



PQ-FMEA

Power of quality

PQ-FMEA+ user manual

Version: 07.2023

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1. Installing and running PQ-FMEA+

To install PQ-FMEA+ , log in to the page to which the link and a password will be sent to the e-mail provided.

After successful validation of the data, you need to click "**Download**" and complete the form that is visible below and confirm again with the "**Download**" button.

Checkout

Home / Checkout

Fill in the form below in order to receive a link to download a program.

First name *

Last name *

Company name *

Country / region *

Poland

Street (optional)

City/Town (optional)

E-mail address *

Phone (optional)

☐ I have read the website regulations and accepted their rules. I have read and selected the PQ-FMEA license terms. I agree to contact me in order to carry out all activities with the order of the demo version of the PQ-FMEA program. *

☐ I consent to contact me for communication via (e-mail) commercial information. Data not shared with recipients. (optional)

The administrator of your personal data is H&Q&S Management s.c. ul. Cieszadzkiego 26, 13-100 Świdwin, Poland, registered in the Sąd Rejonowy dla M. St. w Warszawie, KRS 0000262200, NIP 525-244-52-52, REGON 141919101, and in order to send commercial information by electronic means (e-mail messages). The data will not be disclosed to third parties.

→ you have a right to access your data and modify them.

→ you can delete your personal data voluntarily.

After that, a link to download PQ-FMEA+ installer will be sent to the e-mail address provided.

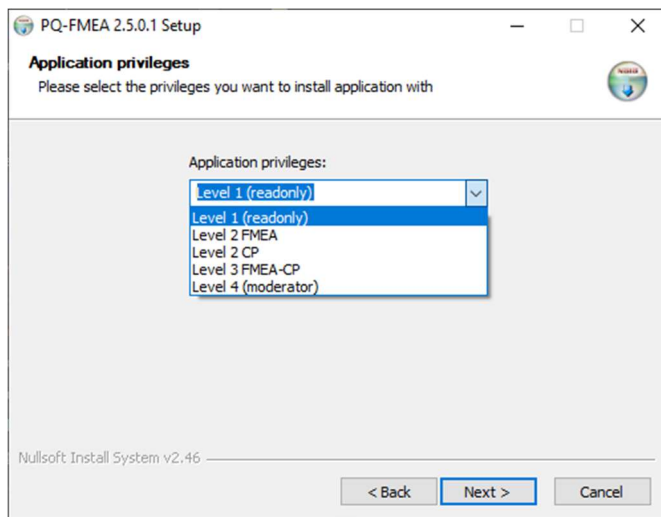
Dear Sirs!

Downloads

Product	Link expires	Download
PQ-FMEA+ Beata Grzybowska	Never	PQ-FMEA+

During the first launch, the software will ask you to choose a language, inform you about the license agreement, ask for the location for installation and application permissions. To choose the right access, you need to know the differences between each level of permission – below is a table with a detailed list of permission levels.

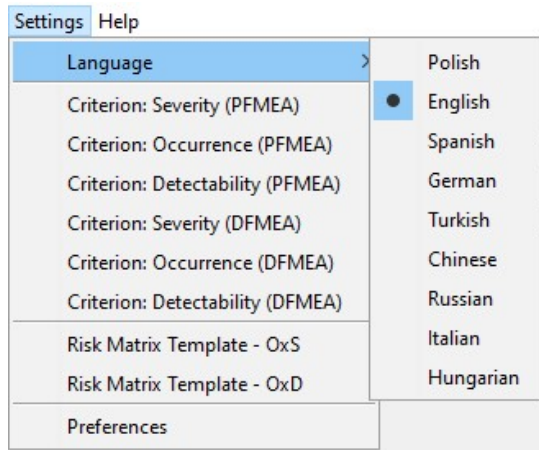
AUTHORIZATION	LEVEL 1 - READING	LEVEL 2 FMEA	LEVEL 2 CP	LEVEL 3 FMEA - CP	LEVEL 4 - MODERATOR
Tree	Read only	✓	Read only	✓	✓
FMEA sheet	Read only	✓	Read only	✓	✓
CP sheet	Read only	Read only	✓	✓	✓
PF sheet	Read only	✓	✓	✓	✓
FMEA project data	Read only	Read only	✓	✓	✓
CP project data	Read only	Read only	✓	✓	✓
PF project data	Read only	✓	✓	✓	✓
Statistics	Read only	Read only	Read only	Read only	✓
Personalization					✓
Print	✓	✓	✓	✓	✓
Export	✓	✓	✓	✓	✓
Language change	✓	✓	✓	✓	✓



Finally, click "**Install**".


2. Language selection

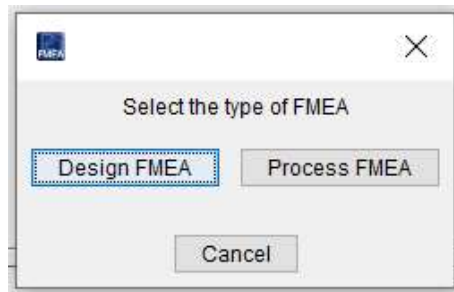
To select the language of the software, click on the menu in "**Settings**" on the toolbar, then click "**Language**" and select the language you are interested in. The program language will be changed after restarting the software.



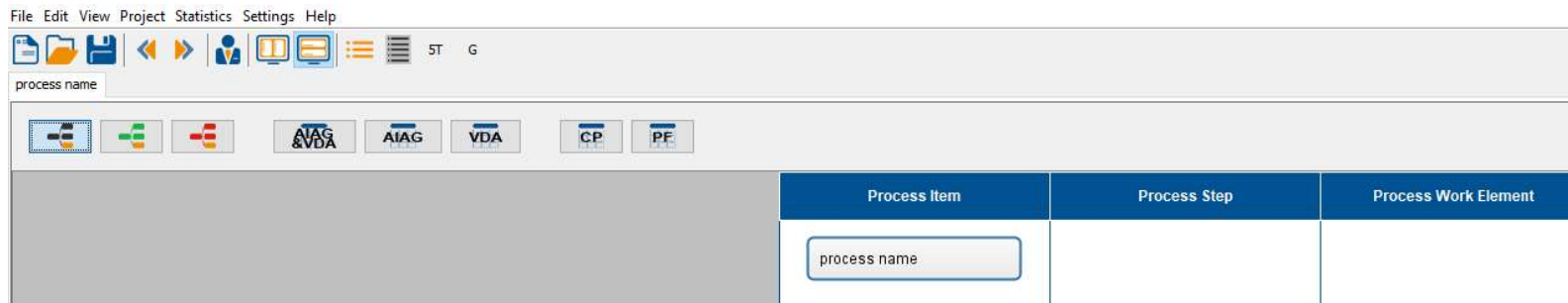
Note: in the software, the system language (headers, menu language) can be changed at any time, but if you save the file (given project) then after restarting the selected (saved) file, the filling of tables S, O, D will remain permanently in the version they were saved (you can not return to the default settings or another language) unless the changes are made manually or the tables are imported.

3. Getting started

To start working with the software, use the "New project" icon  or select "File" → " New project". The analysis selection window will be displayed.



After running the selected option, a window for creating a structure analysis (black tree) will be displayed.



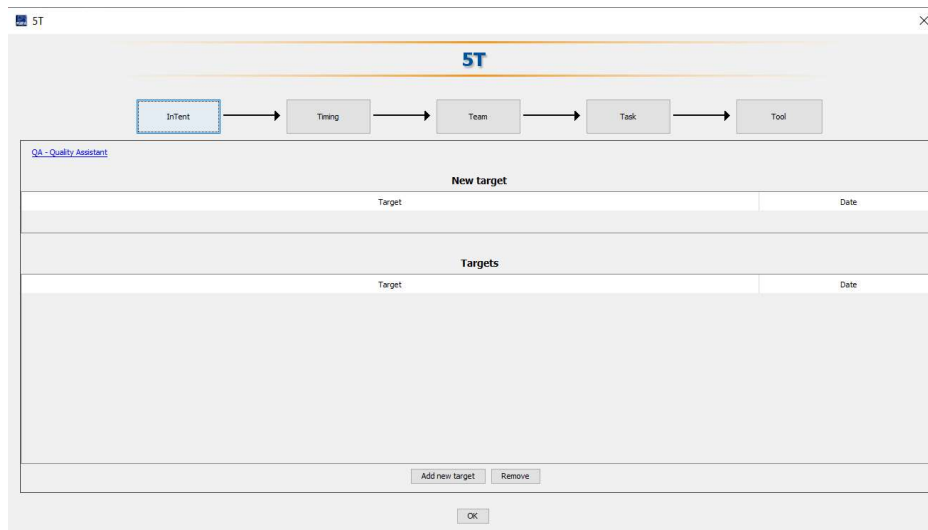
4. 5T Table

The program allows you to define 5 topics (5T) before starting the actual analysis. To open the table go to "**Project**" → "**5T**", or use the "**5T**" button on the quick access bar.



4.1 inTent

To add a new target, use the "**Add new target**" button, enter the data into the empty field of the target column in "**New target**", select the date and click the "**Add new target**" button again. To delete one of the targets, select the line to be deleted and click the "**Remove**" button.



4.2 Timing

To create a new schedule table, click the "**Add**" button, fill in the columns, set the dates and click the "**Add**" button again. In order to delete a plan, select which plan you want to delete and click the "**Remove**" button.

The screenshot shows the ST software interface. At the top, a navigation bar contains the 'ST' logo and a sequence of steps: InTent, Timing, Team, Task, and Tool. Below this, a table titled 'APQP / MLA' outlines five phases of the product lifecycle. The 'Team' step in the navigation bar is currently selected.

Plan and Define Program	Product Design and Development Verification	Process Design and Development Verification	Product and Production Validation	Feedback Assessment and Corrective Action
Start PFMEA planning in concept phase before product development begins. Information flow from DFMEA to PFMEA. The DFMEA and PFMEA should be executed during the same time period to allow optimization of both the product and process designs.	Start PFMEA when production concept is well understood	Complete PFMEA analysis prior to final process decisions	Complete PFMEA actions prior to PPAP/PPA	Start again with DFMEA and PFMEA planning if there are changes to an existing design or process

Below the table is a section labeled 'Latest table' with an empty table structure and 'Add' and 'Remove' buttons. An 'OK' button is located at the bottom of the interface.

4.3 Team

To create a team, you need to fill in the "**Name**" cell and enter the date. Then, using the "**Add**" button, you can add team members, it is also possible to mark their presence. In order to add a new list, use the "**Add new list**" button (adds a list with suggested members) or "**Add a new list based on the current**". If you want to return to the previous team, just go to the "**Previous teams**" tab and select the list that we are interested in.

This screenshot shows the 'Current team' management screen in the ST software. The 'Team' step in the top navigation bar is highlighted. The main area contains a form for adding team members with fields for 'Name' and 'Date'. Below the form is a large table with columns for 'Team' and 'Presence'. At the bottom, there are buttons for 'Add', 'Remove', and 'Print', as well as navigation buttons: 'Add new list', 'Add new list based on the current', and 'Previous teams'. An 'OK' button is at the very bottom.

4.4 Tasks

To add tasks, simply fill in the columns for each of the analysis steps and confirm with the "OK" button.

