging and dropping the value. Defaulted in the software, the causation charts in the tree view are empty.

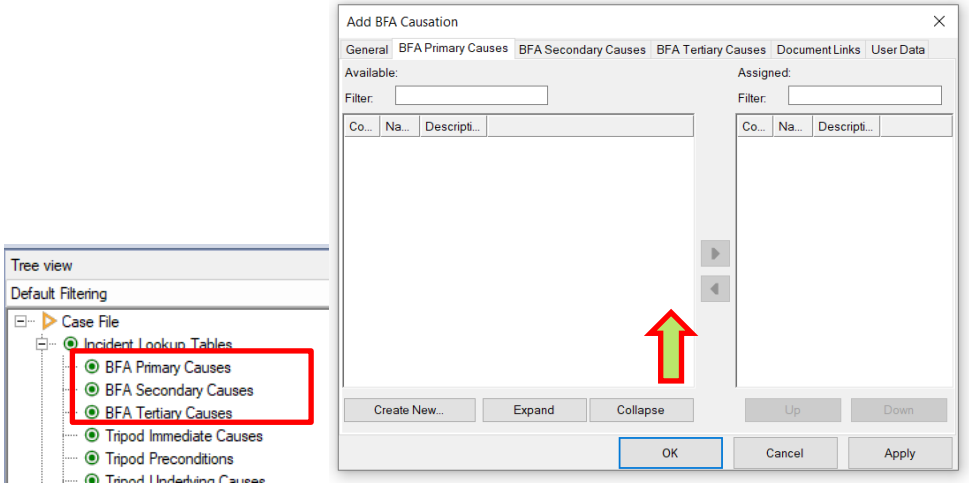

Figure 73 - Incident causation chart value linked to the BFA causation (now empty)

Note: If you want to add a second incident causation path to the same incident barrier, right-click the incident barrier and choose Add → BFA causation.

5.5.1 Incident causation chart

It is possible to create a customized incident causation chart with all three level cause categorizations within the tree view of your case file. If you expand the Incident lookup tables node, you will find the BFA causation chart nodes. As earlier mentioned, these nodes are defaulted empty in the software. An example of customized BFA causation categories is shown below:

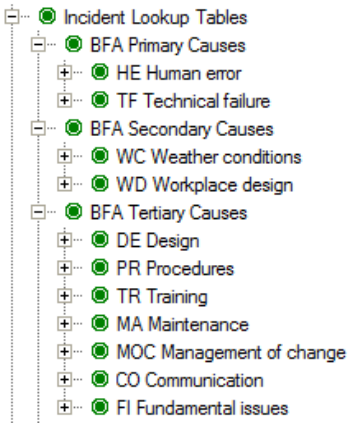

Figure 74 – Example incident causation chart

How to adjust the lookup tables can be found in section 10.3, Adjusting lookup tables.

5.6 THE CONNECTOR

The incident connector is the line which connects the incidents' events. To create a new connector, right click on some empty space and select Add, Connector, and then select the events you want to connect. Alternatively, to add a new connector, move your mouse over the right or left side of an existing event and hold on the green button that appears. While holding, drag the line to another event to connect both events.

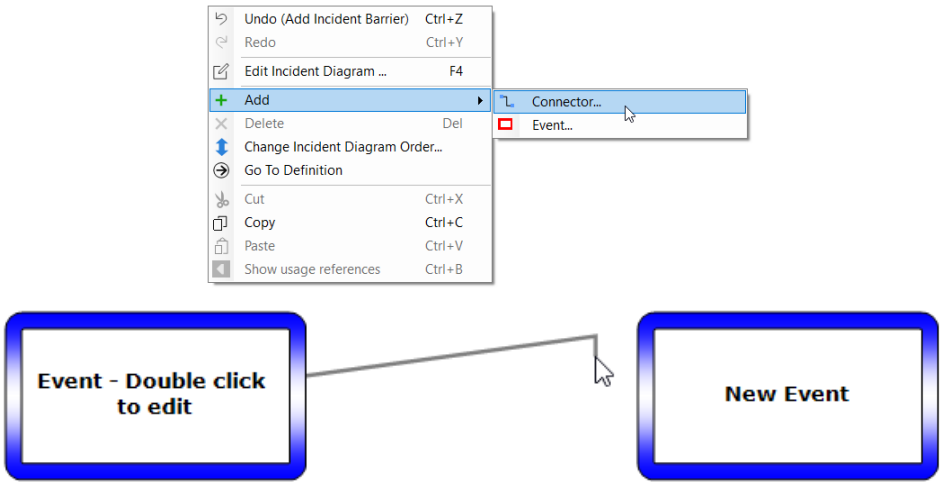

Figure 75 - Add a new connector (two alternatives)

5.7 EDIT THE BFA DIAGRAM

Here is a list of all methods for editing the diagram shapes:

- To edit a shape, double click it or select it and press F2.
- To change the order of barriers, drag them left or right beyond its neighbour.
- Hold down SHIFT to also move connecting shapes.

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- It is possible to copy (CTRL+C) and paste (CTRL+V) shapes with the clipboard.
- To copy some properties, Use paste special. This allows you to select which items to paste over the selection.
- To remove an item, select it and press DEL.
- To move barriers, select it, right-click it and select cut. Click the destination and select paste.

Note: The layout engine in the IncidentXP software has been optimized for BFA diagrams – diagrams with not too many parallel paths. If you attempt to create very complex diagrams, you could run into the limitations of the automatic layout function.

Breaking the movement of items into separate steps will alleviate this problem. With separate steps we mean more than one drag and drop operation. Instead of trying to move an item immediately to the wanted end position, do it in smaller steps. E.g. first move it left, and then move it up. This also helps you understand what the layout engine is trying to do and make the system work for you, instead of against you.

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6
THE ROOT CAUSE ANALYSIS (RCA) METHOD

6.1 A BRIEF DESCRIPTION OF RCA METHODOLOGY

Root Cause Analysis (RCA) is a simple and straightforward incident analysis technique. It starts off with an incident and drills down into the chain of events that led to that incident until the root causes are identified. This method is widely used throughout the world, and the idea of drilling down to the root cause is also present in all of our other incident analysis methods.

As a downside, a traditional root cause analysis has the potential to turn into a jumble of elements. We felt this could be improved, so we did two things in our software solution. Firstly, we added some categorizations to see at a glance where the core problem areas accumulate. This enables you to perform a concise analysis that is easier to communicate. Secondly, you can separate the main diagram into smaller sub-parts. This avoids you losing overview. Expectedly these changes to RCA will help you create better analyses.

6.1.1 7.1.1. Barriers vs RCA

The main difference between RCA and our other incident analysis methods, lies in the fact that RCA is not barrier based. Everything in RCA is an event, including the elements that would be considered barriers or barrier failures in Tripod or BFA. However, from software version 9.2.0 onwards you are able to link RCA events to bowtie barriers. By doing so you can signal if an event can be seen as a failed barrier. To find out how to do this, please see chapter 9 Linking incidents with bowtie.

6.2 CREATING AN RCA DIAGRAM

To create a new RCA diagram, you have to right-click the incident node in the tree view and select ‘New Incident’. Name the diagram and select methodology ‘RCA’.

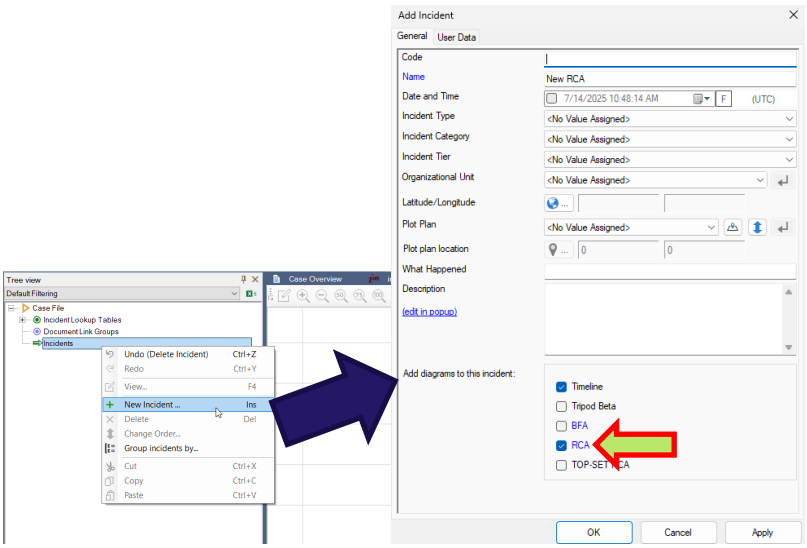

Figure 76 - Creating new RCA diagram

The RCA diagram consists of events, which are connected through connectors. To start building a diagram we must begin with a single event.

When selecting the method RCA for incident analysis (see section 3.2, Creating an incident & incident analysis diagram on page 12), the software automatically creates the first event of a RCA diagram, so you can get started on the RCA diagram immediately.

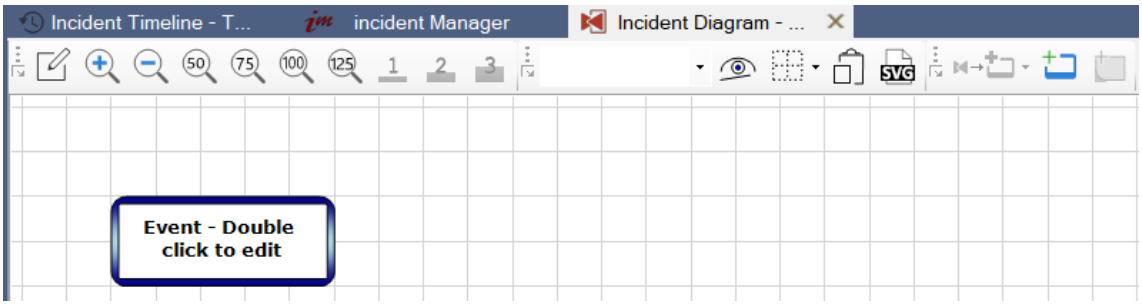

Figure 77 - Default start of an RCA diagram

6.3 ADD AN RCA EVENT

Add an event by clicking the green button on the left or right-hand side of the shape. An Event will automatically be created on the respective side.

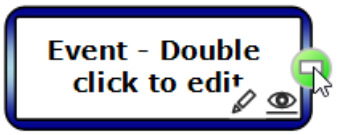

Figure 78 - Adding an event using the green button

Another way of adding an event is done by right-clicking the event and subsequently selecting Add → Add Event to the Left/Right.

It is also possible to add a new RCA event by clicking this button in the toolbar: 

Using the pen icon in the bottom right of an event shape you can name the RCA event and decide about the appearance of the event. It can be shown as a 'Regular event', a 'Root cause', a 'Contributing cause', 'Confirmed not a cause', 'More info needed', and a 'Stop' event.

You can also assign a category and an equivalent Incident diagram. When an equivalent incident diagram is chosen, a link will be created from this particular event to another incident diagram. See section 6.6, for more information.

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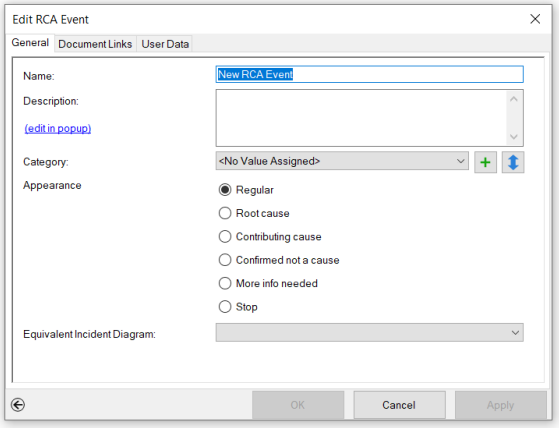
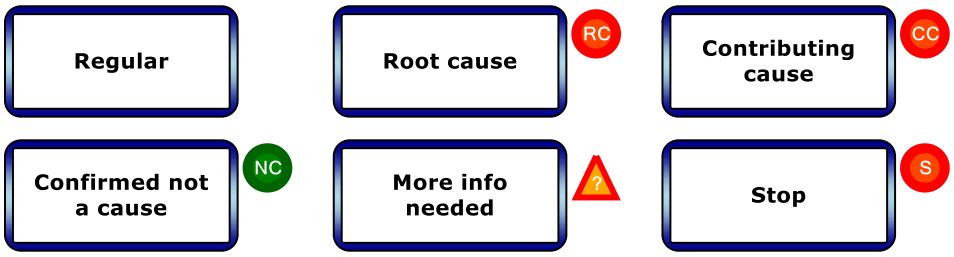


Figure 79 - RCA event editor

Here are the different appearance options for the events:



These appearance options are to differentiate what kind of event is at hand. The first event (regular) is the default RCA event appearance. When we click OK the event is added to the diagram:

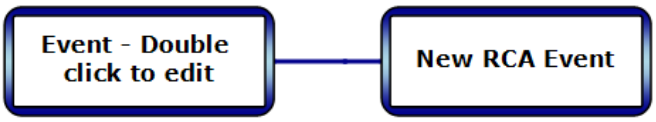


Figure 80 - Added RCA event

We can reposition the events by dragging them around the diagram. By default, RCA diagrams use a free layout grid. The free layout allows the user to distribute the diagram shapes freely on the diagram space by simply moving them or using cutting and pasting movements. In this way, RCA diagrams can easily be rearranged. To change the layout grid, please see section 10.4 Layout grid.

6.3.1 Add an RCA event in parallel to another event

To add events in parallel, move the mouse over the right side of the (first) event, and a green button will appear. When we click this green button, we can add an event parallel to the other event. Alternatively, you can right-click and select Add > Event to the right (or left).

Figure 81 - Add an event in parallel to another event

After repositioning the elements, the result can look like this:

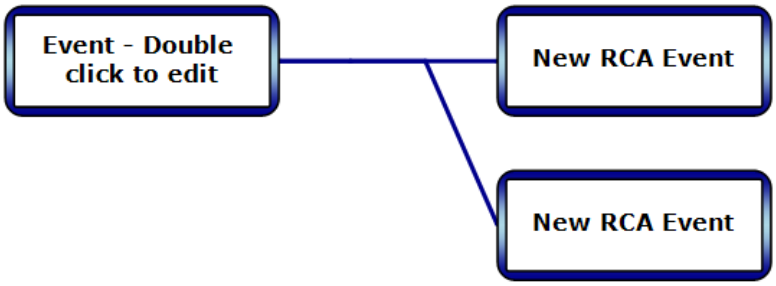


Figure 82 - A parallel RCA event

6.4 THE CONNECTOR

The incident connector is the line which connects the incidents' events. To create a new connector, right click on some empty space and select Add, Connector, and then select the events you want to connect. Alternatively, to add a new connector, move your mouse over the right or left side of an existing event and hold on the green button that appears. While holding, drag the line to another event to connect both events.

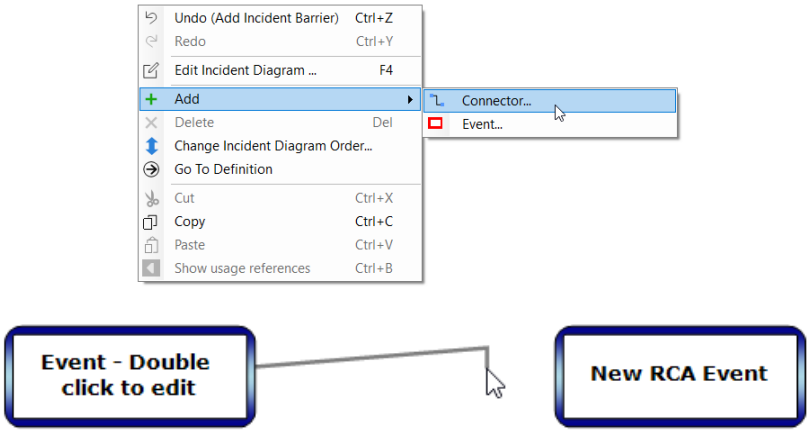


Figure 83 - Add new connector (two alternatives)

6.5 EDIT THE RCA DIAGRAM

Here is a list of all methods for editing the diagram shapes:

- To edit a shape, double click it or select it and press F2.
- To change the order of barriers, drag them left or right beyond its neighbor.
- Hold down SHIFT to also move connecting shapes.
- It is possible to copy (CTRL+C) and paste (CTRL+V) shapes with the clipboard.
- To copy some properties, Use paste special. This allows you to select which items to paste over the selection.
- To remove an item, select it and press DEL.

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6.6 LINK RCA EVENT TO EQUIVALENT INCIDENT DIAGRAM

When RCA diagrams become too large or when multiple incident investigators or investigation teams investigate different parts of the incident, a decision can be made to split the RCA diagram into different parts.

Take the following steps to connect an RCA diagram to an RCA event from a different diagram within the same incident.

1. Double click the RCA event which should be linked to the other RCA diagram.
2. Choose the RCA diagram that should be linked to this event.
3. Click OK.