ST

ST

Intent

Timing

Team

Task

Tool

FMEA 7 Step Approach						
System Analysis			Failure Analysis and Risk Mitigation			Risk Communication
1st Step Planning & Preparation	2nd Step Structure Analysis	3rd Step Function Analysis	4th Step Failure Analysis	5th Step Risk Analysis	6th Step Optimization	7th Step Results Documentation
Project identification. Project plan: Intent, Timing, Team, Tasks, Tools (ST). Analysis boundaries: What is included and excluded from the analysis. Basis for the Structure Analysis step.	Visualization of the analysis scope. DFMEA: Structure tree or equivalent. Identification of design interfaces, interactions, dose clearances. PFMEA: Structure tree or equivalent. Identification of process steps and sub-steps. Collaboration between customer and supplier engineering teams.	Visualization of functions. DFMEA: Function tree or function analysis from sheet and parameter diagram. PFMEA: Function tree or equivalent process flow diagram. DFMEA and PFMEA: Cascade of customer (external and in termal) functions with associated requirements. Collaboration between engineering teams.	Establishment of Failure chain. DFMEA: Potential Failure Effects, Failure Modes, Failure Causes for each product function. PFMEA: Potential Failure Effects, Failure Modes, Failure Causes for each process function. Collaboration between customer and supplier (Failure Effects).	Assignment of existing and/or planned controls and rating of failures. DFMEA & PFMEA: Assignment of Prevention Controls to the Failure Causes. Assignment of Detection Controls to the Failure Causes and/or Failure Modes. Collaboration between customers and supplier (Severity).	Identification of the actions necessary to reduce risk. Assignment of responsibilities and deadlines for action implementation. Implementation of actions taken including confirmation of the effectiveness of the implemented actions and assessment of risk after actions taken. Collaboration between the FMEA team, management, customers and suppliers regarding potential failures.	Communication of results and conclusions of the analysis. Documentation of actions taken including confirmation of the effectiveness of the implemented actions and assessment of risk after actions taken. Communication of actions to reduce risks, including within the organization and with customers and/or supplier as appropriate. Record of risk analysis and reduction to acceptable levels.

OK

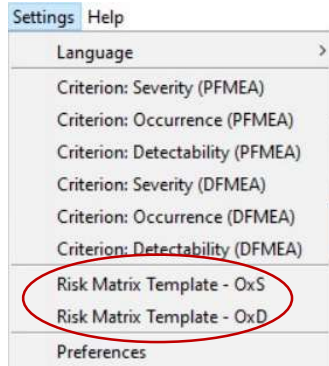
4.5 Tools

The field is filled in automatically because the tool used for FMEA analysis is the PQ-FMEA+ software.

5. Personalization of the software for organization

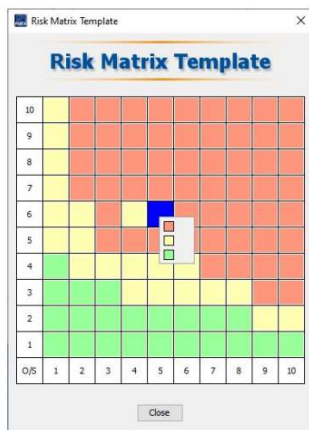
The program allows you to personalize the components of the analysis for the needs of the organization in which you work.

5.1 Personalization of the risk matrix



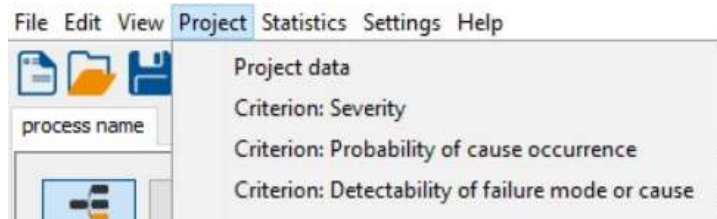
PQ-FMEA+ allows you to develop a risk matrix in accordance with the needs of a given organization. To customize the matrix, select the "**Settings**" button from the toolbar and select "**Risk matrix formula**" from the list.

To adjust the appropriate fields to the scale of the threat (green, yellow, red), right-click on the field to edit. When clicked, a color selection list will appear.



5.2 Project data

To enter project data, select the "**Project**" button from the toolbar and then select the "**Project Data**" field from the list.



The dialog box will appear to complete. In 3 different sections you can enter data for FMEA, CP and PF.

The image displays three side-by-side screenshots of the 'Project Data' dialog box, each showing a different tab: FMEA, CP (Control Plan), and PF (Process Failure Mode).
The FMEA tab includes sections for Confidentiality level (Business use, Proprietary, Confidential), Process FMEA (Prototype, Pre-Launch, Production), and various input fields for Project, Project ID, Client, Engineering Location, Person responsible, FMEA Number/Version, Number/Name of product, Date of first FMEA, FMEA Creator, FMEA Approver, Team members, Notes/comments, Last revision date, and Company name. There is also a checkbox for 'Show team composition in the sheet header' and a 'Browse...' button for the logo.
The CP tab contains input fields for Control Plan Number, Key Contact/Phone, Date (Orig.), Date (Rev.), Part Number/Latest Change Level, Core Team, Customer Engineering Approval/Date (If Req'd.), Part Name/Description, Supplier/Plant Approval/Date, Customer Quality Approval/Date (If Req'd.), Supplier/Plant, Supplier Code, Other Approval/Date (If Req'd.), and another Other Approval/Date (If Req'd.).
The PF tab includes input fields for Process name, Data (orig.), Data (rev.), Part description, PF Creator, PF Approver, and Revision level.
Each dialog box has 'OK' and 'Cancel' buttons at the bottom.

The entered data will be moved to the form headers (visible when printed).

5.3 Risk assessment criteria (S, O, D)

The program has the Severity (S), Occurrence (O) and Detection (D) criteria saved (the function is available after running the PFMEA or DFMEA analysis).

The software has built-in SOD tables in accordance with the requirements of AIAG & VDA ed.1 and AIAG ed.4.

Default Severity Scale

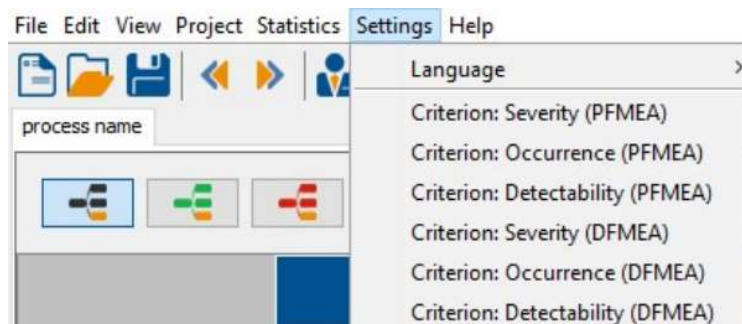
AIAG & VDA

AIAG ed. 4

5	Effect	Impact to Your Plant	Impact to Ship-to Plant (when known)	Impact to End User (when known)	Corporate or Product Line Examples
10	High	Failure may result in health and/or safety risk for the manufacturing or assembly worker.	Failure may result in health and/or safety risk for the manufacturing or assembly worker.	Affects safe operation of the vehicle and/or other vehicles, the health of driver or passenger(s) or road users or pedestrians.	
9		Failure may result in implant regulatory noncompliance.	Failure may result in implant regulatory noncompliance.	Noncompliance with regulations.	
8	Moderately high	100% of production run affected may have to be scrapped.	Line shutdown greater than full production shift; stop shipment possible; field repair or replacement required (assembly to End User) other than for regulatory noncompliance.	Loss of primary vehicle function necessary for normal driving expected service life.	
7		Product may have to be sorted and portion (less than 100%) scrapped; deviation from primary process; decreased line speed or added manpower.	Line shutdown from 1 hour up to full production shift; stop shipment possible; field repair or replacement required (assembly to End User) other than for regulatory noncompliance.	Degradation of primary vehicle function necessary for normal driving during expected service life.	
6	Moderately low	100% of production run may have to be reworked off-line and accepted.	Line shutdown up to one hour.	Loss of secondary vehicle function.	
5		A portion of the production run may have to be reworked off line and accepted.	Less than 100% of product affected; strong possibility for additional defective product; sort required; no line shutdown.	Degradation of secondary vehicle function.	
4	Low	100% of production run may have to be reworked in station before it is processed.	Defective product triggers significant reaction plan; additional defective products not likely; sort not required.	Very objectionable appearance, sound, vibration, harshness, or haptics.	
3		A portion of the production run may have to be reworked in station before it is processed.	Defective product triggers no minor reaction plan; additional defective products not likely; sort not required.	Moderately objectionable appearance, sound, vibration, harshness, or haptics.	
2	Very low	Slight inconvenience to process, operation or operator.	Defective product triggers no reaction plan; additional defective products not likely; sort not required; requires feedback to supplier.	Slightly objectionable appearance, sound, vibration, harshness, or haptics.	
1		No discernible effect.	No discernible effect or no effect.	No discernible effect.	

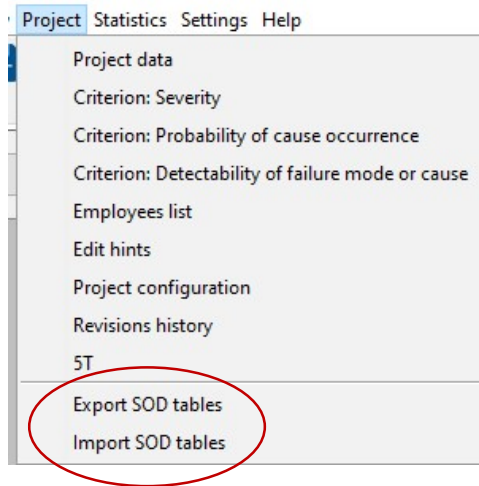
OK

The entered data can be edited. To do this, select the "**Settings**" button from the toolbar, then select the criteria you want to edit from the list.



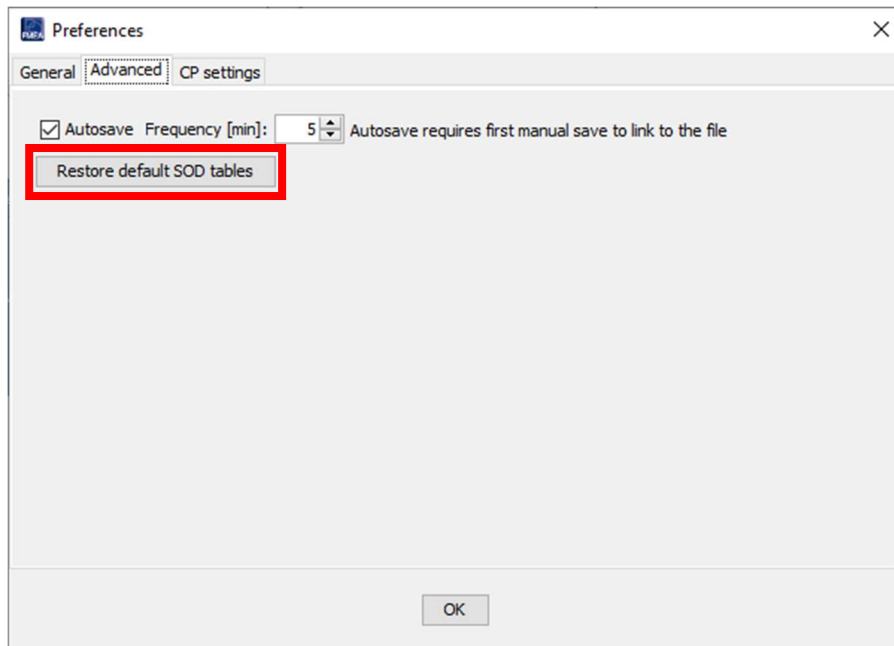
Note: when using the edit function in the settings tab, tables will be permanently saved in the software. If we want to change refer to the description of the evaluation criteria for a given project the "**Project**" function on the toolbar. In the dialog box you should enter the desired text. All squares, except for scoring numbers 1-10 are editable.