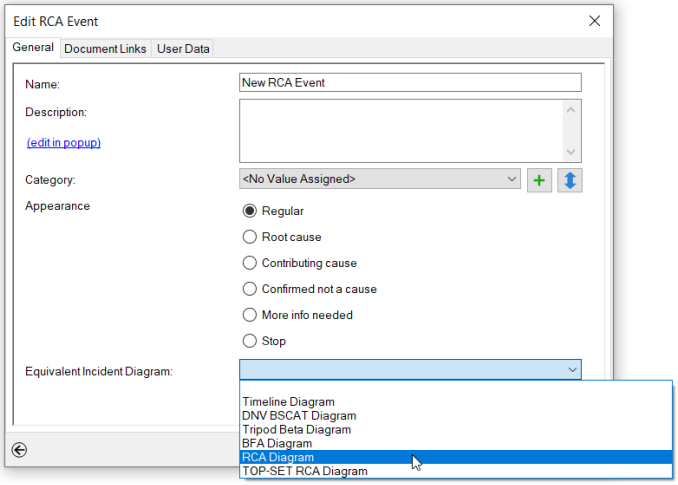

Figure 84 - Linking equivalent incident diagram

Note: it is only possible to link to RCA diagrams within the same incident investigation (node).

A blue arrow button will appear next to the event once a link has been created. You can click this arrow to navigate to the linked RCA diagram instantly.

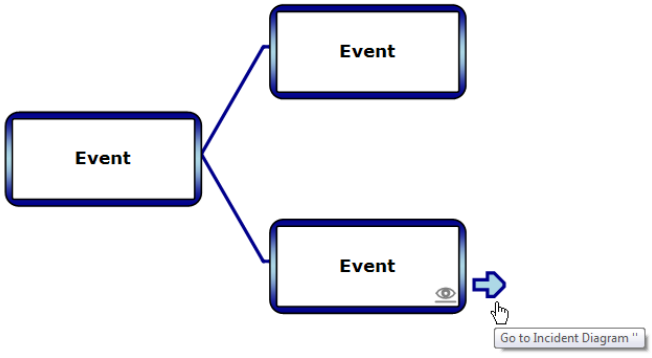

Figure 85 - Navigate directly to equivalent incident diagram

7

KELVIN TOP-SET ROOT CAUSE ANALYSIS

7.1 A BRIEF DESCRIPTION OF RCA METHODOLOGY

Root Cause Analysis (RCA) is a simple and straightforward incident analysis technique. It starts off with an incident and drills down into the chain of events that led to that incident until the root causes are identified. This method is widely used throughout the world, and the idea of drilling down to the root cause is also present in all of our other incident analysis methods.

As a downside, a traditional root cause analysis has the potential to turn into a jumble of elements. We felt this could be improved, so we did two things in our software solution. Firstly, we added some categorizations to see at a glance where the core problem areas accumulate. This enables you to perform a concise analysis that is easier to communicate. Secondly, you can separate the main diagram into smaller sub-parts. This avoids you losing overview. Expectedly these changes to RCA will help you create better analyses.

7.1.1 Kelvin TOP-SET RCA

The TOP-SET® incident investigation methodology is used by major blue-chip clients all around the world. It is taught on 1-day to 3-day senior courses held throughout the world, and are the basis of several incident investigation products for professional incident investigators (Further details are available at www.kelvintopset.com).

TOP-SET® was developed in 1989 to provide a comprehensive incident investigation methodology that would take users by the hand from the start of the process of investigation throughout the end. Users are educated in planning an investigation, visiting the scene and gathering data, interviewing witnesses, creating a storyboard of events through which incorporating as much information as possible, analysing the information to discover the causes, creating recommendations, and to report them.

The Kelvin TOP-SET RCA method is a more structured approach than the regular RCA method. The TOP-SET acronym stands for Technology, Organization, People, Similar events, Environment and Time. It emphasizes on not to quit investigating too rapidly. We have all heard the phrase, “We all know what has happened here”, where the temptation is to make the RCA fit this early conclusion. Kelvin TOP-SET RCA encourages you to keep digging deeper until you arrive at the Root Cause of an incident.

NOTE: Kelvin TOP-SET makes use of reference lists to ensure better quality incident investigations. Our software however, supports with the analysis part of incident investigation mostly. We advise you to contact Kelvin TOP-SET directly to gain a better understanding on their full methodology.

7.1.2 Barriers vs TOP-SET RCA

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The main difference between TOP-SET RCA and our other incident analysis methods, lies in the fact that TOP-SET RCA is not barrier based. Everything in TOP-SET RCA is an event, including the elements that would be considered barriers or barrier failures in Tripod or BFA. However, from software version 9.2.0 onwards you are able to link TOP-SET RCA events to bowtie barriers. By doing so you can signal if an event can be seen as a failed barrier. To find out how to do this, please see chapter 9 Linking incidents with bowtie.

7.2 CREATING A KELVIN TOP-SET DIAGRAM

To create a new TOP-SET RCA diagram, you have to right-click the incident node in the tree view and select 'New Incident'. Name the diagram and select methodology 'TOP-SET RCA'. It is possible to add additional incident information within this screen. After completion, press OK.

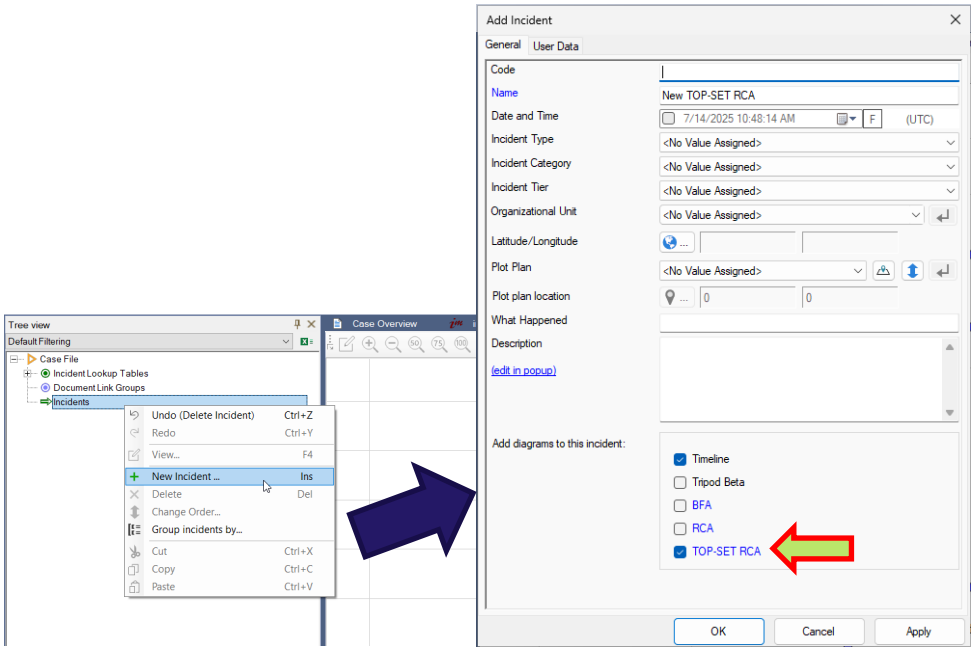

Figure 86 - Creating new TOP-SET RCA diagram

The Kelvin TOP-SET RCA diagram consists of events, which are connected through connectors. To begin a diagram we start off from a single event.

When selecting the TOP-SET RCA method for incident analysis (chapter 3.2 Creating an incident & incident analysis diagram), the software automatically creates the first event of a TOP-SET RCA diagram, enabling you to start the TOP-SET RCA diagram immediately.

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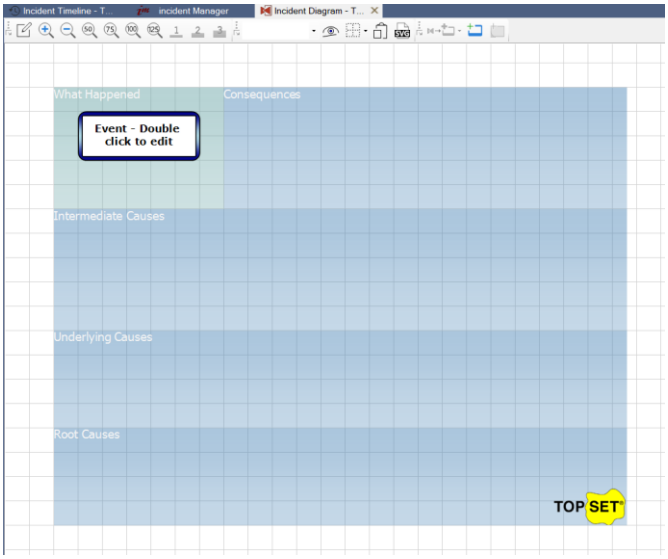

Figure 87 - Default start of a TOP-SET RCA diagram

Aside from automatically creating an event, it also shows the structure on which you can map your analysis.

7.3 ADD AN TOP-SET RCA EVENT

Add an event by clicking the green button on the left, right, bottom or top side of the shape. An Event will automatically be created on the respective side.

Figure 88 - Adding an event using the green button

Another way of adding an event is done by right-clicking the event and subsequently selecting Add → Add Event to the Left/Right.

It is also possible to add a new RCA event by clicking this button in the toolbar: 

Using the pen icon in the bottom right of an event shape you can name the RCA event and decide about the appearance of the event. It can be shown as a 'Regular event', a 'Root cause', a 'Contributing cause', 'Confirmed not a cause', 'More info needed', and a 'Stop' event.

You can also assign a category and an equivalent Incident diagram. When an equivalent incident diagram is chosen, a link will be created from this particular event to another incident diagram. See section 6.67, for more information.

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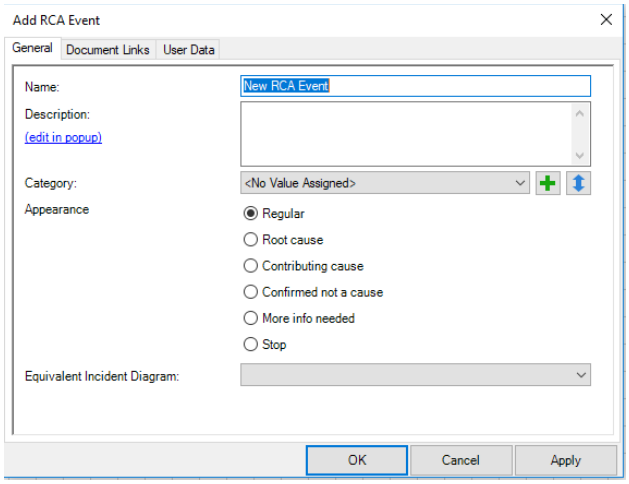
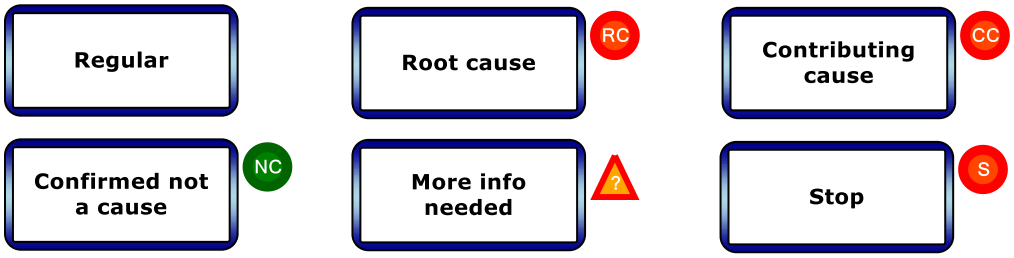


Figure 89 - TOP-SET RCA event editor

Here are the different appearance options for the events:



These appearance options are to differentiate the type of event. The first event (regular) is the default RCA event appearance. When we click OK the event is added to the diagram:

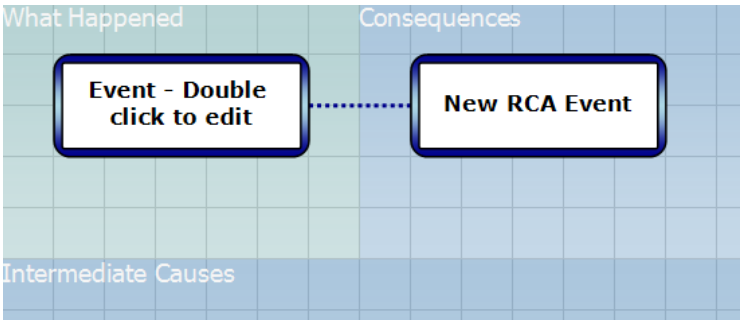


Figure 90 - Added TOP-SET RCA event

We can reposition the events by dragging them around the diagram. By default, RCA diagrams use a free layout grid. The free layout allows the user control over the layout of the diagram. This means that the diagram shapes can be freely distributed on the diagram space by simply moving them or with cutting and pasting movements. In this way, RCA diagrams can easily be rearranged. To change the layout grid, please see chapter 10.4 Layout grid.

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7.4 ADD AN TOP-SET RCA EVENT IN PARALLEL TO ANOTHER EVENT

To add events in parallel, move the mouse over the right-and side of the (first) event, and a green button will appear. When we click this green button, we can add an event parallel to the other event. Alternatively, you can right-click and select Add > Event to the right (or left).

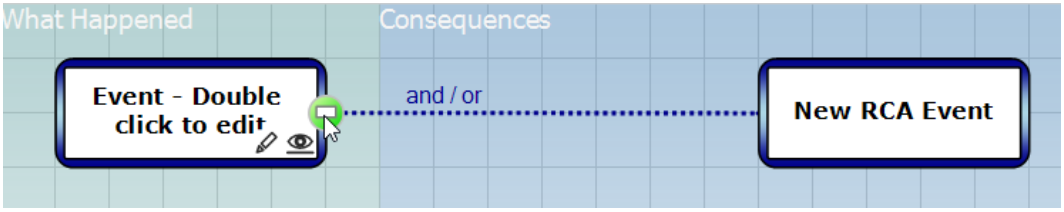

Figure 91 - Add an event in parallel to another event

After dragging, the result can look like this:

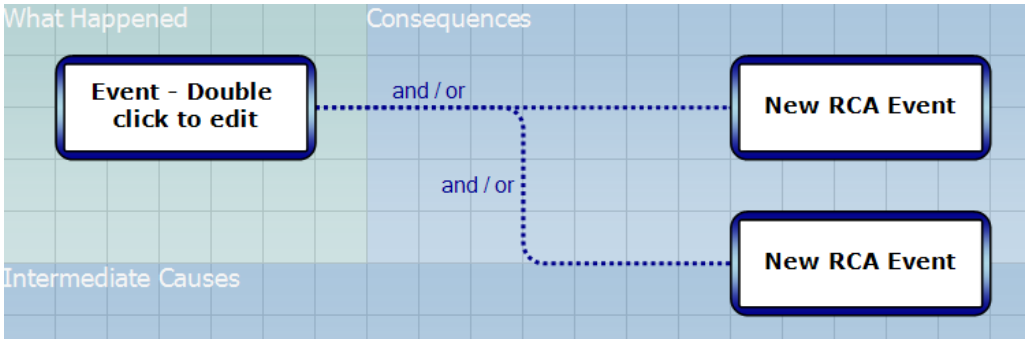

Figure 92 - A parallel TOP-SET RCA event

7.5 THE CONNECTOR

The incident connector is the line which connects the incidents' events. To create a new connector, right click on some empty space and select Add, Connector, and then select the events you want to connect. Alternatively, to add a new connector, move your mouse over the right or left side of an existing event and hold on the green button that appears. While holding, drag the line to another event to connect both events.

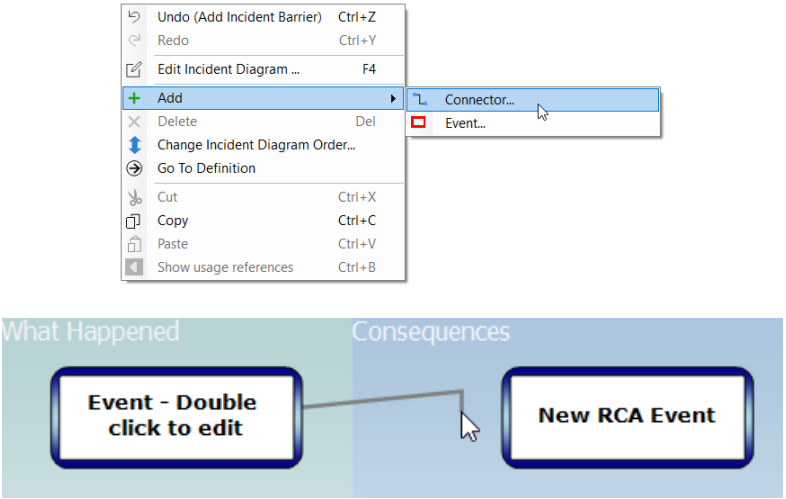

Figure 93 - Add new connector (two alternatives)

7.6 EDIT THE TOP-SET RCA DIAGRAM

Here is a list of all the ways to edit the diagram shapes:

- To edit a shape, double click it or select it and press F2.
- To change the order of barriers, drag them left or right beyond its neighbor.
- Hold down SHIFT to also move connecting shapes.
- It is possible to copy (CTRL+C) and paste (CTRL+V) shapes with the clipboard.
- To copy some properties, Use paste special. This allows you to select which items to paste over the selection.
- To remove an item, select it and press DEL.