After making changes to the SOD tables, we can export them and use them in another FMEA file.



Restore default values for tables S, O, D

Tables in the software can be restored to default values in Settings -> **Preferences** -> **Advanced**, using the "Restore default SOD tables" button.



6. Create cells and move through trees

To move around the tree and sheets more conveniently, you can open the full-screen view of windows. To maximize the view, click the arrow symbol on the left side of the bottom bar.



6.1 Generic analysis

The "G" button on the top panel of the software allows you to add a column called "**Process**" to the analysis, making it easy to create advanced and complex FMEA analysis (Generic analysis for product groups). To remove an additional column, leave only one cell in the Process Item column of the process and press the "G" button again.

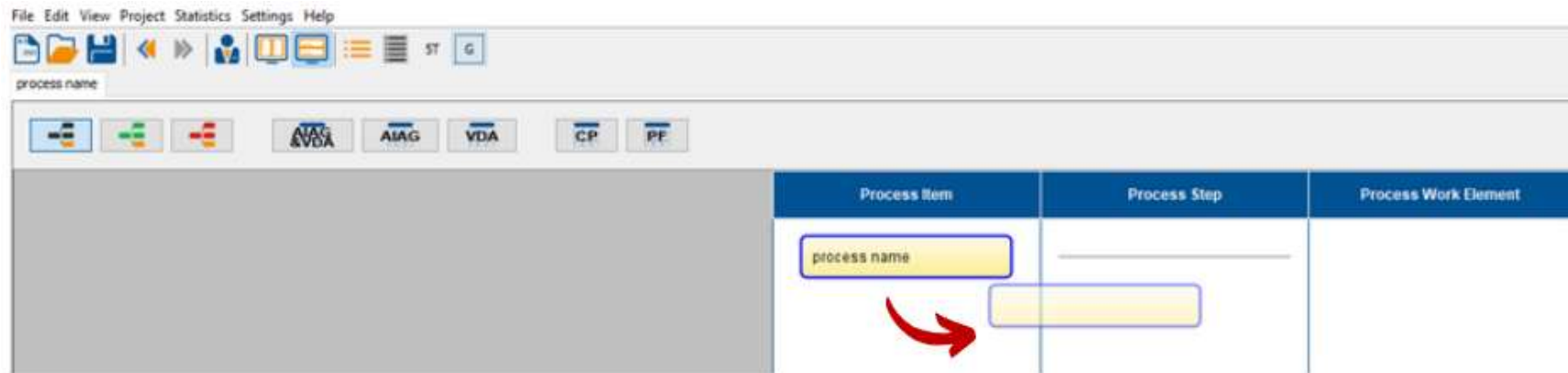
The "Generic" button thanks to which we can add the "Process" column to our trees

Additional column "Process"

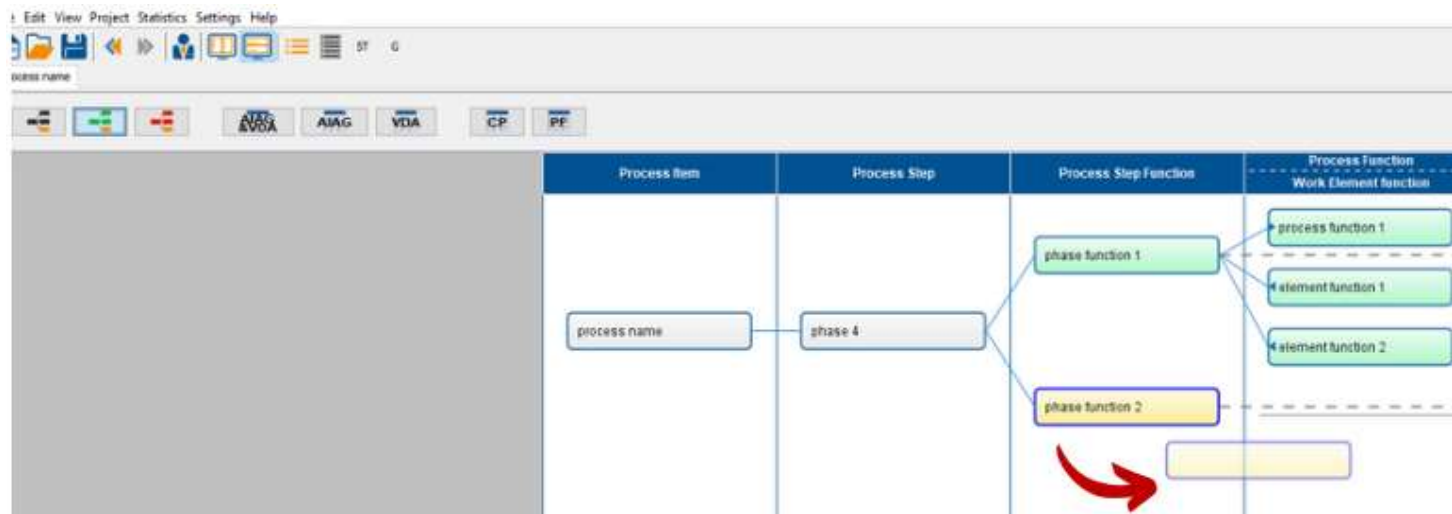
Process	Process Item	Process Step	Process Work Element
process	process name	phase 1	???
		phase 2	Work Element 4
			Work Element 5
			Work Element 6
		phase 3	Work Element 7
			Work Element 8

6.2 Creating new cells

To create new cells on any tree, grab the cell (left click and hold), drag it to the right and drop it in a free space.

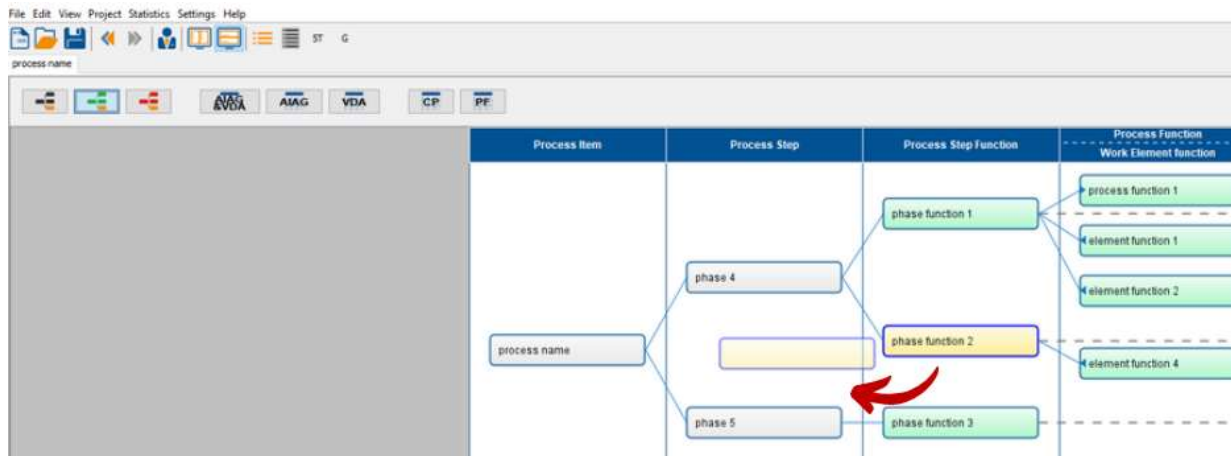


It works the same on every tree.

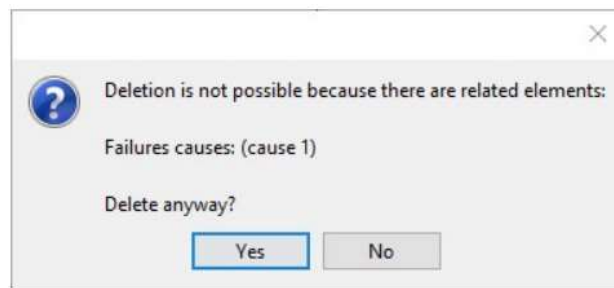


6.3 Removing cells

To delete a cell, grab it (left-click and hold), drag it to the left on the previous column and drop it in a free place. You can also use the right-click list and select "**Delete**".



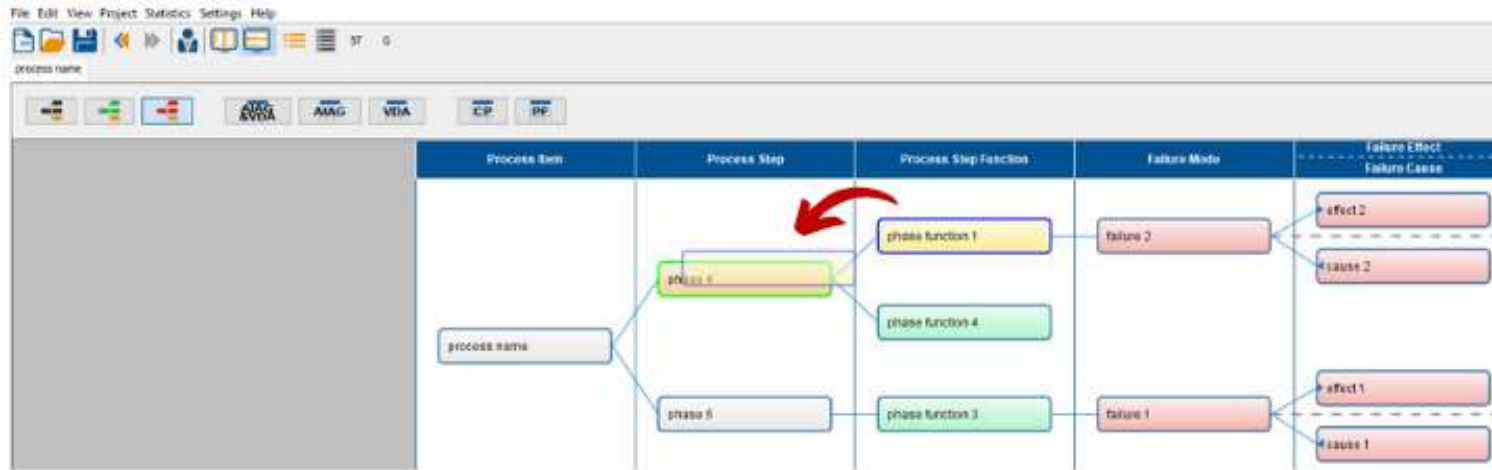
If the cell that we want to delete has connections, we will see a message asking:



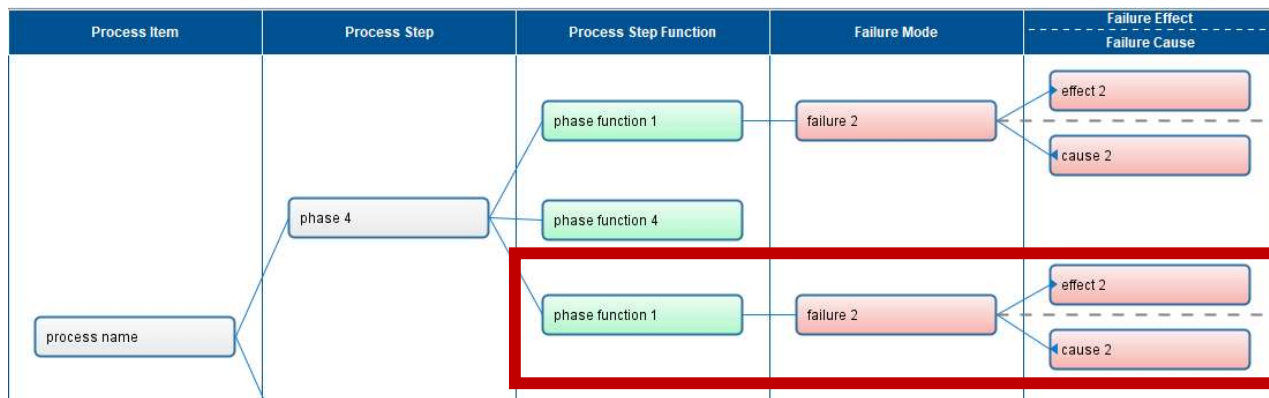
If there are no contraindications for deleting related cells, press the "**Yes**" button, the selected cell and related cells will be deleted.