7.7 LINK TOP-SET RCA EVENT TO EQUIVALENT INCIDENT DIAGRAM

When RCA diagrams become too large or when multiple incident investigators or investigation teams investigate different parts of the incident, a decision can be made to split the RCA diagram into different parts.

Take the following steps to connect an RCA diagram to an RCA event from a different diagram within the same incident.

1. Double click the RCA event which should be linked to the other RCA diagram.
2. Choose the RCA diagram that should be linked to this event.
3. Click OK.

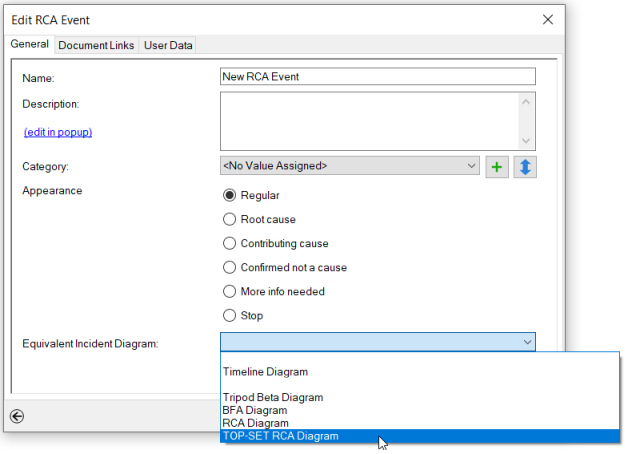

Figure 94 - Linking equivalent incident diagram

Note: it is only possible to link to RCA diagrams within the same incident analysis (node).

A blue arrow button will appear next to the event once a link has been created. You can click this arrow to navigate to the linked RCA diagram instantly.

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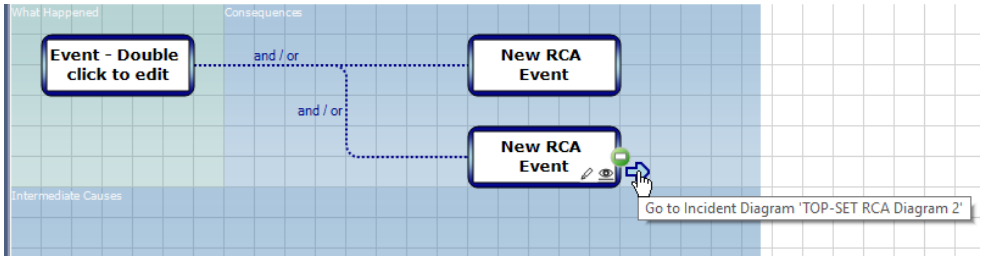

Figure 95 - Navigate to equivalent incident diagram

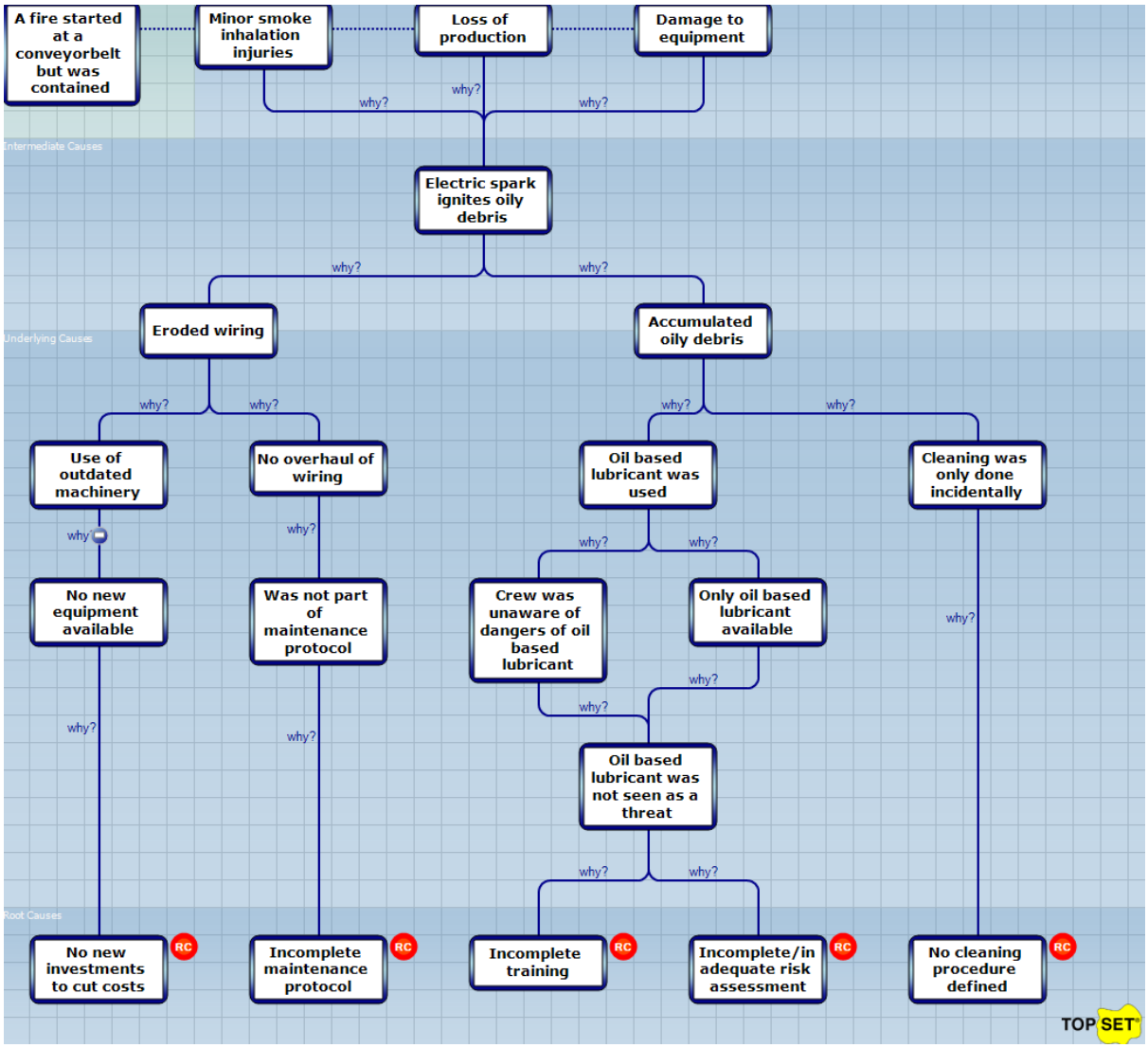

Figure 96 - An example of a finished TOP-SET RCA diagram

8
ACTIONS / RECOMMENDATIONS

Actions can be used in two ways, as TODO items during the incident investigation, or as recommendations (an improvement plan) as a result of the incident analysis. Actions are visualized on the analysis diagram as post-it shapes. The action code is also displayed in the sticky note shaped action.

8.1 ACTIONS AS A TODO ITEMS

The creation of incident diagrams has often already started during the initial information gathering phase of the incident investigation. Creating incident analysis diagrams gives the incident investigator insight into where information is lacking. Creating an action lets you track all the elements in your incident diagram that need further investigation. An example could look like this:

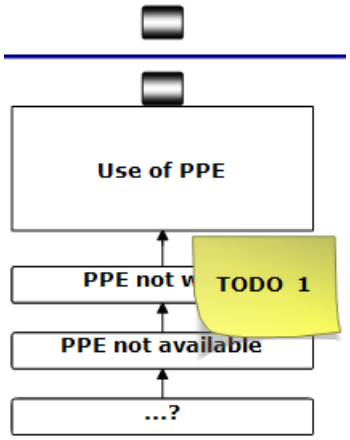

Figure 97 - Example of a TODO action during incident investigation

8.2 ACTIONS AS RECOMMENDATIONS

After completing the incident analysis diagram, there is a better understanding of how and why the incident took place. Actions thereafter can also be used as recommendations to improve an organizations risk control framework and/or (safety) management system. Recommendations could refer to adding new barriers, improving existing barriers or changing the management system by focusing on an incidents root cause and fixing systemic failures. Action shapes can be used to highlight those areas.

Some examples of actions as improvements are: correcting an error in a procedure, adding a new railing or changing the accountable party for a barrier. The improvements do not need to be recurring, but are implemented on a singular basis to improve the overall level of safety.

Actions to create a new barrier are usually displayed on the associated event within the diagram, while (short-term) improvements on existing barriers are usually placed on the barrier itself. Improvements that cover deeper lying systemic causes (long-term) can be added to the causation path. An example could look like this:

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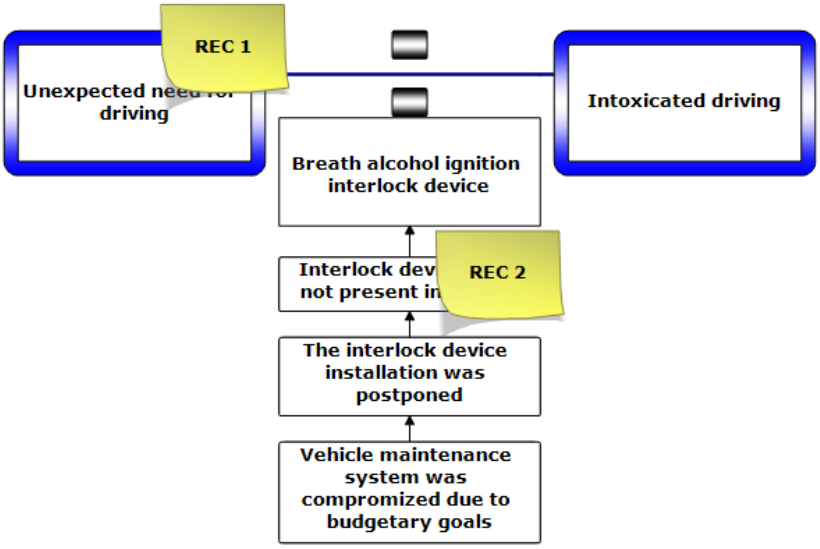

Figure 98 - Example of recommendations on an incident diagram

8.3 ADDING AN ACTION

To add an action, first select the element you want to add the action to. Adding an action can be done in two different ways:

1. Clicking the action icon in the toolbar

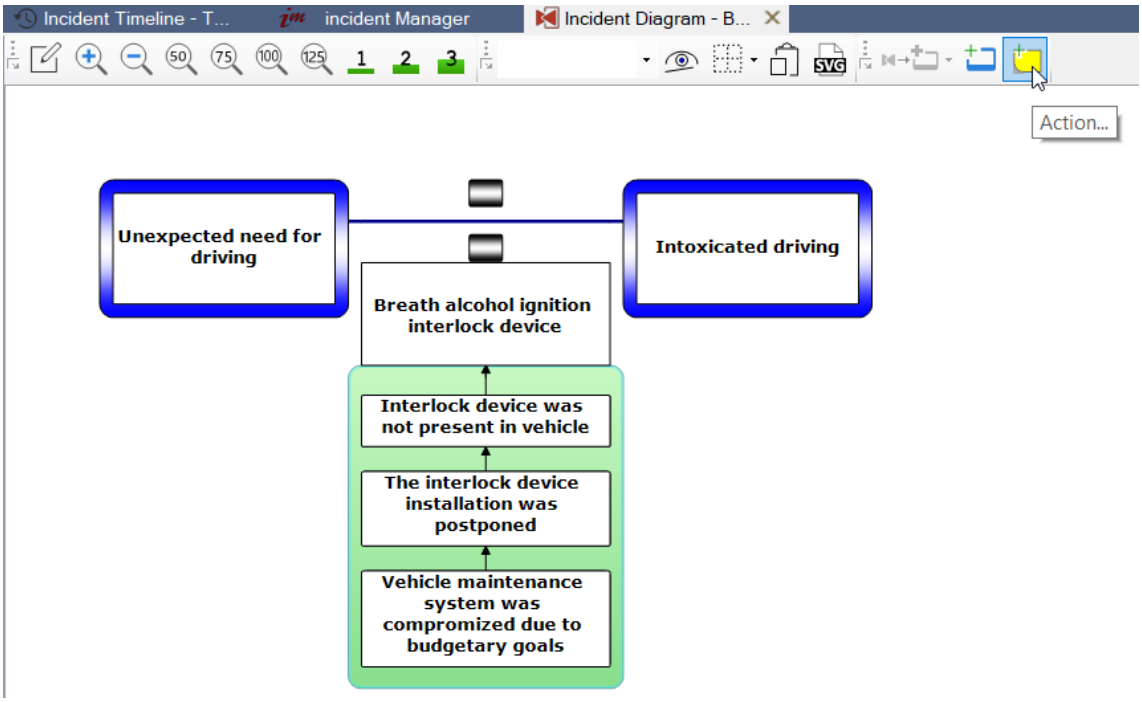

Figure 99 - Action button in the toolbar

2. Right-clicking the element → Add → Action...

Note: the action icon in the toolbar will only be activated once an element is selected, since actions need to be linked to a specific element of your diagram and can't "float" in the diagram space.

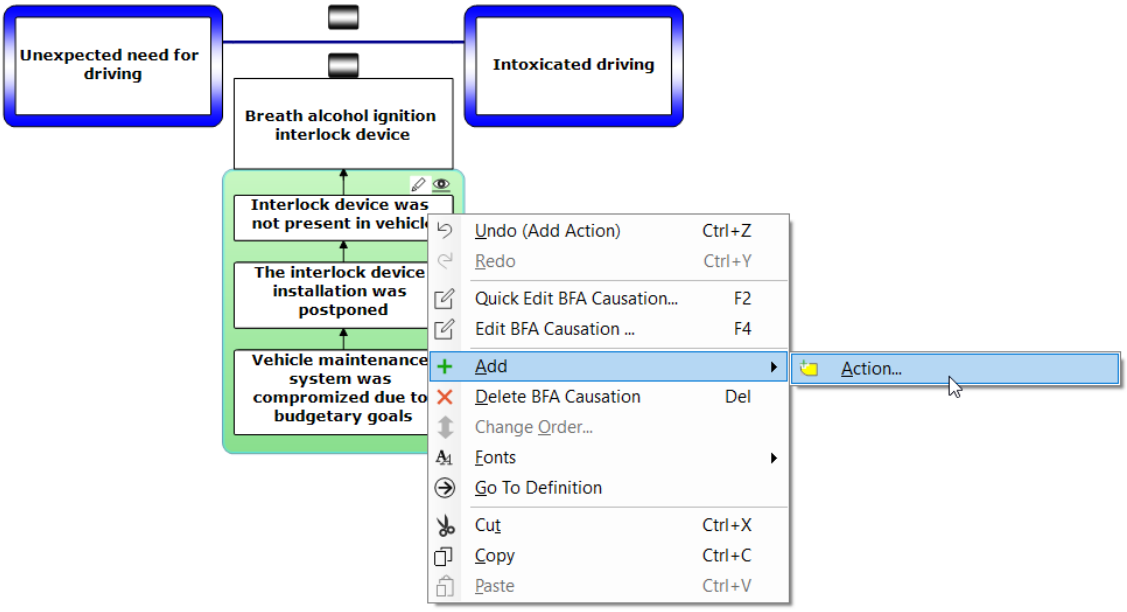

Figure 100 - Add action by right-clicking an element

The action editor will open and will allow you to add the following data:

- **Code**: the action code is displayed on the diagram.
- **Name**: shortly describes what the action is about.
- **Description**: a detailed description of the action.
- **Category:** a taxonomy for categorizing actions (NOTE: non-customizable).
- **External Reference**: possibility to fill in a reference to an external action tracking system.
- **Action party**: the job title responsible for completing this action (customizable in Incident Lookup Tables, as well as on the spot using the icon).
- **Organization unit:** specific department or site of an organization (customizable in Incident Lookup Tables, defaulted as an empty node).
- **Priority**: gives a priority level to an action (customizable in Incident Lookup Tables).
- **Target**: sets a date before which the action has to be completed.
- **Sign off comment**: an optional field to provide comments when signing off an action.
- Sign off authorized by: the job title that authorized the completion (customizable in Incident Lookup Tables, as well as on the spot using the icon).
- **Sign off date**: the date on which the action is signed off.
- **Completed**: this box can be toggled once the action has been completed.