6.4 Copying Cells

In order to copy a cell, drag it to the one to which you want to assign it (the frame of the cell on which you move will be highlighted in **green**). When copying with the cell, everything that is assigned to the right of the structure will be copied.



The copied cell (with the cells assigned to it on the right) appears at the bottom.



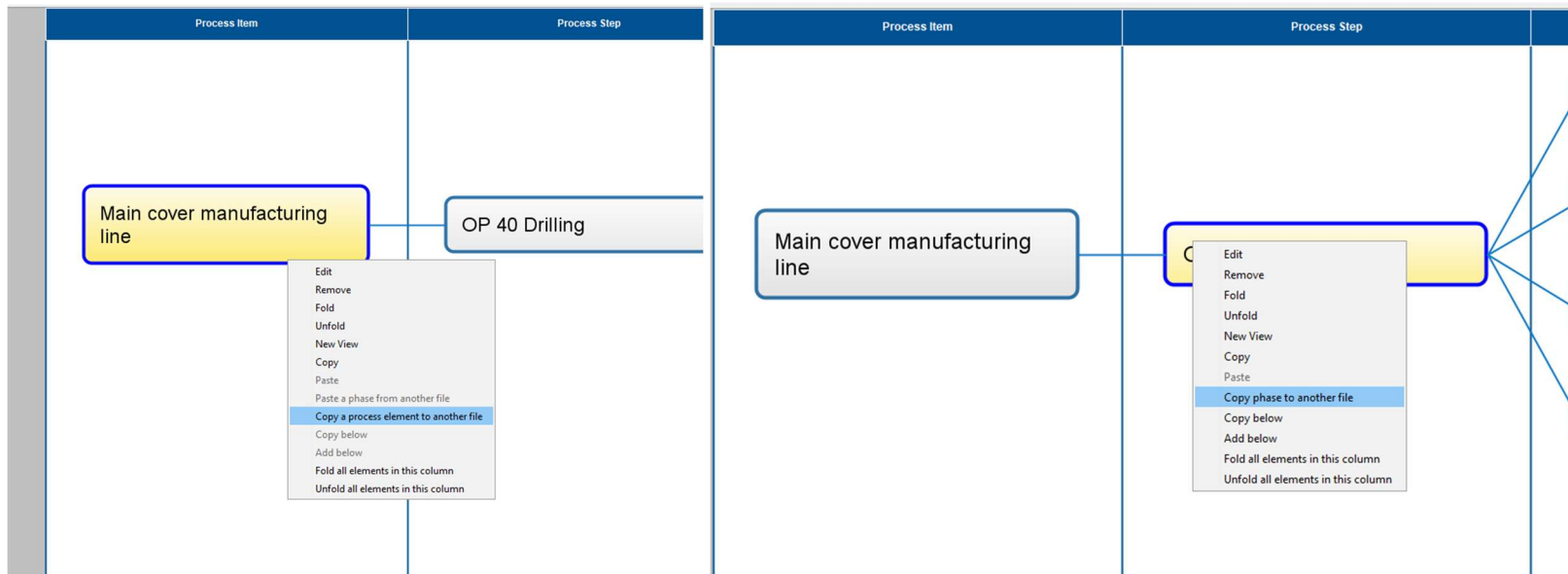
Copying cells can also be done by clicking on the right mouse button and selecting "**Copy**" and then "**Paste**" by clicking on the cell to which we want to assign the previously copied cell.

Note: You can only copy cells in adjacent columns.

Copy between files

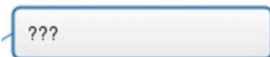
Process elements and process phases can be copied between files along with all the content that is assigned to it.

To use the function, right-click on "**Process item**"/"**Process Step**", select from the drop-down list "**Copy a process element to another file**"/"**Copy phase to another file**".



In order to paste the copied data, open another PQ-FMEA+ window, right-click on the cell "**Process Item**" or "**Process Step**" or "**Process**" (the generic option must be **enabled**) and select "Paste from another file" from the drop-down list.

6.5 Cells with "???"



In some specific cases cells containing "???" will appear on trees in the software.

These cells will form in situations where the newly created cells on the green or red tree will not be associated with previous structures. The question marks are to draw attention to the fact that the FMEA analysis lacks some data to be correct constructed.

Question marks:

- They will form on the black tree when the work element function is added to the green tree.

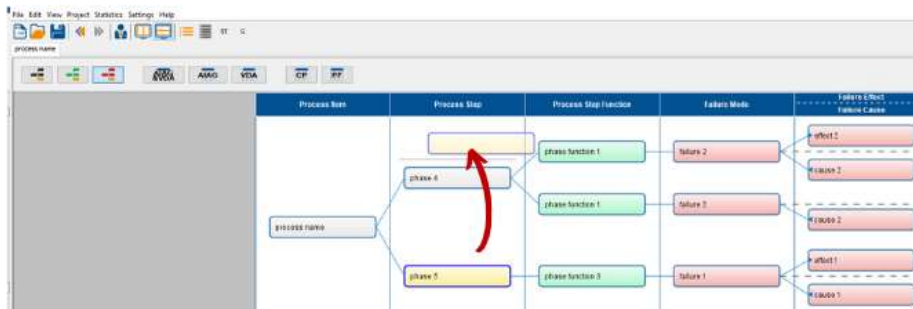
- They will form on a green tree when an error is added to a red tree, more precisely its effect or cause.
- They will form on black and green trees when we start building an FMEA analysis from a red tree or when loaded the old analysis will be from the PQ-FMEA version not adopted to AIAG & VDA ed. 1.

In order for the question marks to "disappear" you should:

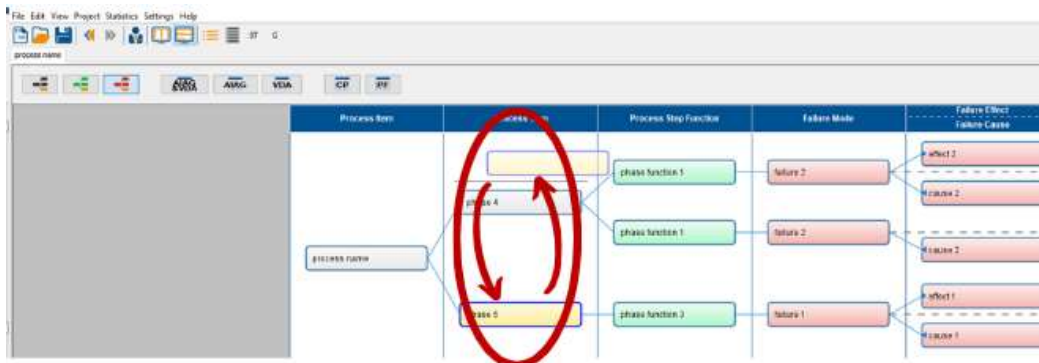
- Associate cells in the green tree with those in the black tree - work item functions with the corresponding work items.
- Associate cells from the red tree with those on the green tree - effects with the functions of processes and causes with the functions of work items.
- You can delete the cell, but associated cells will be deleted along with it.

6.6 Moving cells

The order of cells on the tree can be freely changed. To change the order of cells in a column, drag it to the place you want. As you move, a horizontal black bar will appear to show where the cell will go.



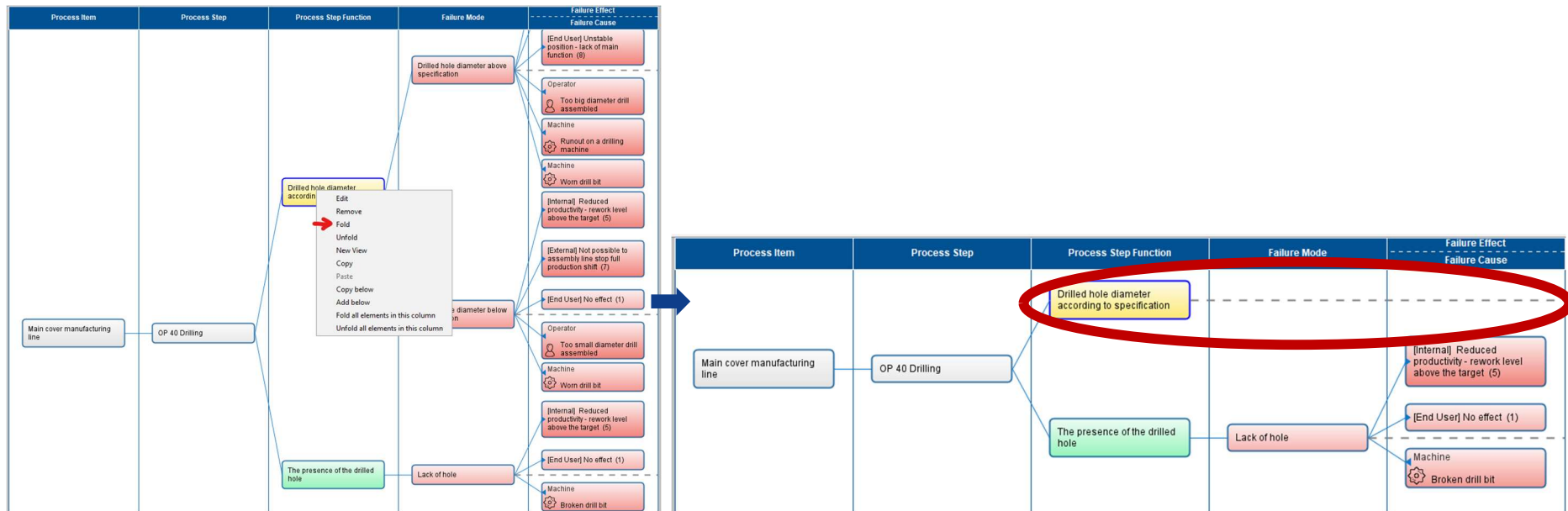
Note: cells can only be moved among themselves within a given tree branch.



6.7 Wrapping and expanding cells

The software has a built-in option to fold and unfold cells on trees.

To collapse cells on the tree, right-click on the cell and select "Fold" from the list.

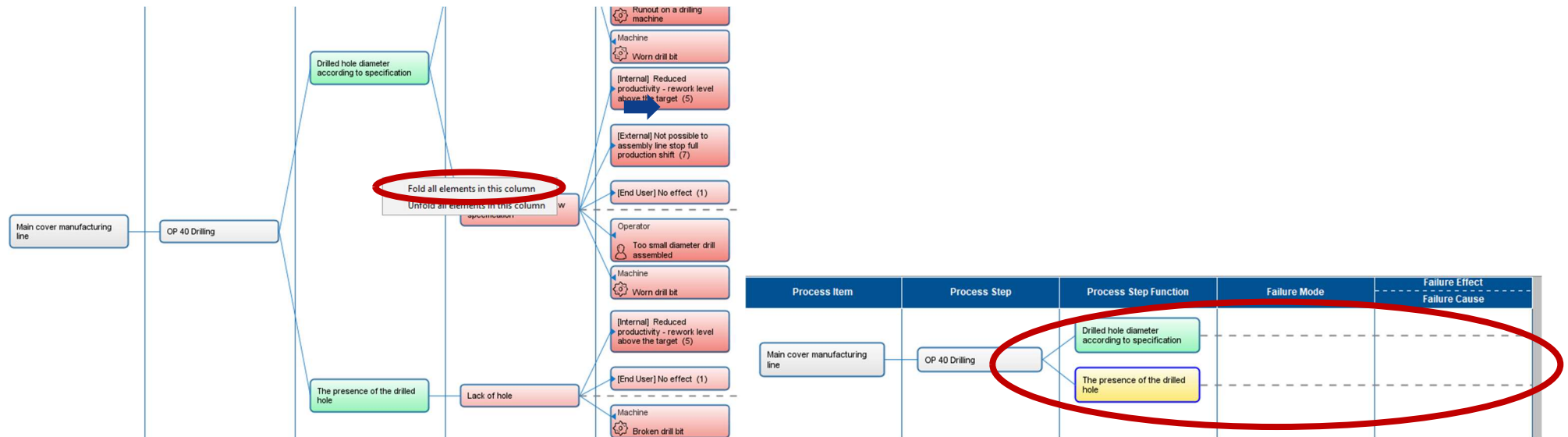


All cells to the right are folded and a dashed line appears.

To expand cells, right-click on the selected cell and select "Unfold".

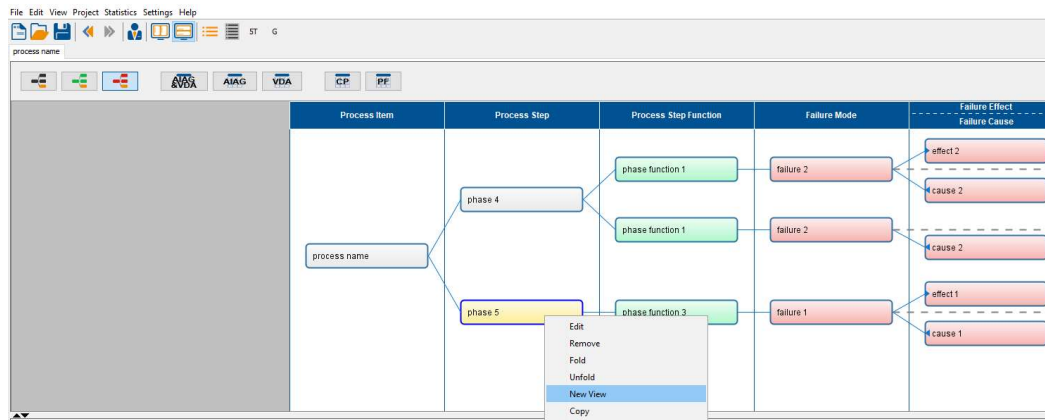
You can also fold or unfold all the cells in a column at once.

To do this, click on the empty field in the selected column and select "Fold / Unfold all elements in this column".



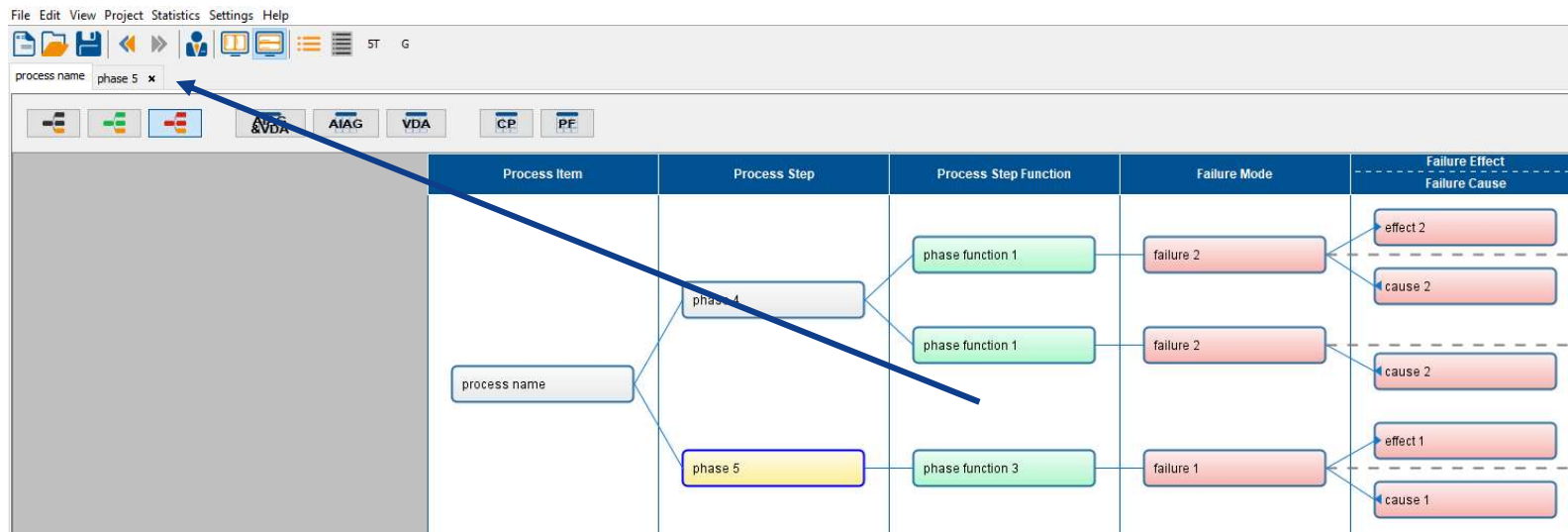
6.8 Open the selected branch in a new tab – new view

The software also has the function of opening cell branches in a new tab. To open a branch in a new tab, right-click the cell and select "**New view**". A branch will open in a new tab with all cells to the right of the one we click on.

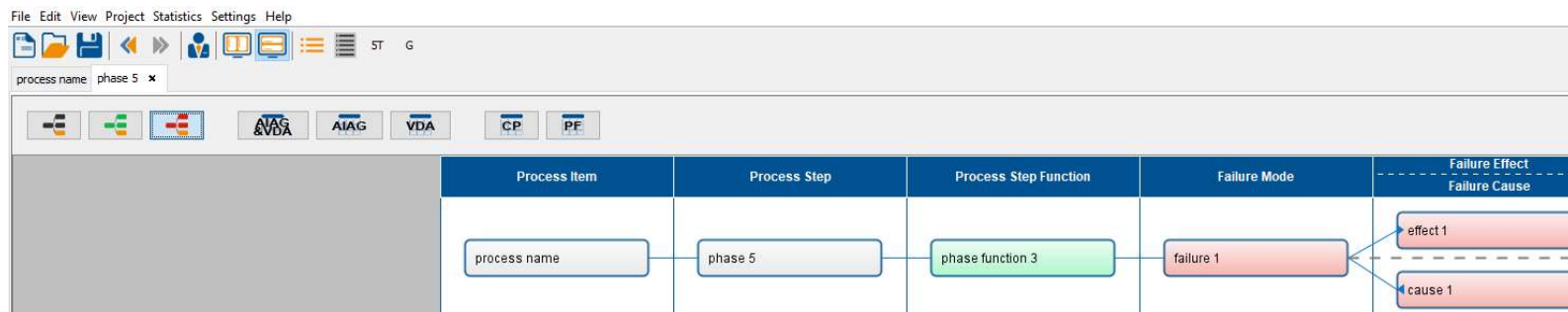


Note: New views are only a graphical representation of a portion of your analysis, and any changes you make to truncated views will affect the underlying analysis.

A new window opens at the top of the main toolbar.



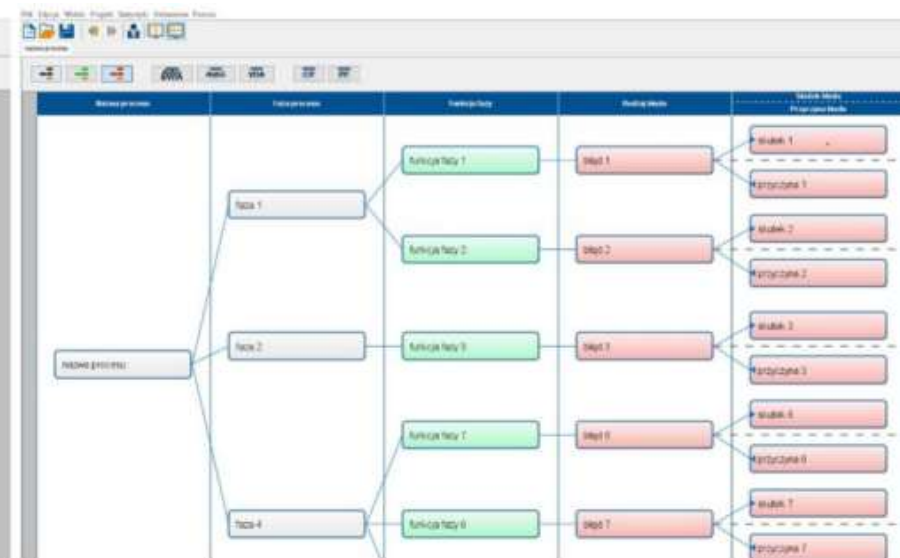
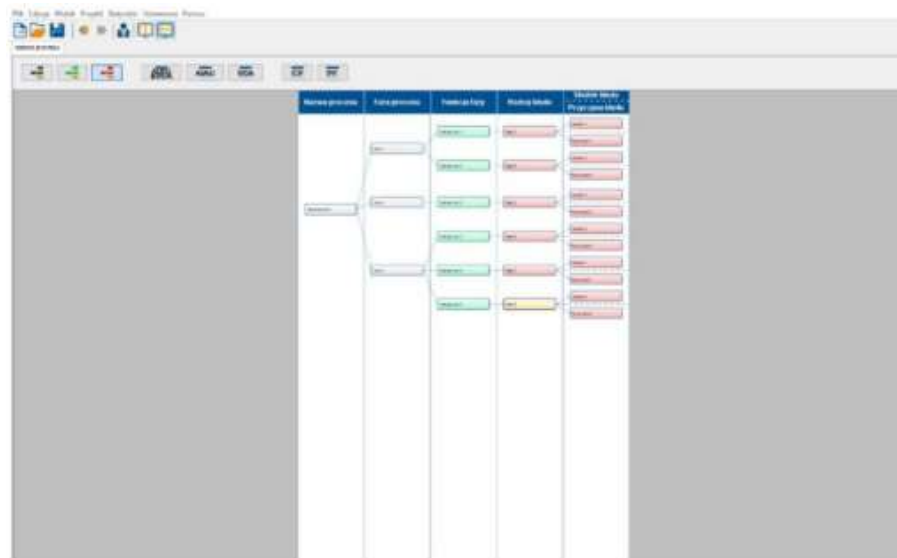
After switching the window in the indicated place, the view will open only with the selected part of the analysis.