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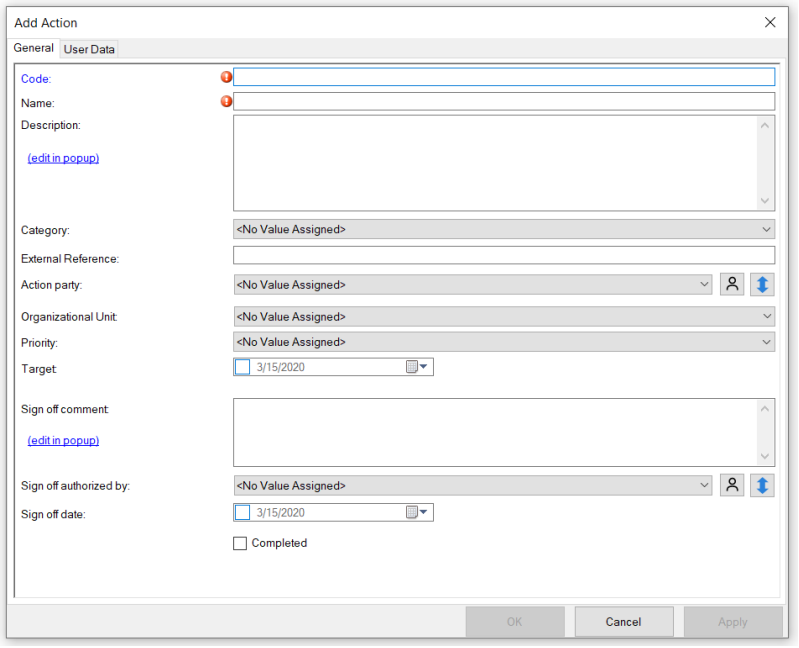

Figure 101 - Add action window

8.4 VISUALIZING ACTIONS

Actions are visualized on the diagram as post-it shapes. The code is displayed within the shape. Go to Diagram → Display options or click the 'large eye icon' in the toolbar ( ) to adapt the visualization of actions.

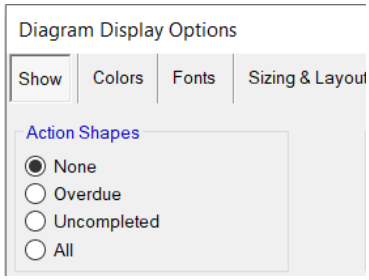

Figure 102a - Action shape display settings

For Action Shapes, select either 'None' to hide all actions, choose 'Overdue' to show all uncompleted actions with an overdue target date, tick 'Uncompleted' to show only uncompleted actions or select 'All' to see every action shape.

In the Colors tab you can choose to color your actions by Priority, Category, Overdue or Completed status.

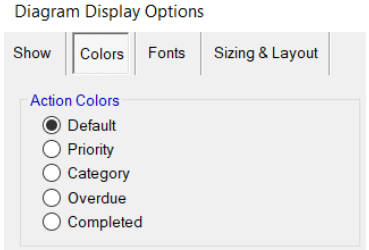

Figure 103 - Action color display settings

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8.5 ACTION REPORTS

There are specific reports available for actions. Go to Tools → Reports or click the report button in the main toolbar (). Then expand the Actions section to see the following action reports:

- **Actions in XL**: a flat list of Actions, opens in Excel
- **All Actions**: a list of all actions in alphabetical order based on code, opens in Word
- **Actions by Action party**: a report with all actions sorted by Action party, opens in Word
- **Actions by Priority and Action party**: a report with all actions sorted by Priority, opens in Word
- **Actions of a specific Action party**: a report with all actions for a specific job title, opens in Word

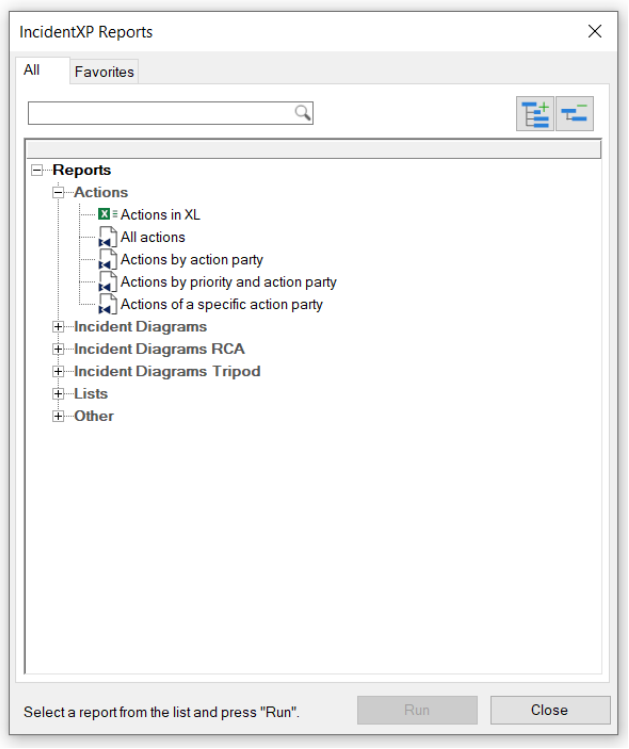

Figure 126 – Action report overview

Note: If you are using BowTieXP in combination with IncidentXP, actions found in these reports can be a combination of bowtie actions and incident related actions (i.e. recommendations).

9
LINKING INCIDENTS WITH BOWTIE

Note #1: To create templates containing bowtie information, or to link incident information to bowties, you will need an IncidentXP + BowTieXP license.

Note #2: For a brief summary about the bowtie risk assessment methodology, see section 14, A brief description of a subset of bowtie methodology. Please refer to our BowTieXP manuals for an extensive explanation of the bowtie methodology and the BowTieXP software.

The IncidentXP software allows you to have a full integration of incident and risk analysis, by using and linking existing risk assessment information (bowties) to your incidents.

If relevant bowtie diagrams are available to use in your incident investigation, you can take entire scenario lines from the bowtie and pin them directly into your incident analysis diagram. This results in a better fit between incident and risk assessment analysis, which in turn allows you to improve the (initial) risk assessment.

This allows organizations to analyze incidents in a barrier-based framework with minimal bowtie training. Creating a barrier-based incident diagram requires training. However with this templated software approach, all incident scenarios which already exist on bowties can be quickly plotted and analyzed using any licensed incident analysis method.

After completing the incident analysis, the incident data and recommendations can be linked back to the bowtie risk assessment and visualized on existing barriers. Plotting all your incidents data onto a single BowTieXP case file allows you to aggregate barrier failure information and allows users to perform incident trend analysis and visualize weak spots within your management system.

In short, the linking process allows you to gauge barrier effectiveness and availability on your bowtie model(s), based on real-world information from incident analyses.

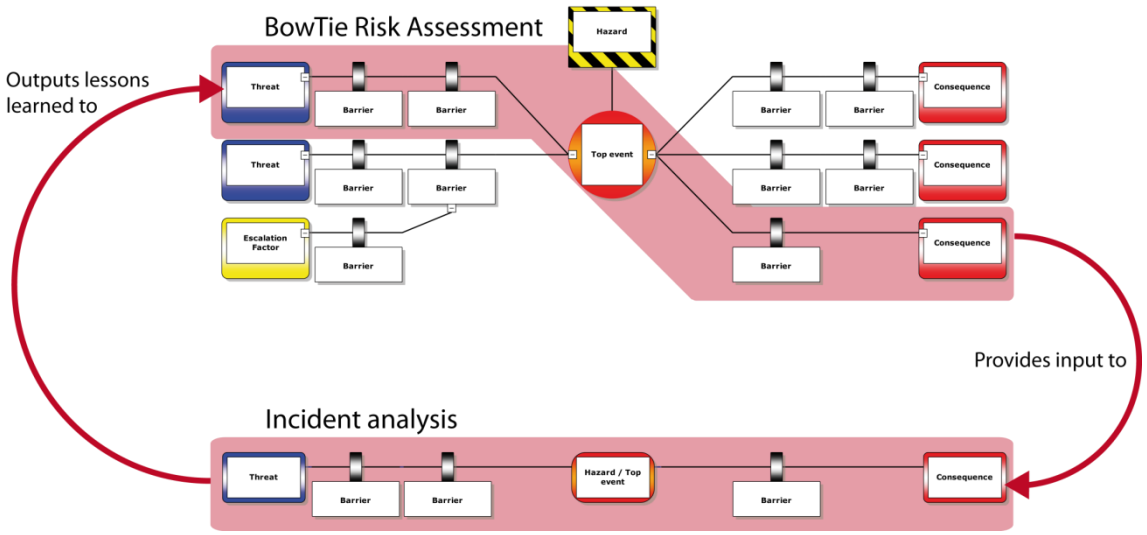

Figure 104 - Bowtie risk assessment & incident analysis

9.1 CREATING A BOWTIE TEMPLATED INCIDENT ANALYSIS DIAGRAM

In order to start the incident analysis using specific bowtie diagrams as template you have to:

1. Make sure there are bowtie diagrams available in your current case file (.btf).
2. Create an incident in the tree view. See section 3.2, Creating an incident & incident analysis diagram.

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If your bowtie case file contains bowtie information, the ‘Add Event from bowtie’ button will be enabled:

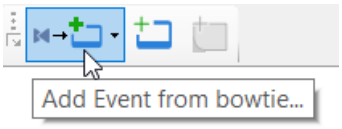

Figure 105 - Add event from bowtie button

By selecting the ‘Add Event from bowtie’ button, you will be presented with a drop-down menu allowing you to choose a bowtie element (top event, threat or consequence) to start from:

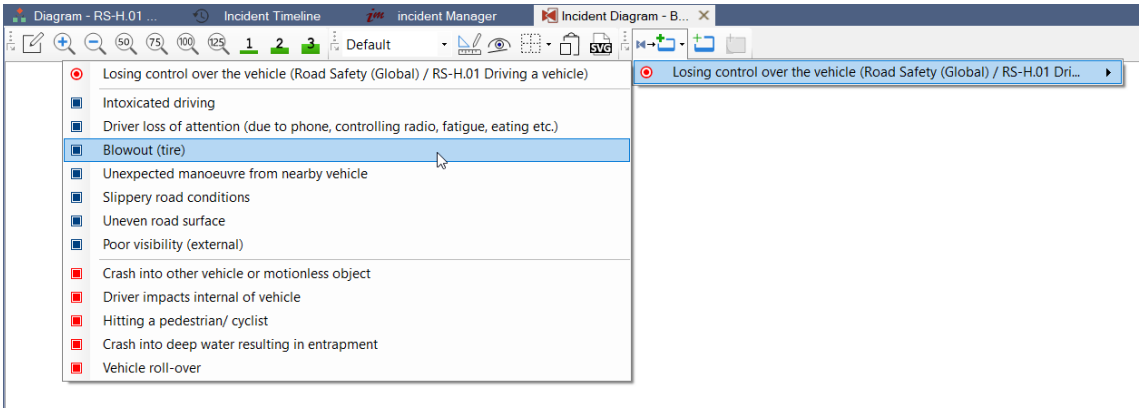

Figure 106 - Add event from existing bowtie

Note: The link between the incident analysis and the bowtie diagram is automatically created when the incident analysis diagram is created by using existing bowties.

In this example we choose a road safety bowtie and have selected the threat ‘Blowout (tire)’. This event then will be added to the diagram. When usually hovering over the green button to add another event, we get another small orange button allowing to choose the next logical step in the (bowtie) event flow:

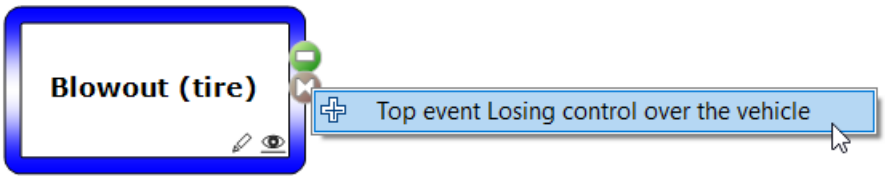

Figure 107 - Add new (existing bowtie) event

Once selected, not only is the top event ‘Losing control over the vehicle’ brought into the diagram, but also its associated barriers. In the same way you can continue adding every bowtie item needed. It is also possible to add items manually.

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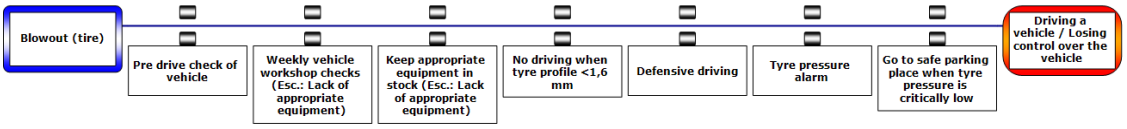

Figure 108 - Added new (existing bowtie) event, including all barriers

In using the Tripod Beta methodology, you are forced to alter some events manually (see section 4.2, Creating a Tripod Beta diagram). Tripod Beta uses trio's instead of straight event lines, therefore you will need to rework your events methodically. Each (threat) event must be split up into two elements: an agent and an object. Because of this you will probably need to replace some of the barriers, according to the correct event lines. You can do this by 'Cut' (selecting a barrier and press Ctrl + X) and 'Paste' (selecting the alternate connector and press Ctrl + V).

In all methods, after creating the diagram, every barrier needs to be assessed and assigned a barrier state (failed, missing, unreliable, inadequate or effective), and provided with a causation assessment. For each method specifically, see:

- Tripod Beta, see section 4.5, Add a Tripod Beta causation assessment.
- BFA, see section 5.5, Add a BFA causation assessment.

9.1.1 Difference in detail level between risk assessment and incident analysis

There exists a mismatch in the perspective/ abstraction level of the defined barriers between the risk analysis (bowtie diagrams) and the incident analysis. Barriers in incident analyses tend to be described more specific than those in risk analysis – those tend to be defined more abstract, high-level. For example: 'high level alarm' in a risk assessment can become (more specific) 'High level alarm A2.1 on Tank X' in your incident analysis. Incident analysis allows you to be more specific because -once an incident occurred- specific information from that situation is available, whereas in risk assessment all scenarios need to be covered.

Note: The name of the elements in your incident analysis diagram can be adjusted without losing the connection with the linked bowtie diagram, nor altering its content.

9.2 LINKING INCIDENT ANALYSIS ELEMENTS TO BOWTIE DIAGRAMS

The link between the incident diagram and a particular bowtie can also be created after finishing a regular incident diagram. To link an incident barrier (or an event if you are using the TOP-SET/RCA method) to a bowtie barrier, double click an incident barrier and go to the 'Barriers' tab in the editor.

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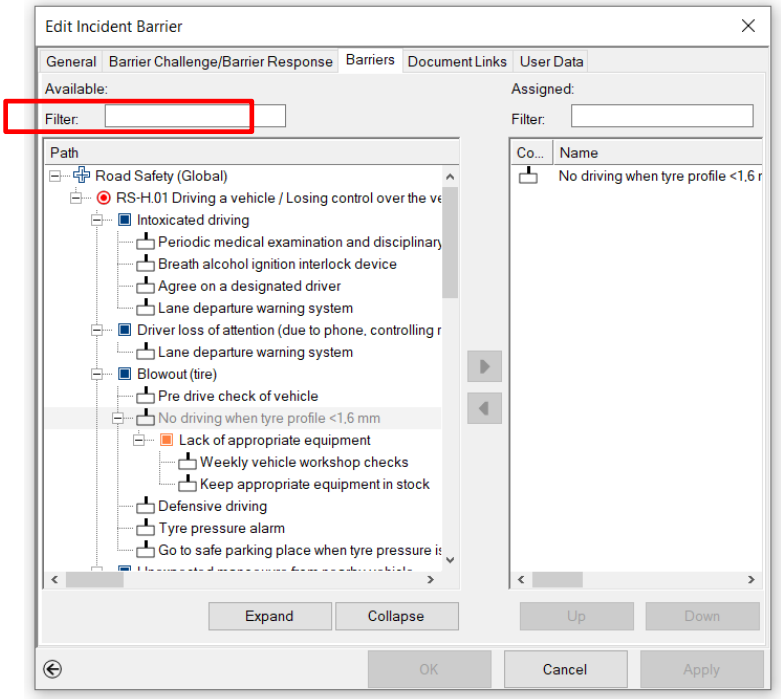

Figure 109 - Linking an incident barrier to bowtie barrier

Select the corresponding bowtie barrier(s) within the 'Available' window and move it to the 'Assigned' window by either dragging and dropping or using the arrows in between. The filter can be used to search for a specific barrier.

The process of linking an incident event to a bowtie event (threat, top event or consequence) works almost the same. Again, double click the incident event and this time search for a corresponding bowtie event in the tabs Hazards, Threats, Consequences and Escalation factors.

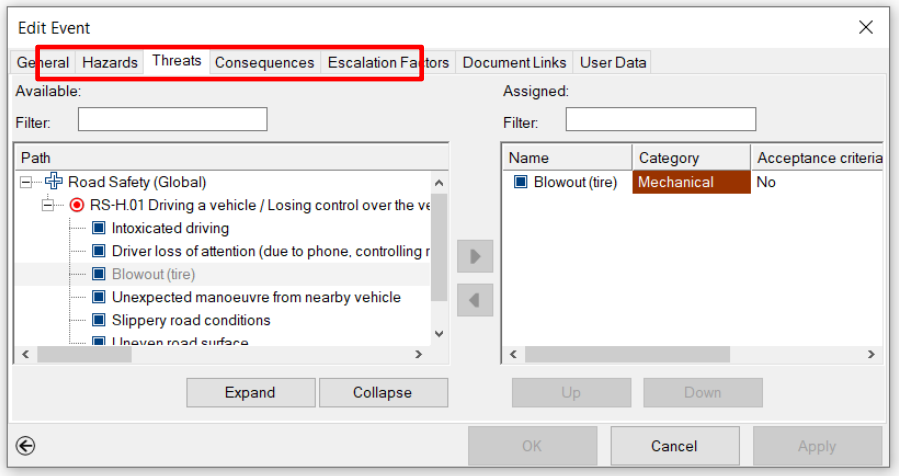

Figure 110 - Linking an incident event to a bowtie event

Select the corresponding bowtie element(s) within the 'Available' window and move it to the 'Assigned' window by either dragging and dropping or using the arrows in between. The filter can be used here as well.