You can create as many new views as you want.

6.9 Zoom in and out

To increase the readability of the analysis, the tree and sheet view can be zoomed in and out. To do this, hold down the *Ctrl* button and then use the mouse scroll to zoom in or out.



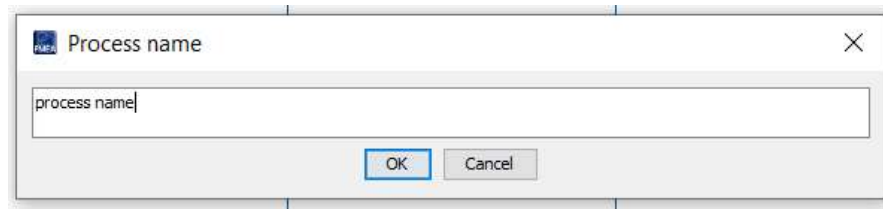
7. Editing cells

To edit cells, double-click the cell with the left mouse button. After clicking, a dialog box with a place to enter data will open. Cells differ from one another and are filled with different data. Some data is transferred automatically to the next cells. Data entered in cells are automatically transferred to the forms: AIAG & VDA, AIAG, VDA, CP and PF.

7.1 Structure analysis – black tree

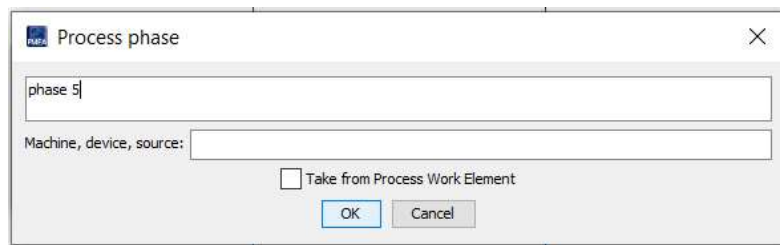
At this stage of the analysis, you can add **a process item**, **a process step**, and **process work element**.

Process item

A dialog box titled "Process name" with a close button (X) in the top right corner. It contains a text input field with the placeholder text "process name". At the bottom, there are two buttons: "OK" and "Cancel".

Process item edit window.

Process Step

A dialog box titled "Process phase" with a close button (X) in the top right corner. It contains a text input field with the placeholder text "phase 5". Below this is a label "Machine, device, source:" followed by a text input field. There is a checkbox labeled "Take from Process Work Element" which is currently unchecked. At the bottom, there are two buttons: "OK" and "Cancel".

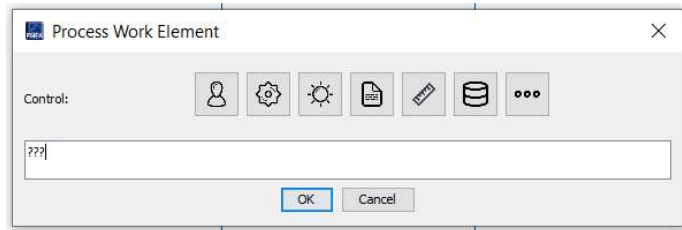
In this window, in addition to the name of the process phase, you can enter the designations of the machine, device and source.

You can use the option „**Take from process Work Element**”, then all related work items with machine symbol in work elements will be automatically assigned.



Process work element

Using this window, you can add process work elements and define their category (icons). These are: man, machine, environment, method, measurement, material and others. After hovering the cursor over the icon, the name of the given category will be displayed.

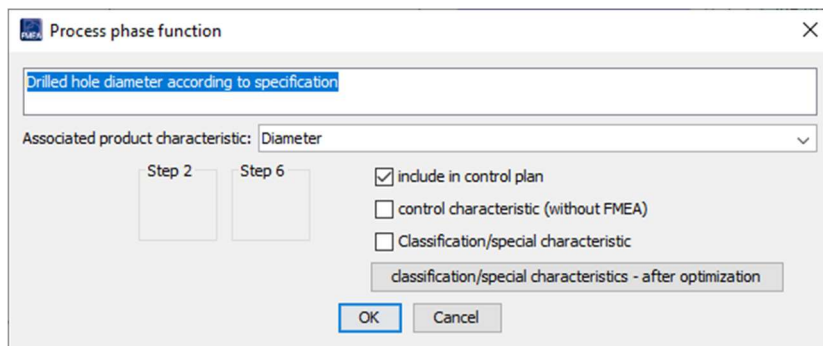


7.2 Function analysis – [green tree](#)

At this stage, you can add: **process phase functions**, **process functions**, and **work element functions**.

The **process item** and **process phases** are taken from the previous tree. If they have not been added earlier, you can also do it from a [green tree](#). Remember to link the cells with each other so that the FMEA analysis is performed correctly.

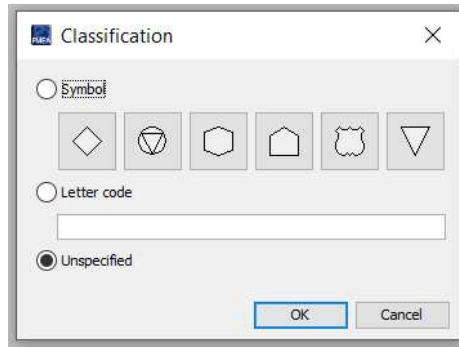
Process phase function



In addition to entering the phase function, it is possible to enter or select from the list (if it has already been entered) the related characteristic of the product. Once added underneath, you will be able to edit the fields:

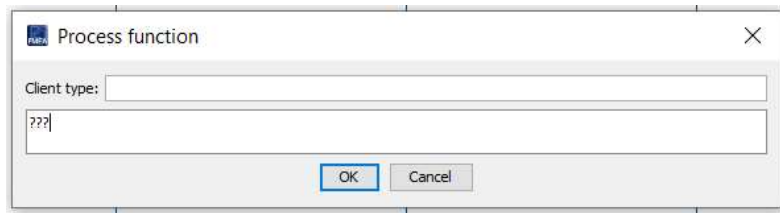
- „**Include in control plan**“ is checked automatically and can be unchecked at any time.

- „**Classification/special characteristic**“- after this field is marked, a window will be displayed with the following symbols to choose from: You can select a symbol or enter a letter. You can also add your own symbols. To do this, open "**Classification**" in the place where the program is installed and add the symbols of your choice.
- „**Classification/special characteristics - after optimization**", the entered characteristics will be displayed on the form in step 6 of the analysis



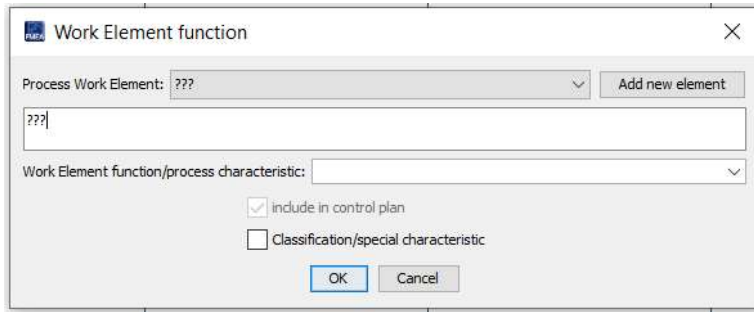
- "**Control characteristics (without FMEA)**" - the software will block the possibility of adding cells in subsequent columns for this phase function and creates a fully editable row in the CP.

Process function



In the process function window, enter the Client type. At this stage, we enter also a process function. Good practice suggests that if there is no function for a given client, enter "**No function**".

Work element function



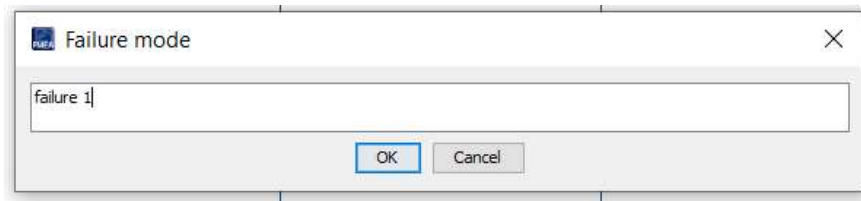
In the work element functions window, select the work element to which you want to add the function. You can also add a new work element by clicking on **"Add new element"**. Then, in the window below, enter the function of the selected element. Additionally, it is possible to mark special characteristics of the process. To do this, complete the field **"Work elements functions/process characteristics"** or select it from the list by clicking the down arrow (if it has already been entered). After adding the function, it is possible to check or uncheck **"Include in the control plan"** and the characteristics of the process.

7.3 Risk analysis – red tree

On the red tree you can add: **failure modes**, **failure effects**, and **failure causes**.

Cells: **process items**, **process phases**, and **phase functions** have been pulled from previous trees. If this has not been done, you can add them to this structure. Be sure to tie the cells together for proper analysis.

Failure mode

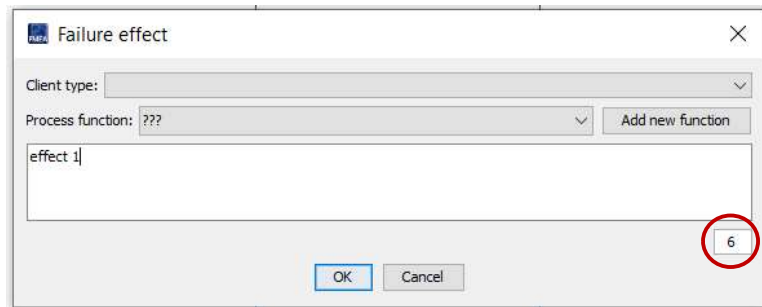


In this window, type a potential type of error.

Failure effect

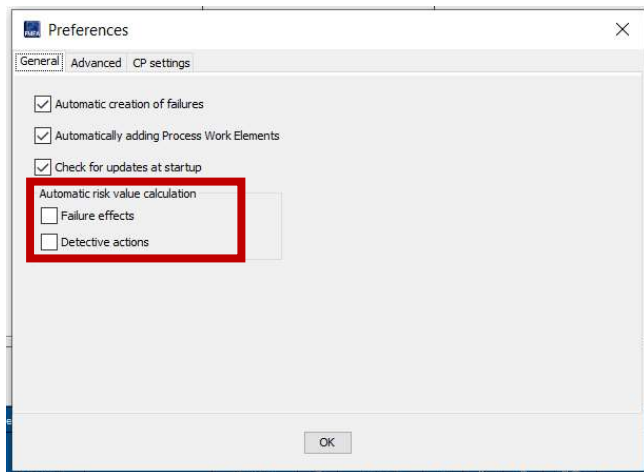
At first, select client type from the drop-down list. The list contains types of clients that were added in with the [green tree](#). The next step is to select a process function that was also taken from the [green tree](#). You can also add a new process feature by clicking "Add new function". Then a window from a [green tree](#) will open, where you can add a new feature and client type.

In the "Failure effect" cell, we can assign an effect severity rating (S), which will be automatically entered in the FMEA sheet.



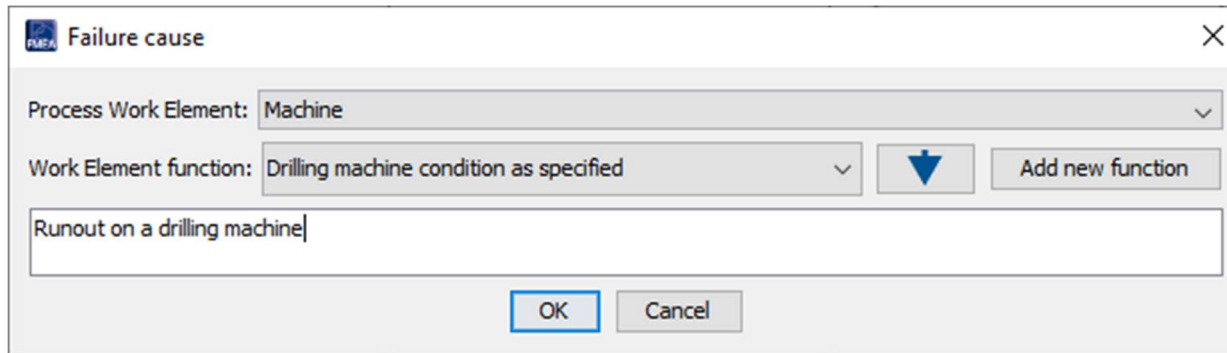
The 'Failure effect' dialog box is shown. It has a title bar with a close button. Inside, there is a 'Client type' dropdown menu, a 'Process function' dropdown menu with '???' selected, and an 'Add new function' button. Below these is a text area containing 'effect 1'. At the bottom right, there is a small input field containing the number '6', which is circled in red. At the bottom left are 'OK' and 'Cancel' buttons.

Automatic loading of entered rating can be turned on in the "Preferences" window, which can be opened from the "Settings" → "Preferences" toolbar.



The 'Preferences' dialog box is shown with the 'General' tab selected. It has a title bar with a close button. Inside, there are several checkboxes: 'Automatic creation of failures' (checked), 'Automatically adding Process Work Elements' (checked), 'Check for updates at startup' (checked), 'Automatic risk value calculation' (checked), 'Failure effects' (unchecked), and 'Detective actions' (unchecked). The 'Automatic risk value calculation' section is highlighted with a red rectangle. At the bottom is an 'OK' button.

Failure cause



Failure cause

Process Work Element: Machine

Work Element function: Drilling machine condition as specified

Runout on a drilling machine


OK Cancel

In the "**Failure cause**" window, type the potential error effect for the client and the process function.

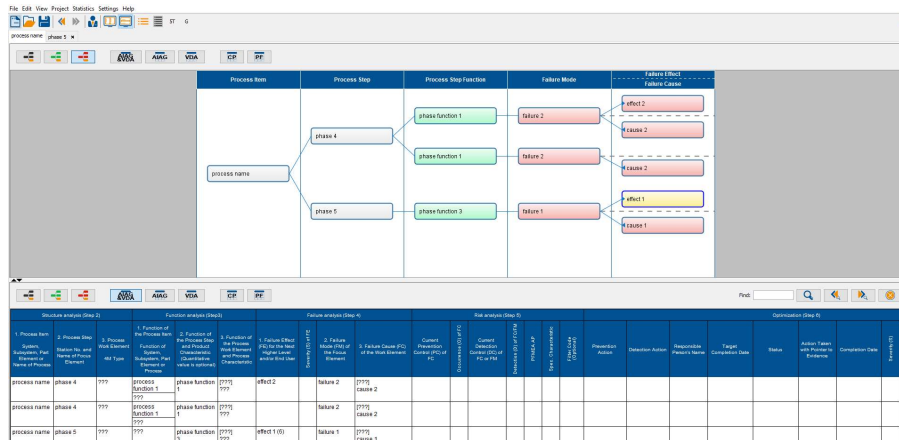
First, in this cell, we select "**Process work element**" from the drop-down list and then "**Work element functions**". You can add a new function by clicking on "**Add new function**". In the text window, you must type a potential cause of error.

Left-clicking on the **arrow** symbol copies the text of the selected Process Work Element to the failure cause text box.

8. Work on the AIAG & VDA form

To switch to the AIAG & VDA form view, use the icons  in the lower navigation bar.

When you click the arrow, you can get a double view, at the top the failure tree, at the bottom the AIAG & VDA sheet.



The data entered in the failure tree (steps 2, 3 and 4) will automatically be transferred to AIAG & VDA form (and all the remaining sheets).

You can edit all windows in forms by double click on the selected cell.

To scroll to the right to see step 5 and 6, use the scroll bar at the bottom.

Severity (S)

The only field to complete remains the severity (S) value. Select the highest of the values of the entered effects and then type it manually or double-click open the severity (S) table.

Failure analysis (Step 4)			
1. Failure Effect (FE) for the Next Higher Level and/or End User	Severity (S) of FE	2. Failure Mode (FM) of the Focus Element	3. Failure Cause (FC) of the Work Element
effect 1		failure 1	[??] cause 1

8.1 Risk analysis (step five)

Risk analysis (Step 5)						
Current Prevention Control (PC) of FC	Occurrence (O) of FC	Current Detection Control (DC) of FC or FM	Detection (D) of FC/FM	PFMEA AP	Spec. Characteristic	Filter Code (Optional)

Current prevention control (PC) of FC

Here we enter the current implemented and used preventive measures. To add another activity, click "**Add**", to remove click "**X**".



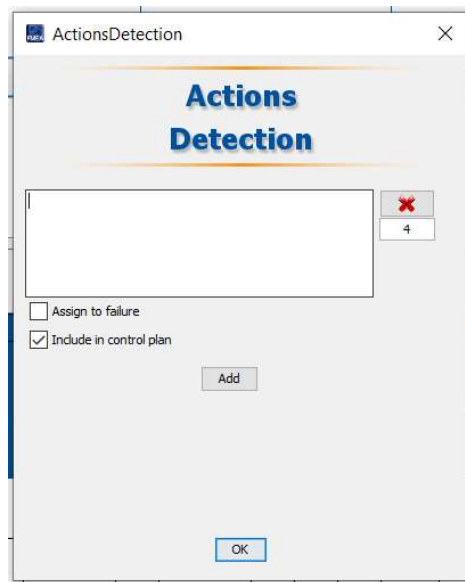
Occurrence (O)

By default, tables are built in the software that meets the requirements of AIAG & VDA ed.1 and AIAG ed.4. They can be switched using the top navigation bar. You can also add specific examples in the right column of the table. On the left side of the table, we select an occurrence (O) rating.

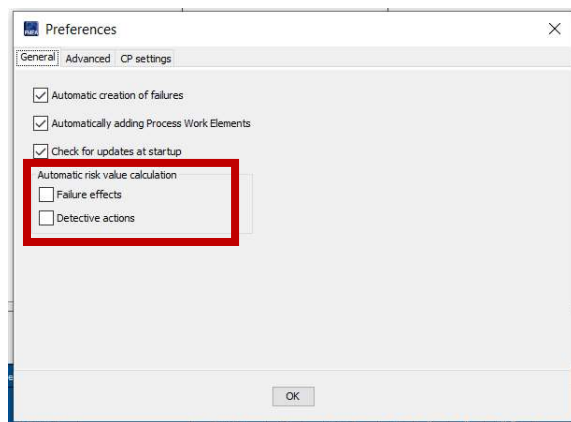
Current control - detection (DC) for FC or FM

In this window, you can enter detection (control) actions. In addition to adding and removing as before, it is also possible to enter two markings: "**Include in control plan**" and "**Assign to failure**".

In addition, in the "**Current control – detection**" window, we can immediately assign a defect/cause detection assessment (D), which will automatically enter the FMEA sheet.



Automatic loading of entered rating can be turned on in the "**Preferences**" window, which can be opened from the "**Settings**" → "**Preferences**" toolbar.



Note: The "Assign to failure" option is marked by copying (with a binding) of a given control to all causes of the error.

Risk analysis (Step 5)					
Cause (FC) Element	Current Prevention Control (PC) of FC	Occurrence (O) of FC	Current Detection Control (DC) of FC or FM	Detection (D) of FC/FM	PFMEA AP
<div> <div>Actions Detection</div> <div> <input type="text" value="visual control"/> <div> <div></div> <div></div> </div> </div> <div> <input checked="" type="checkbox"/> Assign to failure <input checked="" type="checkbox"/> Include in control plan </div> <div>Add</div> <div>OK</div> </div>			visual control		
			visual control		
			visual control		
			visual control		
			visual control		

Detection (D)

Here, as before, we can switch between standards. On the right, we type specific requirements and on the left we select a rating.

AIAG & VDA		AIAG ed. 4		
D	Ability to Detect	Detection Method Maturity	Opportunity for Detection	Corporate or Product Line Examples
10	Very low	No testing or inspection method has been established or is known.	The failure mode will not or cannot be detected.	
9		It is unlikely that the testing or inspection method will detect the failure mode.	The failure mode is not easily detected through random or sporadic audits.	
8	Low	Test or inspection method has not been proven to be effective and reliable (e.g. plant has little or no experience with method, gauge R&R results marginal or comparable process or this application etc.).	Human inspection (visual, tactile, audible), or use of manual gauging (attribute or variable) that should detect the failure mode or failure cause.	
7			Machine-based detection (automated or semi-automated with notification by light, buzzer, etc.), or use of inspection equipment such as a coordinate measuring machine that should detect failure mode or failure cause.	
6	Moderate	Test or inspection method has been proven to be effective and reliable (e.g. plant has experience with method, gauge R&R results are acceptable on comparable process or this application, etc.).	Human inspection (visual, tactile, audible), or use of manual gauging (attribute or variable) that will detect the failure mode or failure cause (including product sample checks).	
5			Machine-based detection (semi-automated with notification by light, buzzer, etc.), or use of inspection equipment such as a coordinate measuring machine that will detect failure mode or failure cause (including product sample checks).	
4	High	System has been proven to be effective and reliable (e.g. plant has experience with method on identical process or this application), gauge R&R results are acceptable, etc.	Machine-based automated detection method that will detect the failure mode downstream, prevent further processing or system will identify the product as discrepant and allow it to automatically move forward in the process until the designated reject unload area. Discrepant product will be controlled by robust system that will prevent outflow of the product from the facility.	
3			Machine-based automated detection method that will detect the failure mode in station, prevent further processing or system will identify the product as discrepant and allow it to automatically move forward in the process until the designated reject unload area. Discrepant product will be controlled by a robust system that will prevent outflow of the product from the facility.	
2		Detection method has been proven to be effective and reliable (e.g. plant has experience with method, error-proofing verifications, etc.).	Machine-based detection method that will detect the cause and prevent the failure mode (discrepant part) from being produced.	
1	Very high	Failure mode cannot be physically produced as-designed or processed, or detection methods proven to always detect the failure mode or failure cause.		

Assistant

OK Cancel

PFMEA AP

AP, or Action Priority, is selected automatically based on individual SOD ratings and ap table from the manual.

The column displays three values:






- H – High risk;
- M – Medium risk;
- L – Low risk

Filter codes (optional)

Filtration codes can be added by entering any string of characters.

8.2 Quality Assistant

Based on the selected data, the software will suggest which numerical value to choose for the detection of the defect / cause (D) and the probability of occurrence of the cause (O). Open the Quality Assistant by clicking on the cell in the form in the column "Occurrence of (O) FC" or "Detection of (D) FC / FM".