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9.3 VISUALIZING INCIDENT ANALYSIS DATA ON THE BOWTIE DIAGRAM

The barriers failure statistics and failure details can be shown on the bowtie diagram once the links between the bowtie barriers and the incident barriers have been made. Failure details include the barrier failure state and the causation paths. To enable this view, you select the incident filter from the filters drop-down on the bowtie diagram toolbar:

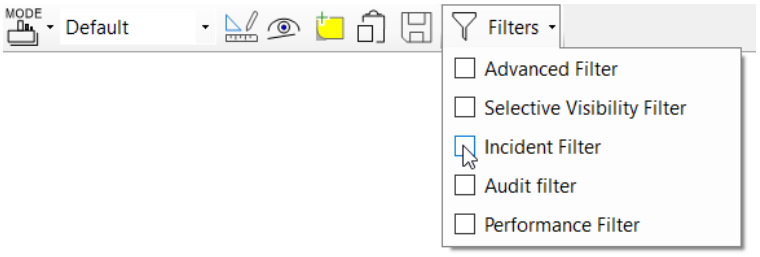
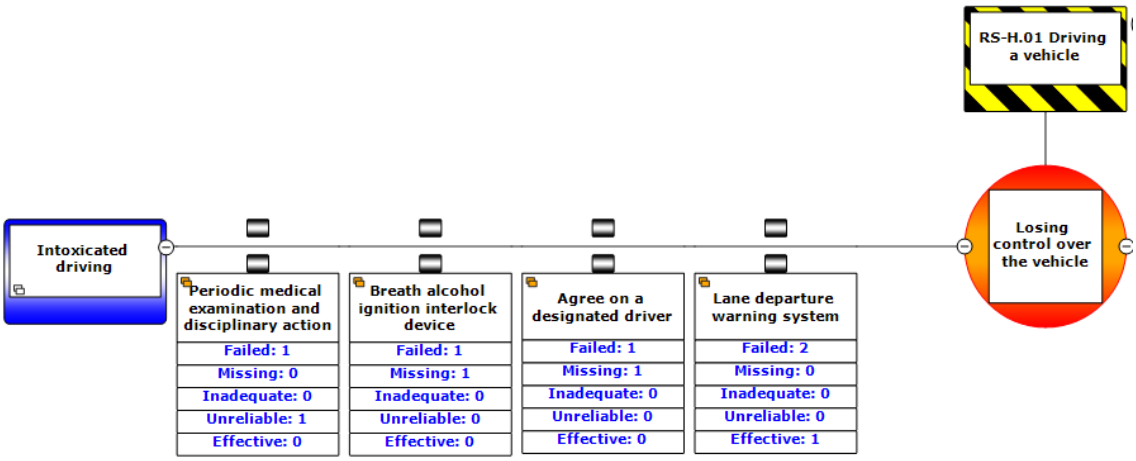


Figure 111 - Enabling the Incident Filter

Here is a cut out of a bowtie diagram showing the incident barrier states:



igure 112 - Bowtie diagram showing incident barrier states

9.3.1 Incident Filter toolbar

Once the incident filter is selected, the incident filter toolbar will be displayed. The filter toolbar allows you to fine-tune what information will be shown. You can choose to show data from one incident, all incidents or from a specific set of incidents:

Figure 113 - Incident filter toolbar

Incidents

You can choose which incident(s) you would like to display within the 'Incidents' selection screen.

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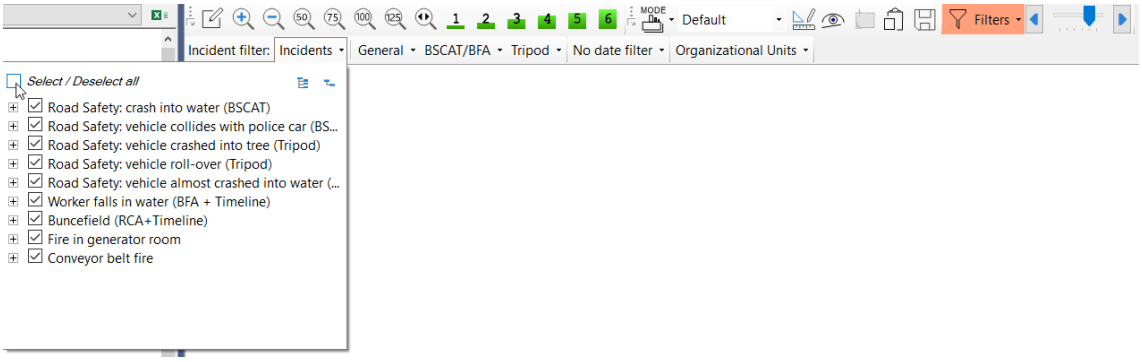

Figure 114 - Incident filter (incident selection)

General

You can change various general visibility settings, underneath the option 'General':

- **Show Incident count:** show the number of incidents the barrier was linked to.
- **Show Failure Percentages:** show the percentual barrier failure from the incidents it was linked to.
- **Show linked item count:** show the number of incident shapes the bowtie element was linked to. As incident diagrams tend to be more specific (where bowties are more general/abstract), it can happen that a single bowtie barrier will be linked to multiple incident barriers within one incident.
- **Show item state count:** show the number of counts of the defined status within your incident diagrams (e.g. failed, inadequate, unreliable, missing, or effective). See figure 135 for an example.
- **Include draft Incident Diagrams:** this can be used to in- or exclude draft incident diagram data onto the bowtie diagrams. The incident diagram status can be altered (between 'Working Draft' and 'Completed') by double clicking an incident diagram in the tree view, or within the Incident Manager.

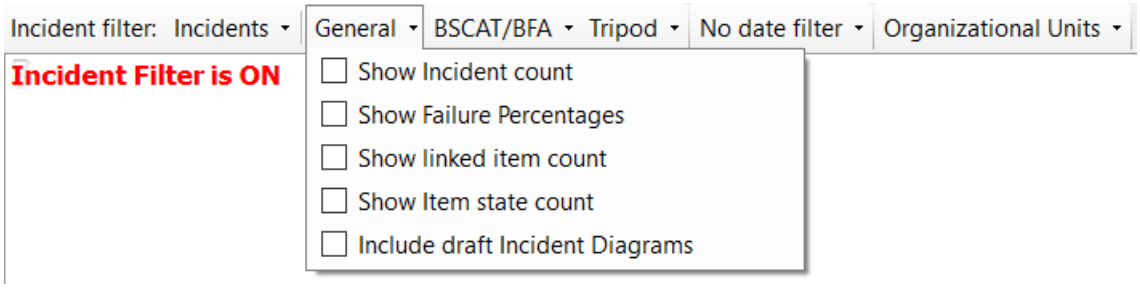

Figure 115 - Incident filter (general settings)

BFA

You can change various BFA diagram related visibility settings, underneath the option 'BFA':

- **Show links:** whether or not to show the BFA chart values.
  - **Show top level links only:** visualize the actual item, or only the main category.
  - **Show codes only:** visualize the full description, or just the items' code.
- **Show free text:** whether or not to show the free text description of the causation path. For BFA, it will also show the name and count of the causation taxonomy.

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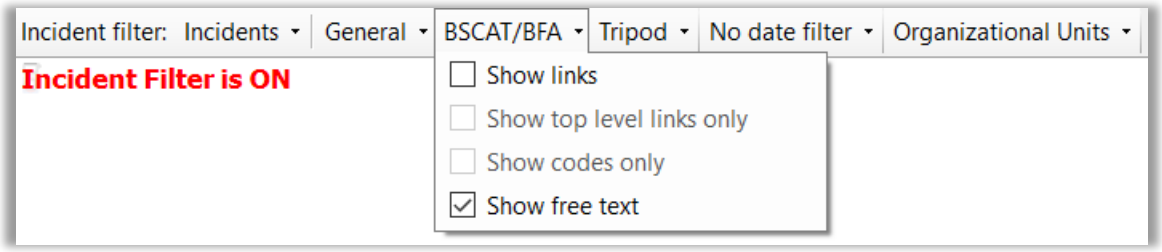

Figure 116 - Incident filter (BFA settings)

Tripod

You can change various Tripod diagram related visibility settings, underneath the option 'Tripod':

- **Show Tripod causations:** whether or not to show Tripod Causation paths.
  - **Only show BRF summary:** visualize the entire causation path or only the BRF codes.

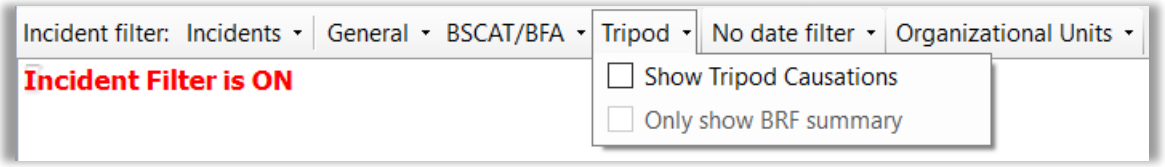

Figure 117 - Incident filter (Tripod settings)

Date & Organizational Unit

In larger organizations, it can be helpful to compare the incident statistics of different sites and dates. This allows a company to benchmark within their own organization to decide where additional efforts are required. To make these comparisons easier, a 'Date' and 'Organizational Unit' filter are implemented.

For the date filter within the incident filter, it is possible to use the predefined date options, or to define a custom date range.

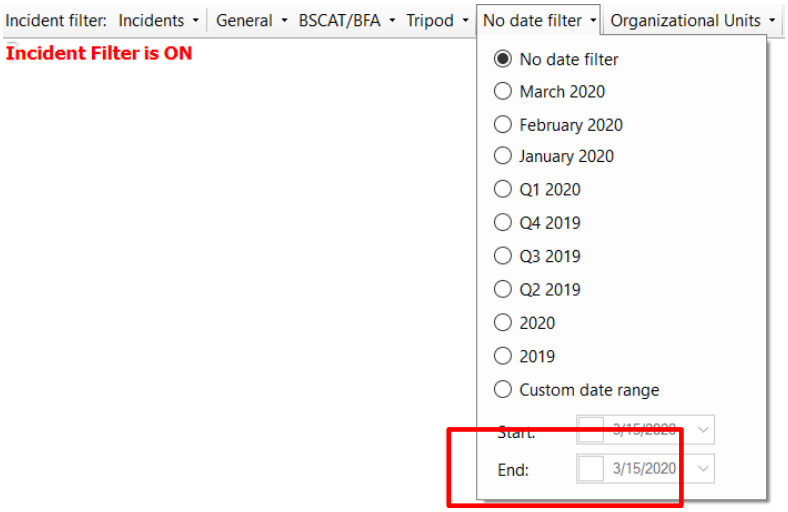

Figure 118 - Incident filter (date settings)

To filter on Organizational Units, (un)check all relevant boxes. Dark green fields indicate that there are items present linked to this specific organizational unit. Light green means there is an indirect link, and white/ no color means there are no incident items linked to this organizational unit.

Figure 119 - Incident filter (Organizational Unit settings)

This makes it easier to discover which organizational units contain relevant incident information.

9.3.2 Filter strength

You can choose to show all bowtie elements or limit the bowtie to only the paths involved in the incident(s). This can be arranged through the filter strength:

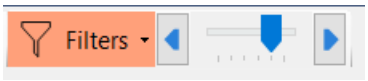

Figure 120 - Filter strength

The filter strength has six strength levels:

1. Show everything
2. Show everything + grey out non selected items
3. Hide unrelated paths
4. Hide unrelated paths + grey out non selected items
5. Show only directly and indirectly selected
6. Show only directly selected + grey out indirectly selected

10 CONFIGURING THE DIAGRAM

IncidentXP has diagrams which are configurable in many ways – there are multiple options to tailor the display to your specific needs. You can apply various colors and show all kinds of extra information. This chapter will explain all the various settings.

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10.1 CHANGING DISPLAY SETTINGS FOR A SINGLE TYPE OF ITEM

In the diagram, if you hover your mouse over an item, an eye-shaped icon will appear:

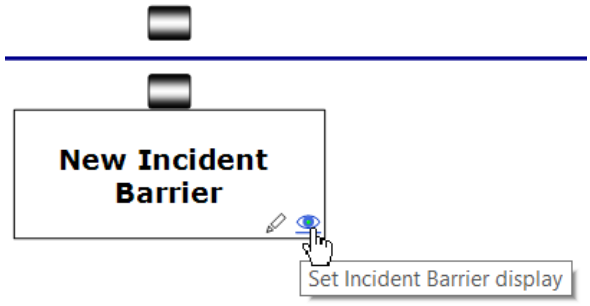

Figure 121 - Eye shaped icon - display settings

By clicking the eye-shaped icon, a dialog box will appear which allows you to customize the display of the item. It lists all the items can be shown on the diagram as additional information box below the element. Choose from this list by selecting the radio button on the S or L column. S stands for **S**hort format and L stands for **L**ong format.

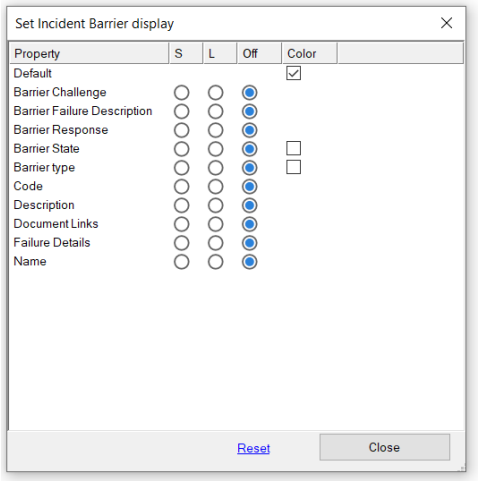

Figure 122 - Set incident barrier display dialog (1/2)

You can also select which property is to be used to color the shape itself – this is done by selecting a check box in the color column:

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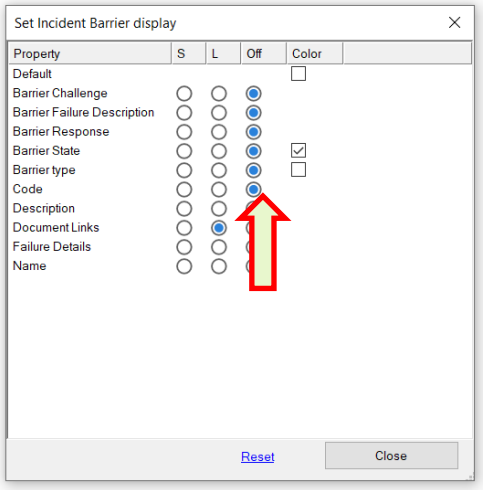

Figure 123 - Set incident barrier display dialog (2/2)

As an example, the above settings result into the visualization shown below:

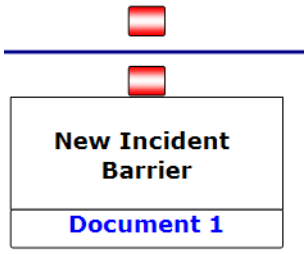

Figure 124 - Incident barrier colored by barrier state and displaying document links

You can adjust the display for all elements on the diagram. If you need to adjust overall display configurations, you can also use the overall diagram display options dialog, discussed in the next section.

10.2 CHANGING DISPLAY SETTINGS FOR THE WHOLE DIAGRAM

Changing settings for the entire diagram is done by clicking the 'large eye-icon' in the toolbar (). This shows you the current display settings. The dialog consists of several tabs which allow you the change the appearance of the diagram(s) shapes.

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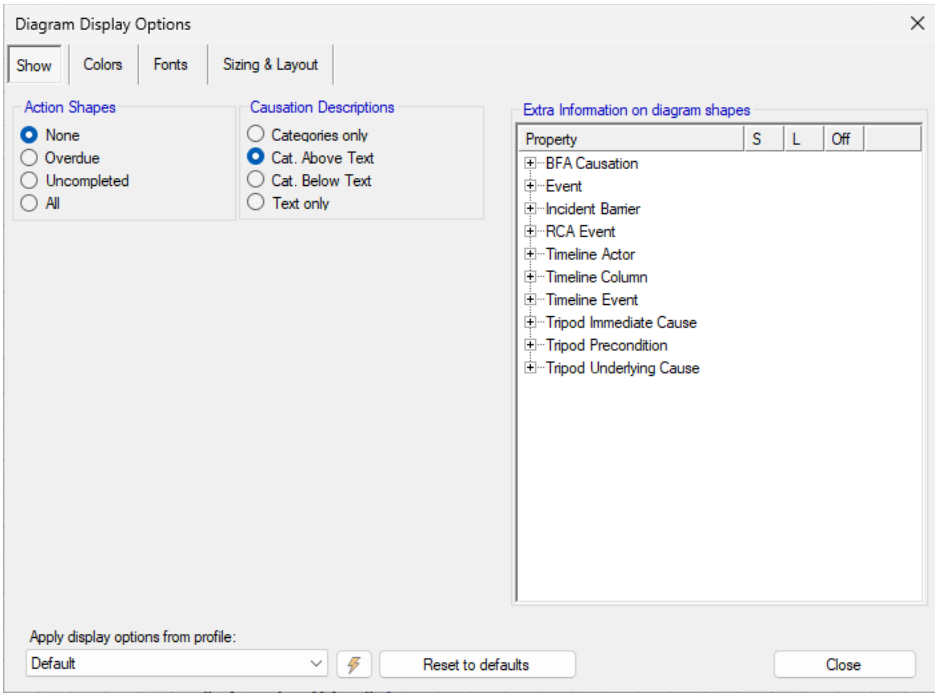

Figure 125 - Diagram display options – 'Show'

10.2.1 Display settings - the 'Show' tab

The first tab 'Show' is about what additional information to display on diagrams and whether and how to display actions and causation descriptions. On the left-hand side you can choose whether to show actions, and if so, which ones. You can also select here whether and how to display the causation descriptions.

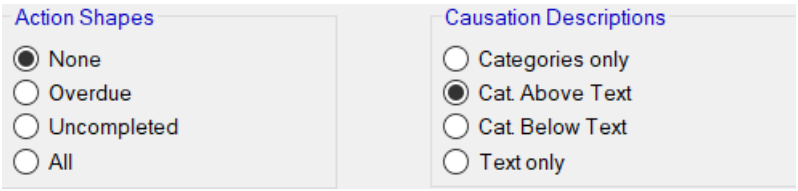

Figure 126 - Diagram display options - actions and causation descriptions

On the right-hand side, you can choose per element which information to display and again whether to use a **S**hort or a **L**ong format to do so.

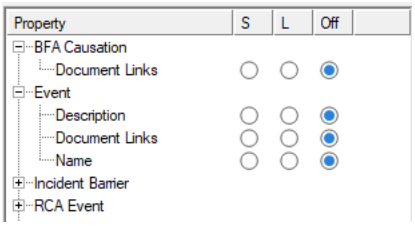

Figure 127 - Diagram display options - right hand side of 'Show' tab

10.2.2 Display settings - the 'Colors' tab

The next tab within the overall display option is on if and how to color the shapes.

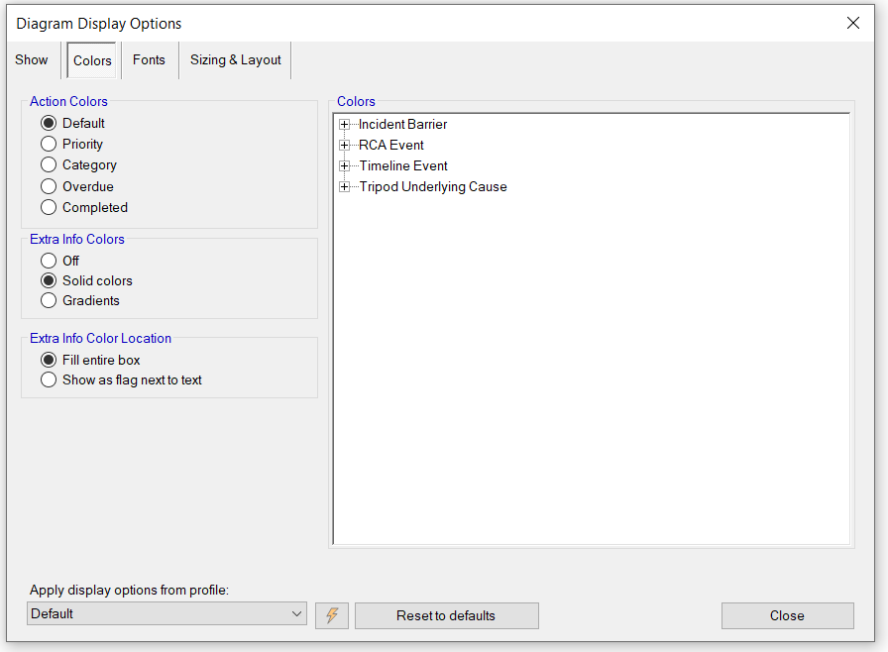

Figure 128 - Diagram display options – 'Colors'

On the left-hand side of this tab we can configure the action shapes' color, and if we want colors to appear in the additional information boxes. If some colors lead to bad readability of the information, we can also choose to display its color only in the left corner of the information box (option 'Show as flag next to text').

In the right hand side of this tab we can select which property to use to color the element itself.

10.2.3 Fonts to use – the 'Fonts' tab

The next tab allows us to set default fonts. Click one of the main buttons to bring up a font dialog. An example of the current font will be shown in the box. The General Font is shown in the main incident diagram shapes (events and barriers). The Extra Info Font is shown for additional information.

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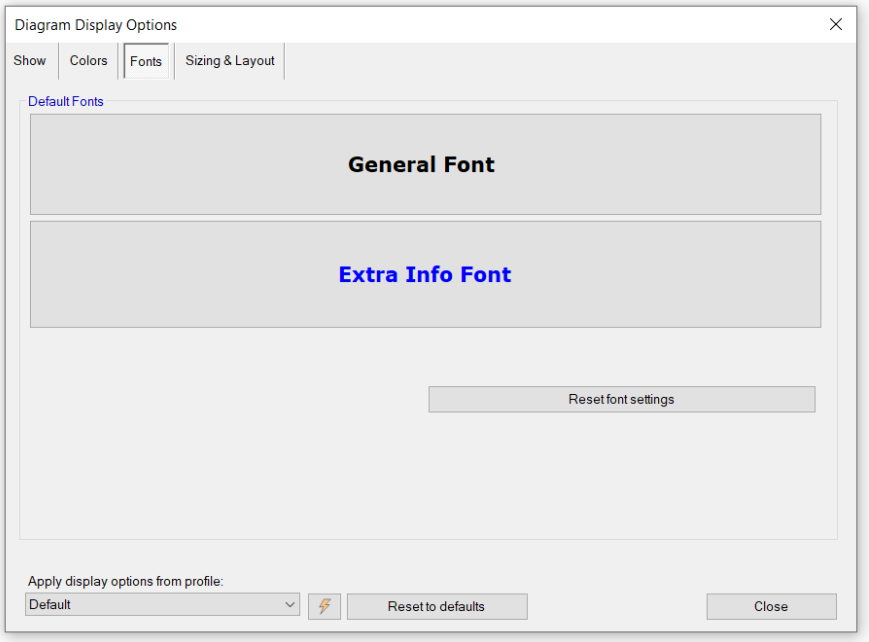

Figure 129 - Diagram display options – 'Fonts'

10.2.4 Fonts to use – the 'Sizing & Layout' tab

The last tab allows us to make decisions about sizing and layout of boxes and connectors.

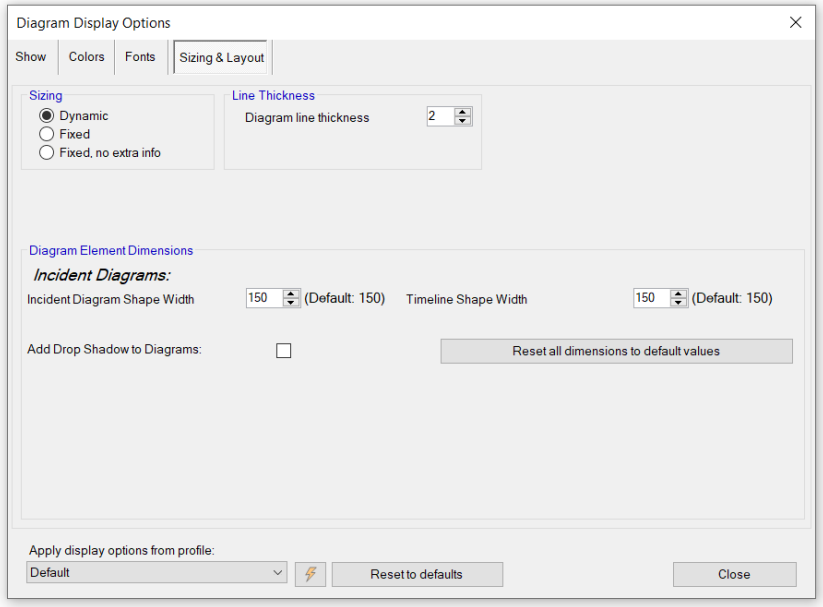

Figure 130 - Diagram display options – "Sizing & Layout"

10.3 ADJUSTING LOOKUP TABLES

While creating incident diagrams (and the timeline), you will find a lot of drop-down pick lists. These lists almost always refer to the Lookup Table lists in the tree view. These lookup tables are configurable to your companies' standards.

Right-click a lookup table node to add, edit or delete a value in the list or change the value order.

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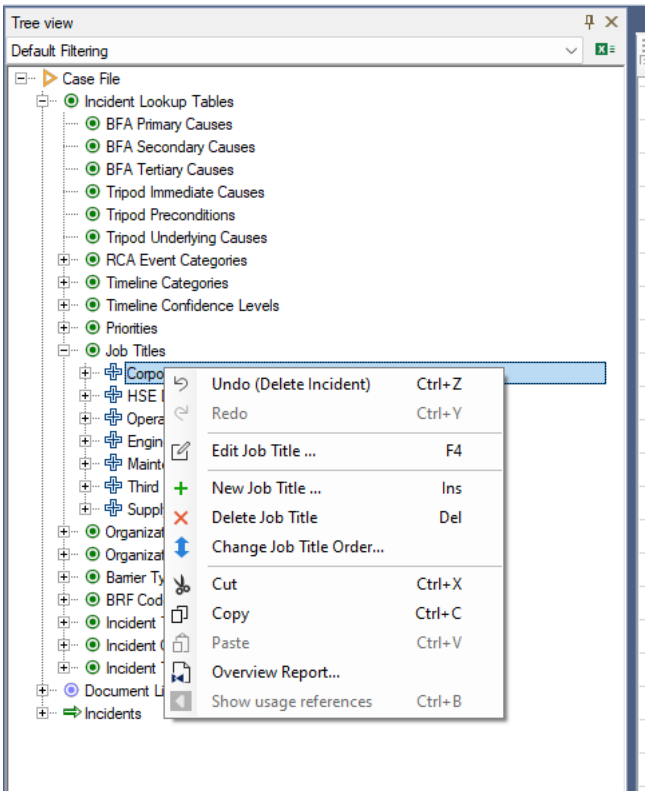

Figure 131 - Adjusting the lookup tables

10.3.1 Adjusting lookup table colors

The colors used in the diagram are also adjustable. They can be set using the same editor in the tree view. Find the appropriate value to edit in the tree view, open the editor and subsequently select 'Choose' to select a color and pattern for the respective value.

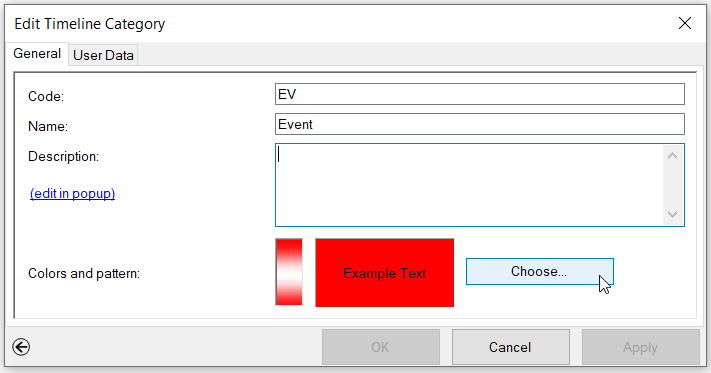

Figure 132 - Adjusting lookup table colors

Within this sub-editor we can thereafter choose a pattern and/or a color. Use the Background color to adjust the coloring of the additional information boxes within the diagram.

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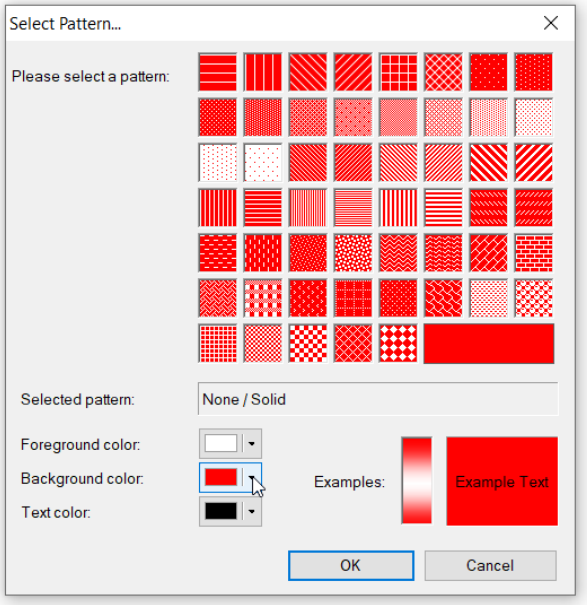

Figure 133 - Color picker dialog

The software has a default color that is used when no value is assigned to an item. This color can also be adjusted: Select Case > 'Edit null value colors' in the upper menu toolbar. This will bring up the dialog below Clicking an item will again bring up a color picker dialog.

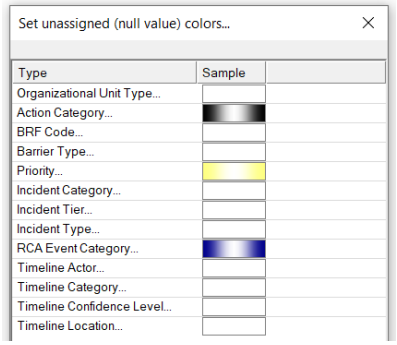

Figure 134 - Null value colors

10.4 LAYOUT GRID

IncidentXP has different layout options to facilitate incident analysis diagram creation and development. There are two main grid layout options:

- **Assisted Layout:** the incident diagram shapes fit precisely into a grid in the diagram space. BFA diagrams have this option enabled by default. The shapes will automatically snap to the grid when adding or dropping shapes.
- **Free grid Layout**: the diagram shapes can freely be distributed across the diagram space by moving them around or with cutting and pasting actions. The free layout puts the user in full control over the layout of the diagram when rearranging the shapes. This option is especially useful for non-linear incident analysis diagrams. RCA & Tripod-Beta diagrams have this option enabled by default.

To select 'Assisted Layout' or 'Free grid Layout', use this icon in the toolbar. 

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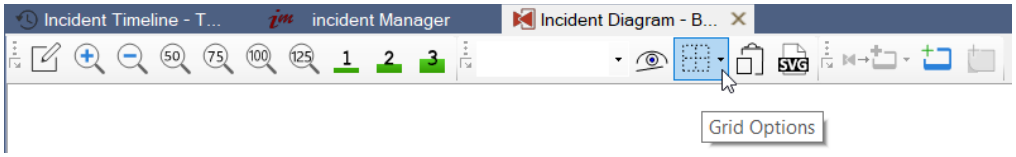

Figure 135 - Layout options icon

When this icon is selected, various options are presented. To select a main layout option, pick the assisted or free layout option.

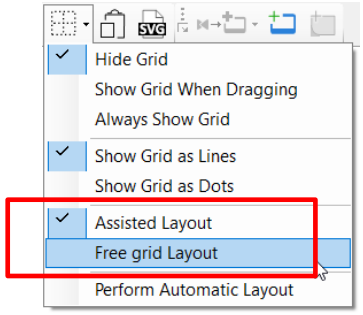

Figure 136 - Select assisted or free grid layout

In the grid options drop-down, there are various other grid display options, such as showing/hiding the grid, or showing the grid as lines as dots.

Below the grid options menu it is possible to select 'Perform Automatic Layout'. This can be used when you have been creating a diagram using the free grid layout, but you want the shapes to snap to the grid to make them more readable. This is because shapes can have the possibility (until a certain extend) to overlap when using the free grid layout.

11
CASE FILE TOOLS

11.1 LISTVIEW WINDOW

Go to View > Windows > Listview. The listview window sums up underlying information of a selected tree view node. The listview is especially useful for the display of backlinks.

When a document link is referenced on say, a barrier, there's a virtual arrow pointing from the barrier to the location in the tree view where the document link is defined. This arrow is called the link. We can also follow this arrow in the reverse direction, from the document links to all the barriers where it is used. These are called the backlinks. The backlinks are a summation of all places where the item is used.

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A similar concept applies to lookup table values, the items used in drop-down lists such as the incident type. For each item we can find out where they are used by revealing their backlinks. This is done by right-clicking the item of which you want to see where it is referenced, and selecting the option in the context menu called 'Show usage references'. The listview will show the usage references and indicate that it is displaying backlinks.

11.2 QUALITY CHECKS WINDOW

The quality checks window can display a number of different reports pertaining to the quality and completeness of your incident analysis. You can find the quality checks hidden on the right side of the diagram in the default layout or open the window by selecting View > Windows > Quality Checks.

From the drop-down box at the top of the window, select the report you want from the list. Once you have selected a report, the window is populated with its results. To refresh the list of items, click the button with the blue circular arrow. The quality checks are extremely helpful in identifying missing data in your analysis.

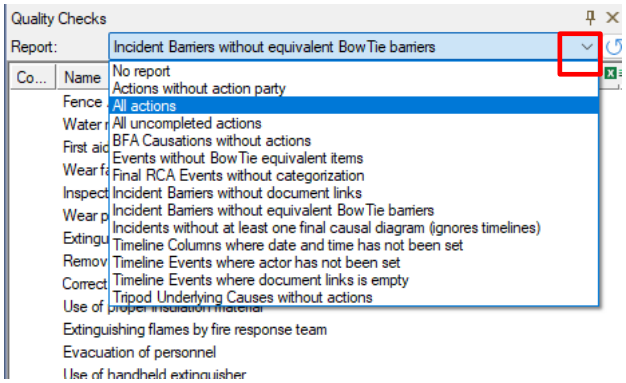

Figure 137 - Quality checks window

11.3 CASE OVERVIEW

The case file overview presents many views of the data in your case file from different perspectives, allowing visualization of relationships which might otherwise be less evident, plus allowing you to quickly find related data.

The Case overview is a separate tab in the diagram window. Activation of this tab can be done through the main menu selecting View > Windows > Case overview.

Using the drop-down menu on the toolbar labeled Overview Perspectives, you can change the overviews' perspective.

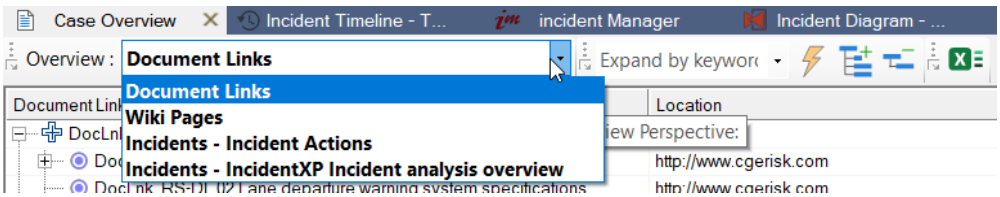

Figure 138 - Case overview window

All output from each overview can be exported to Excel by means of the 'Export To Excel' button ( ).

When information in the case file changes, the case file overview will update automatically. If, for some reason, you want to rebuild the output you can do so with the 'reset/reload' button ().

All the case overview buttons are shown below.

Icon	Description
	Execute expand by keyword operation by means of the keywords entered into the text box
	Go to previous keyword match
	Go to next keyword match
	Expand all
	Collapse all
	Go to definition in the tree view
	Show relationship model of selected entity (only activated in combination with BowTieXP)
	Reset/reload
	Export to Excel

11.3.1 Document Links perspective

This perspective lists all document links defined in your case file and where they are used.

11.3.2 Wiki Pages perspective

This perspective lists all Wiki groups and Wiki pages defined in your case file and provides a full description of them.

11.3.3 Incident Actions perspective

This perspective lists all actions present on any incident analysis diagram and displays them in two groups: open actions and completed actions.

11.3.4 IncidentXP Incident Analysis Overview

This perspective lists aggregated causation chart value counts, which enables performing trend analysis. It aggregates the values for the entire case file as well as per incident analysis diagram.

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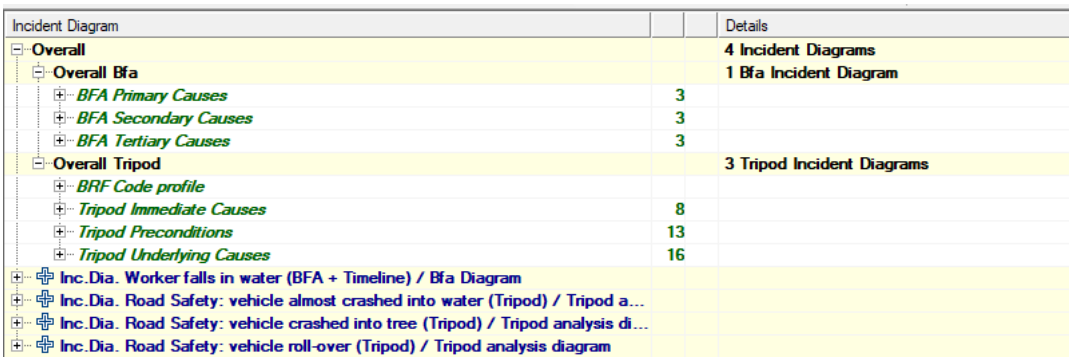

Figure 139 - Case overview – perspective: IncidentXP incident analysis overview

12
LINKING TO DOCUMENTATION

12.1 INTRODUCTION

A lot of information which is present in a case file refers to things which have already been documented elsewhere, and in a lot of places in a case file you might want to refer to that information. Besides that, evidence is often captured in a separate document, which should be linked to the incident analysis as well.

To solve this need, both BowtieXP and IncidentXP offers a document links module. Document links are pointers to external documentation which can be linked to various elements within your case file. In this chapter you will learn how to make efficient use of them.

Document links are defined in a central hierarchy within the tree view, and are then linked to all relevant (diagram) items throughout the rest of the case file. When assigned they can be shown on the diagram, and quickly accessed by means of the 'open/go to' icon :

Figure 140 - Barrier showing documents links along with "open" button

12.2 CREATING A DOCUMENT LINK

To create a document link, navigate to the 'Document Link Groups' node in the tree view, right-click this node and select 'New Document Link Group'. Within a Document Link Group, actual Document Links can be created. Document links can be created in a hierarchical structure. A sub-document link will be created if you add a Document Link by right-clicking an existing Document Link or Document Link Group.

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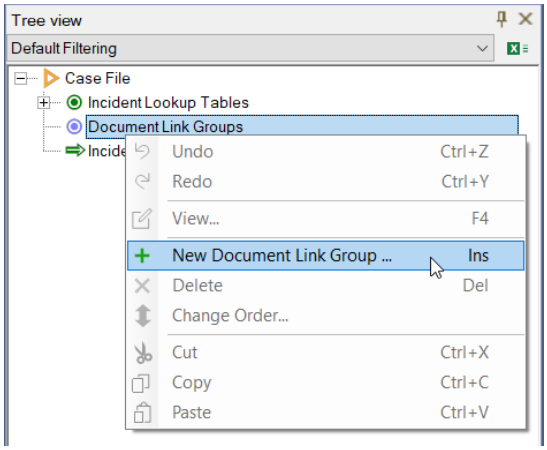

Figure 141 - Add new document link (1/3)

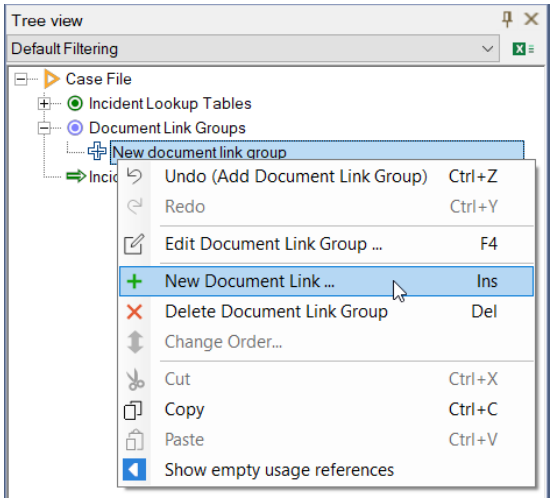

Figure 142 - Add new document link (2/3)

A document link contains a code, a name, a description and a location. The location defines where the actual document resides. This can be either a URL or a file path.

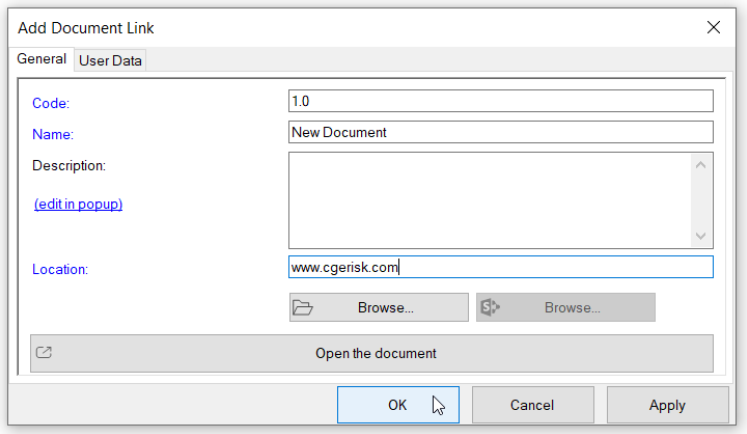

Figure 143 - Add new document link (3/3)

12.3 LINKING A DOCUMENT LINK TO THE DIAGRAM

After defining document links, they can be linked onto other elements by the usual methods of dragging and dropping (either from the tree view or within the editor box shown below) or using the arrows within the document links tab in the editor window.

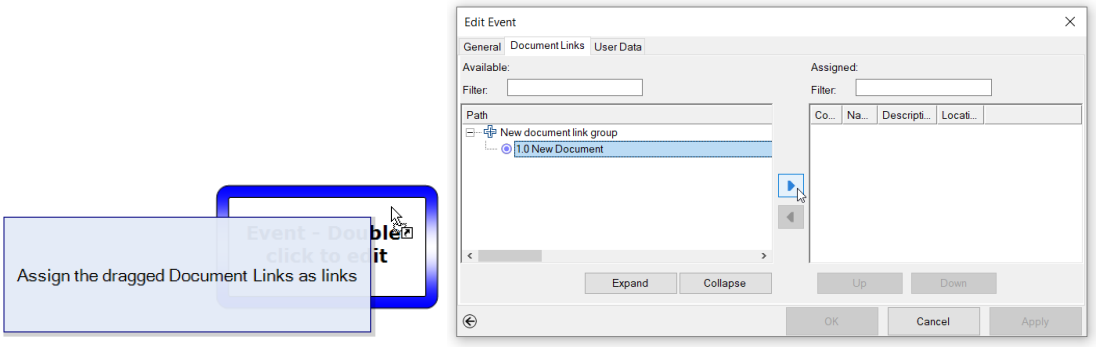

Figure 144 - Linking a document link to an incident event (two alternatives)

13
GETTING DATA OUT OF THE PROGRAM

13.1 INTRODUCTION

Putting information into case files is useful, but it is even better to also have the opportunity to get all the information out of the case files in various perspectives and formats, in order to share them with your desired audience.

In this chapter you will learn all the different methods for outputting information. We will discuss:

- The output of the various reports,
- The export of the diagrams.

13.2 REPORTING

Besides being able to create a specific report of a certain incident analysis using the report function within the Incident Manager, you can also report information from an entire case file in various ways using the built-in reporting engine. There are various reports available with different functionality and visualization of the information. Depending on the chosen report, the format will either be Microsoft Word or Microsoft Excel.

13.2.1 Generating a report

Follow these steps to generate a report:

1. Select Tools → Reports, or click the report button in the toolbar ( ).
2. Select the desired report.
3. After selecting the report, it's automatically opened in Word or Excel.

The dialog box depicts already in advance which reports are offered as an Excel file. Deductively the other reports will be generated in Word.

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After running a report you can thereafter save the report under a name of your choosing.

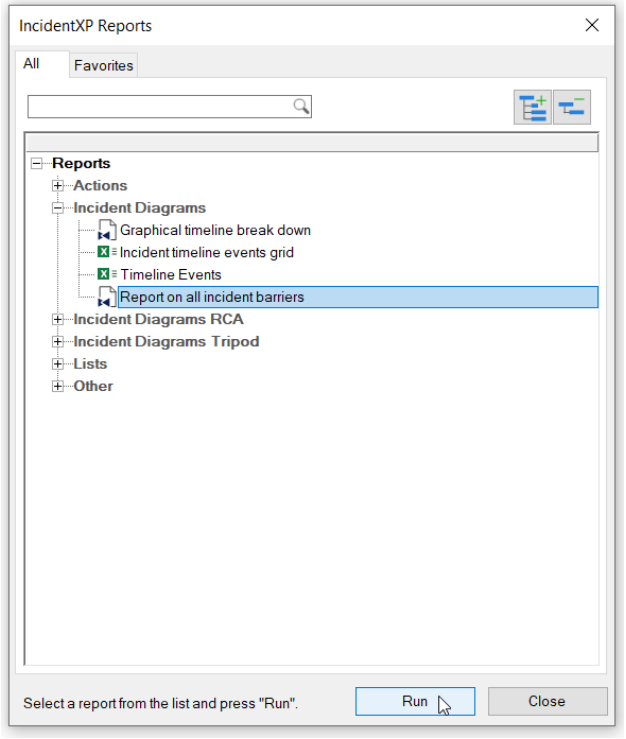

Figure 145 - Generating a report

13.2.2 Report from template

It is possible to define a company template report, complete with logos, fonts and other styling and fill that with information from an incident analysis, using tags that are inserted into the template. A full list of usable tags is available below however the tags are not explained in detail as this might change over time. We advise you to test this yourself by following the below steps and using the template with some dummy data (e.g. data from the test file).

To create a custom template, follow these steps:

1. Open Word (for this example, we will use Word 2016).
2. Go to File > Options > Customize Ribbon.
3. Make sure the “Developer” option is ticked in the Main Tabs section.

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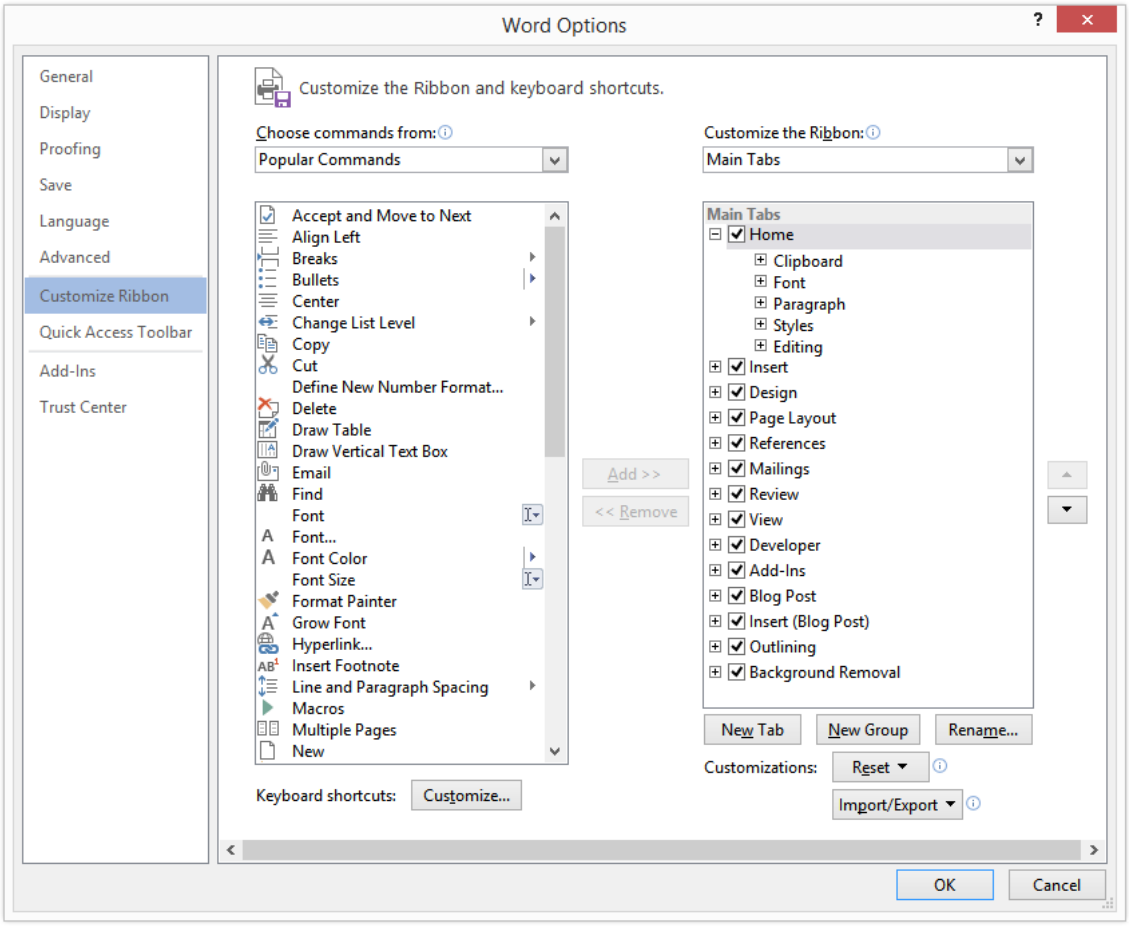

Figure 146 - Microsoft Word - Customize Ribbon

1. Open the Developer tab. You can add fields with the “Aa” icon. The tooltip describes it as a “Plain Text Content Control”.

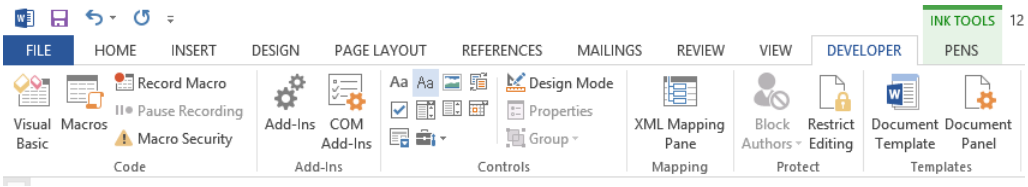

Figure 147 - Microsoft Word - Plain Text Content Control

2. The field will look like this:

Figure 148 - Microsoft Word - Plain Text Content Control (2)

3. To make sure the field is filled with the right data, select the field and click “Properties” in the ribbon.

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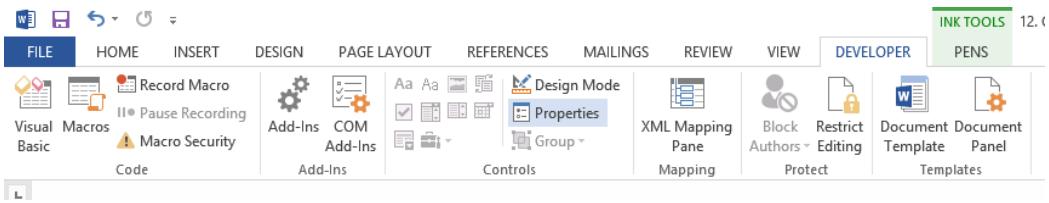

Figure 149 - Microsoft Word – Content Control Properties

4. In the "Tag" field, you can insert one of the tags that are available (see Table below). If you want to see these tags in the document, you have to turn on the "Design Mode".

Available tags:

- Incident.Code
- Incident.Description
- Incident.LongDescription
- Incident.WhatHappened
- Incident.DateAndTime
- Incident.DateAndTimeTimeZoneId
- Incident.DateAndTimeFormat
- Incident.IncidentType
- Incident.IncidentCategory
- Incident.IncidentTier
- Incident.OrgUnit
- Incident.Latitude
- Incident.Longitude
- Incident.PlotPlan
- Incident.PPL_X
- PPL_Y
- PPL_S
- IncidentDiagram.DiagramStatus
- IncidentDiagram.WorkingDraftStatusDescription
- IncidentDiagram.CompletedStatusDescription
- IncidentDiagram.TopSetZone1a
- IncidentDiagram.TopSetZone1b
- IncidentDiagram.TopSetZone2
- IncidentDiagram.TopSetZone3
- IncidentDiagram.TopSetZone4
- IncidentDiagram.Name
- IncidentDiagram.MethodologyType
- IncidentDiagram.UseTopologicalLayout
- IncidentDiagram.IsSIRDiagram
- IncidentDiagram.ShowZones
- IncidentDiagram.ShowConnectorLabels
- TimelineDiagram.TimelinePictures
- IncidentDiagram.TreeOverview
- IncidentDiagram.TreeCutUp
- IncidentDiagram.Counts
- IncidentDiagram.Actions
- IncidentDiagram.DocumentLinks
- IncidentDiagram.AllL1Causes
- IncidentDiagram.AllL2Causes
- IncidentDiagram.AllL3Causes

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- IncidentDiagram.AllEndEvents
- IncidentDiagram.PotentialEndEvents
- IncidentDiagram.NonPotentialEndEvents
- TimelineDiagram.EventsTable
- Application.BowTieXPVersion
- Incident.PlotPlanImage
- Incident.GeoLocationImage

Add the tags to the Content Control Properties:

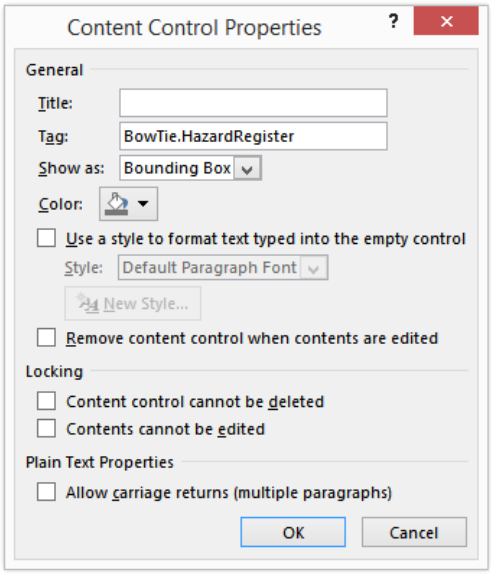

Figure 150 - Microsoft Word – Content Control Properties (2)

5. Save your template and close Word. You cannot run the report while it is opened in Word.
6. In IncidentXP, go to View > Windows > Incident Manager > Global settings.

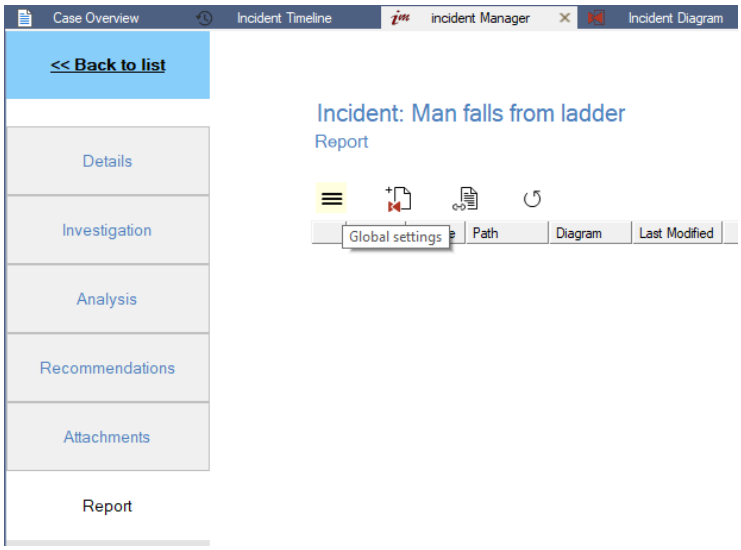

Figure 151 – Global settings in Incident Manager

7. Make sure “Custom made” is selected and browse for the created template by clicking the button with the 3 dots and click ok.

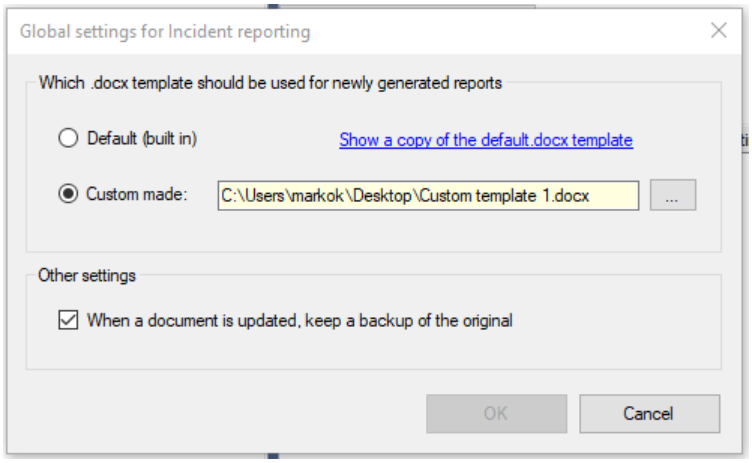

Figure 152 - Selecting reporting template

8. Click on create new report to run the report.

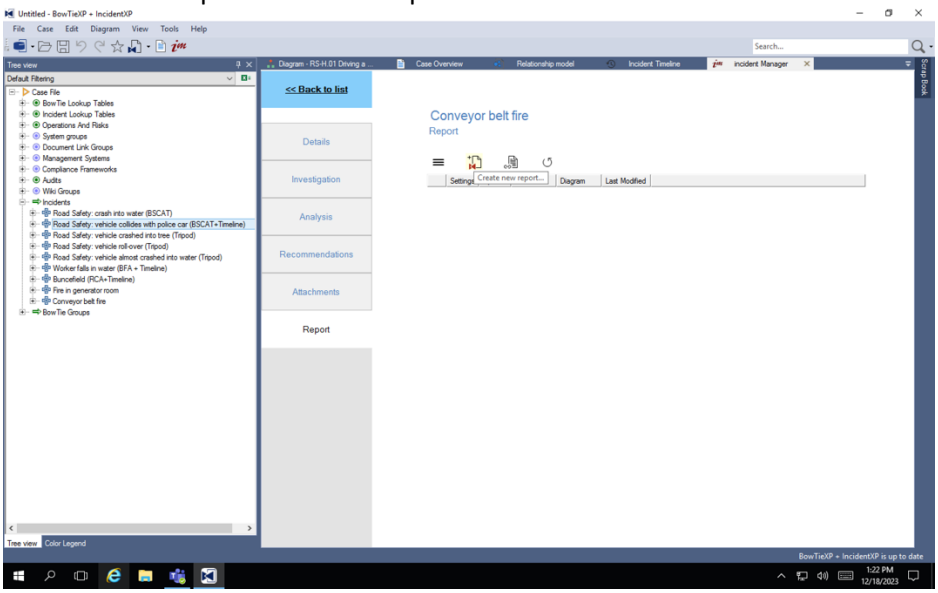

Figure173 - Create new report

You can edit and change the report, then update the tags by selecting the same word file again (step 9). All fields will then be updated, without changing the information around it.

If you work with BowTieXP as well you may notice a small difference in how the templates are used. In the case of custom reports for bowties you can save templates and reuse them from a dropdown list. However, in the case of cusotm reports for incidents you will need to browse for the Word file you want to use for that specific report. Bear in mind that you need to close your Word file before you generate the report using a custom template.

13.3 EXPORT OF DIAGRAMS

There are four ways to export an incident analysis diagram (or timeline) in isolation. Find the buttons in your diagram toolbar to see which one to use when:

Icon	Description

	Copy to clipboard: allows you to paste the diagram in another application (e.g. PowerPoint). This will export a vector-based image, which can be enlarged and reduced in size without losing the image's quality. This makes it very suitable for documents, printing or presentations.
	Save diagram as…: allows you to save the diagram as a picture (e.g. jpg). Most formats are not vector based and therefore not ideal for printing.
	Export as svg drawing: allows you to export picture and save it as an XML based scalable vector graphic.
	Export to Microsoft Visio: allows you to export to Microsoft Visio.

Note: We only support use of Visio 2002 – Visio 2007. Everything thereafter is not supported however it might still work. We discourage the use of Visio because not all diagram info can be exported. Instead we recommend using export to svg, export to png or the use of the BowTieServer WebViewer.

14
A BRIEF DESCRIPTION OF A SUBSET OF BOWTIE METHODOLOGY

The bowtie methodology is used for risk assessment, risk management and risk communication. The method is designed to give a better overview of the situation in which certain risks are present; to help people understand the relationship between the risks and organizational events.

Risk in the bowtie methodology is represented by the relationship between hazards, top events, threats and consequences. Barriers are used to display what measures an organization has in place to control the risk.

All these are combined in an easy-to-read diagram as follows:

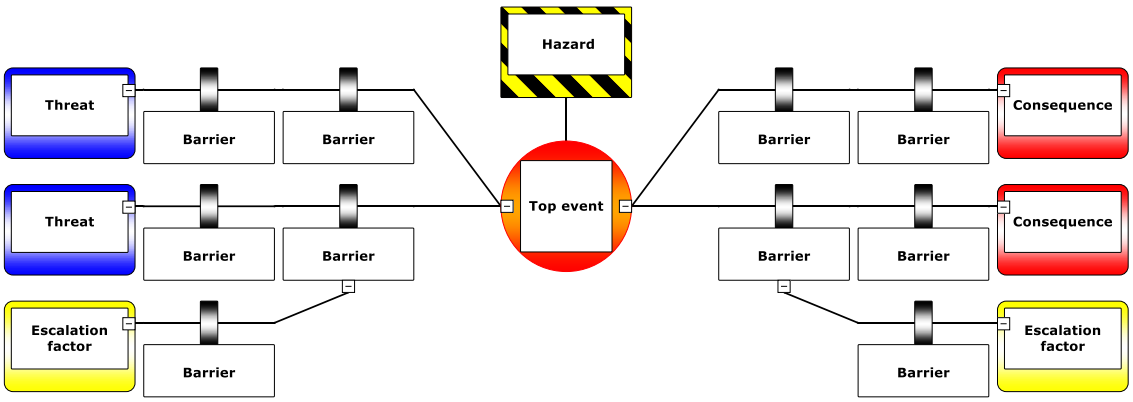

Figure 153 - A bowtie diagram

14.1 HAZARD

The word “hazard” suggests that it is an unwanted entity, but in fact it is the opposite: it is exactly the thing you want or even need in order to create business. It is an entity with the potential to cause harm but without it there is no business. For example in the oil industry; oil is a dangerous substance (and can cause a lot of harm when treated without special care) but it is the one thing that keeps the oil industry in business! When a hazard is managed or under control, it can be of no harm.

14.2 TOP EVENT

As long as a hazard is controlled it is in its desired state. For example: oil is transported through a pipe on its way to shore. Certain events can cause the hazard to be released however. In bowtie methodology such an event is called a top event. The top event is not a catastrophe yet, but the dangerous characteristics of the hazard are now released. This is the moment in which control over the hazard is lost. For example: oil is spilling outside of the pipeline (loss of containment). Not a major disaster yet, but if not mitigated correctly it can result in multiple undesired events (consequences).

14.3 THREATS

Often there are several factors that could cause the top event to occur. In bowtie methodology these are called threats. These threats need to be independently able to cause the top event. For example: corrosion of the pipeline can lead to the loss of containment.

14.4 CONSEQUENCES

When a top event has occurred it can lead to certain consequences. A consequence is a potential event resulting from the release of the hazard, which entails damage, loss, or injuries/fatalities. Consequences in bowtie methodology are therefore unwanted events that an organization ‘by all means’ wants to avoid. For example: oil leaking into the environment.

14.5 BARRIERS (ALSO KNOWN AS CONTROLS)

Risk management is about controlling risks. This is done by placing barriers on bowtie scenarios to prevent certain events form happening. A barrier (or control) can be any measure taken to prevent arriving at un undesired state.

In bowtie methodology there are proactive barriers (on the left side of the top event) that prevent the top event from happening. For example: regularly corrosion inspections of the pipelines. There are also reactive barriers (on the right side of the top event) that prevent the top event resulting into unwanted consequences. For example: leak detection equipment or concrete floor around oil tank platform.

Note the terms barrier and control are the same construct and depending on industry and company, one or the other is used. Barrier is the defaulted term in our software tools.

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14.6 ESCALATION FACTORS/DEFEATING FACTORS/BARRIER DECAY MECHANISMS

In an ideal situation a barrier will stop a threat from causing the top event. However, many barriers are not a 100% effective. There are certain conditions that can make a barrier fail. In bowtie methodology these are called escalation factors. An escalation factor is a condition that leads to increased risk by defeating or reducing the effectiveness of a barrier.

Escalation factors are also known as defeating factors or barrier decay mechanisms – which term is used is dependent on industry and company. The term escalation factor is defaulted in our software tools.

14.7 TERMINOLOGY RECAP

The following terms should now be familiar to you:

- The hazard, part of normal business but with the potential to cause harm, can be released by:
- A top event, no catastrophe yet but the first event in a chain of undesired events.
- The top event can be caused by threats (sufficient and independent causes).
- The top event has the potential to lead to unwanted consequences.
- (Proactive) barriers are measures taken to prevent threats from occurring or resulting into the top event.
- (Reactive) barriers are measures taken to prevent that the top event leads to unwanted consequences, or mitigates the effects from those consequences.
- An escalation factor is a condition that defeats or reduces the effectiveness of a barrier.

15
SUPPORT

15.1 HELPDESK

. There is a helpdesk for users that have bought an IncidentXP license with a valid support and maintenance contract. This helpdesk assists people that have technical and user-related questions regarding IncidentXP.

If you have an active **BowTieXP Support & Maintenance** plan, our support team is available to help with technical issues, user questions, installation guidance, and best practices for using BowTieXP. All support requests are handled through the Enablon Customer Portal **(ECP)**.

Submitting a support request

If you need assistance, please first contact your **primary internal administrator**. Your administrator can submit a support ticket for you in the Enablon Customer Portal (ECP). This portal is where all questions, issues, and requests should be submitted.

If you do not yet have an ECP account, please reach out to your **Enablon Customer Success Manager** or **Account Manager** to request access.

For more details about our support services, visit our support page:
https://www.wolterskluwer.com/solutions/enablon/bowtie/support

Software training
Please contact us via ECP.

15.2 TRIPOD BETA METHOD TRAINING

Please contact the Energy Institute at tripod@energyinst.org. An overview of all Tripod Beta trainings can be found here: https://publishing.energyinst.org/tripod/training

15.3 TOP-SET METHOD TRAINING

TOP-SET method training is available from:

Kelvin TOP-SET Ltd
Annickbank Innovation Campus
Irvine KA11 4LF
Scotland, United Kingdom
+44 (0) 1475 560 007

enquiries@kelvintopset.com
http://www.kelvintopset.com/