Structure analysis (Step 2)			Function analysis (Step3)			Failure analysis (Step 4)				Risk analysis (Step 5)				
1. Process Item System, Subsystem, Part Element or Name of Process	2. Process Step Station No. and Name of Focus Element	3. Process Work Element 4M Type	1. Function of the Process Item Function of System, Subsystem, Part Element or Process	2. Function of the Process Step and Product Characteristic (Quantitative value is optional)	3. Function of the Process Work Element and Process Characteristic	1. Failure Effect (FE) for the Next Higher Level and/or End User	Severity (S) of FE	2. Failure Mode (FM) of the Focus Element	3. Failure Cause (FC) of the Work Element	Current Prevention Control (PC) of FC	Occurrence (O) of FC	Current Detection Control (DC) of FC or FM	Detection (D) of FC/FM	PFMEA AP
process name	phase 4	???	process function 1 ???	phase function 1	[[[[]]] ???	effect 2		failure 1	[[[[]]] cause 1					

Occurrence (O) – hint based on the result based on NOK samples or on the basis of Cp/Cpk.

Detection (D) – hint based on the type of control method.

SOD Assistant

Result based on NOK samples

NOK samples Sample

Proposed OCC value

Result based on C_p/C_{pk}

C_p	C_{pk} value					
	$C_{pk} = C_p$	$C_{pk} = C_p - 0,1$	$C_{pk} = C_p - 0,2$	$C_{pk} = C_p - 0,3$	$C_{pk} = C_p - 0,4$	$C_{pk} = C_p - 0,5$
0.5	8	8	9	9	9	10
1	7	7	7	8	8	8
1.33	3	4	4	5	5	5
1.67	3	3	3	4	4	4
2	2	2	2	2	2	3
5	2	2	2	2	2	2

OK

SOD Assistant

Select inspection type Select MSA type

Acceptable

Conditionally acceptable

Non acceptable

Proposed DET value

* Acceptance/no acceptance


OK

8.3 Optimization (step 6)

Optimization (Step 6)												
Prevention Action	Detection Action	Responsible Person's Name	Target Completion Date	Status	Action Taken with Pointer to Evidence	Completion Date	Severity (S)	Occurrence (O)	Detection (D)	Spec. Characteristic	PFMEA AP	Remarks

Prevention/control actions

Prevention or detection action are introduced using a single window, in which we type and uncheck all the data.

 Prevention Action/Detection Action

Prevention Action/Detection Action

☒ Prevention Action ☐ Detection Action

Procedure for process change release

Responsible Person's Name: John Smith (Production Engineer, Engineering)

Target completion date: 2022-10-13 (41)

Status: Pending decision

Action taken with pointer to evidence:

Completion date:

- **Type of action**

You can choose between preventive or control actions.

- **Content of the action**

In the first text window, type in the task to be performed.

- **Responsible person**

If the list of employees has been completed in advance you can select the person responsible for the task. If this was not done before, click "**Edit list**" and add employees. To add an employee, type: name, position, and department, and then approve "**Add**".

You can export and import employee lists between computers.

After the process of adding employees, close the window with the "**OK**" button, and then select the worker from the drop-down list.

- **Select Planned end date**

Select the date of the planned completion by clicking the calendar and selecting a date.

- **Status**

From the drop-down list, select the status of the task.

- **Action taken**

In this text window we enter all the actions taken.

- **End date**

As in the case of the planned date, we use the calendar to select the end date.

- **Add more tasks**

To add another task, right-click on the cell in the "**Preventive actions**" or "**Control actions**" column and select "**Add new task**".

- **Risk assessment after optimization**

In the rest of step six, consider the risk assessment after optimization. The new risk assessment will appear in red in parentheses until all tasks are completed. Tasks are considered complete when they have an end date and a status marking as "**Completed**."

- "Add existing task" button

The button opens a window with list tasks that have been entered into the form, after double-clicking on the task, all its content will be loaded to the current "Recommended actions" window.

9. Work on the AIAG form

The first 7 columns outside the severity customer relevance assessment is automatically pulled from trees. Fill out the remaining columns with double click in the field.

9.1 RPN

According to AIAG ed.4, RPN (risk priority number) is used to assess the risk. This is a multiplier of S, O and D values. This multiplier ranges from 1 to 1000, the greater the value, the more severe and likely the risk.

The Preventive and Detection Actions columns are edited in the same way as in the AIAG & VDA form.

9.2 Recommended actions

Recommended actions are edited in the same way as in AIAG & VDA form.

9.4 Results of the action

A reassessment of the risk should be reassessed here. The new risk assessment will be shown red in parentheses until all tasks are completed. Tasks are considered completed in the connoisseur in which they have an end date and a status designation "Completed".

10. Work on the VDA form

Effect	Severity (S)	Characteristics	Failure Mode	Failure Cause	Preventive Actions	Occurrence (O)	Detection Actions	Detection (D)	RPN	Responsibility Planned completion date
phase 1										
phase function 1										
effect 1	???		failure 1	cause 1	Initial state					
phase 2										

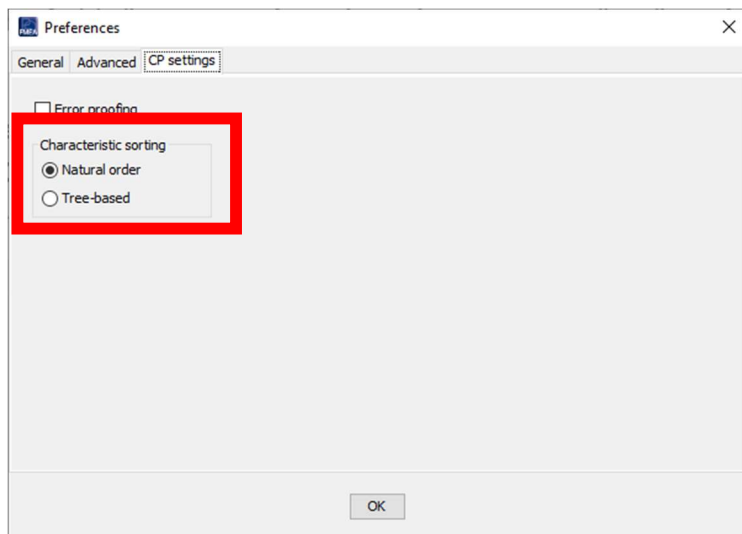
In the VDA sheet, fields are edited when you double-click the left mouse button, in the same way as the AIAG form. However, the sheets differ in construction.

11. CP – Control Plan

Name / number of process / operation description	Machine, Device, Jig, Tools for Mfg.	Characteristics			Special Char. CP	Methods				Reaction Plan	
		No.	Product	Process		Process / product specification / tolerance	Evaluation/ Measurement	Sample			Control Method
								Size	Freq.		
phase 1			char1		⚠						
phase 2			char2								

The control plan will only be displayed when the fields "**Associated Product characteristics**" or "**Work Element function/process characteristic**" are completed in the tree.

Characteristics in the control plan can be **sorted** alphabetically or by the order of phase function/work element function cell order in FMEA trees. The sorting method can be changed in Settings -> **Preferences** -> **CP Settings**.

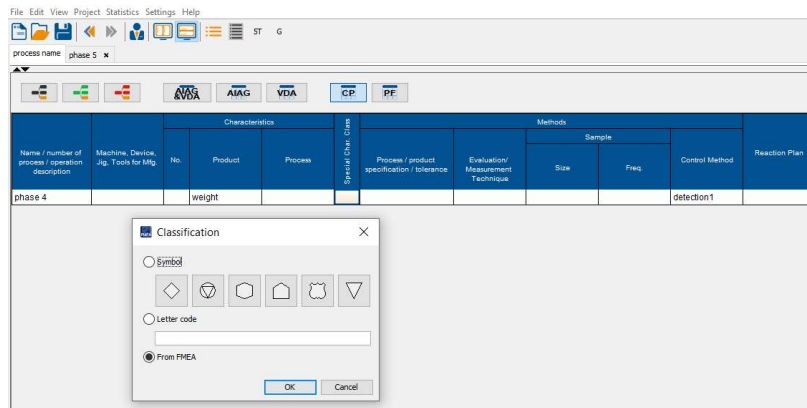


Edit the fields in the "Methods" column

To be able to edit fields with the heading "**Methods**", we need to complete the "**Detection of (D) FC / FM**" in the AIAG & VDA, AIAG, or VDA worksheet and mark them accordingly as failure or cause control.

The controls defined in the FMEA form will be transferred to the control plan in the "**Control method**" field when the product or process characteristics are first defined. If the FMEA form defines the characteristics and the product, the control plan is moved the "**Detection of (D) FC / FM**" for which the "**Assign to failure**" option is selected. **Detections** unassigned to defects will be transferred to CP when the process characteristics are defined.

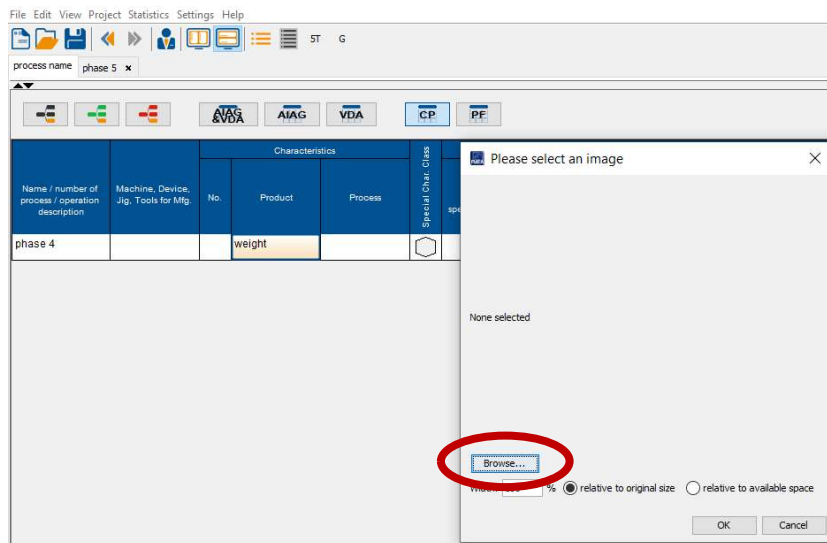
Classification



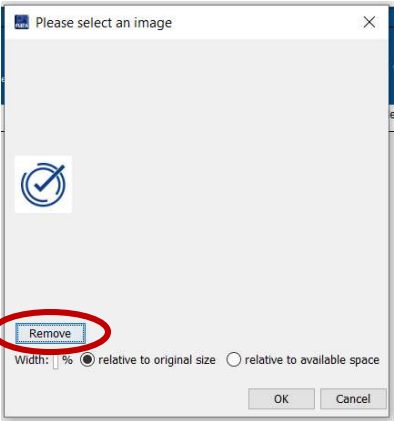
The classification assignment to a given line is done by double-clicking on the field in the "**Classification**" column. This action gives you the ability to assign a symbol or letter sign regardless of the FMEA form. Previously added classification marks in the FMEA sheet will be automatically moved to CP. If the CP symbol is selected, you will not be able to return to automatically enlist classification from the FMEA sheet.

Add photos

It is possible to add photos in CP. To do this, double-click on the place where the product or process characteristics are entered.



You can use "Browse..." Select a picture from your computer. Using the options at the bottom of the window in the software, specify the size of the image to be displayed. To delete a photo, double-click on it and select "Remove" in the window.

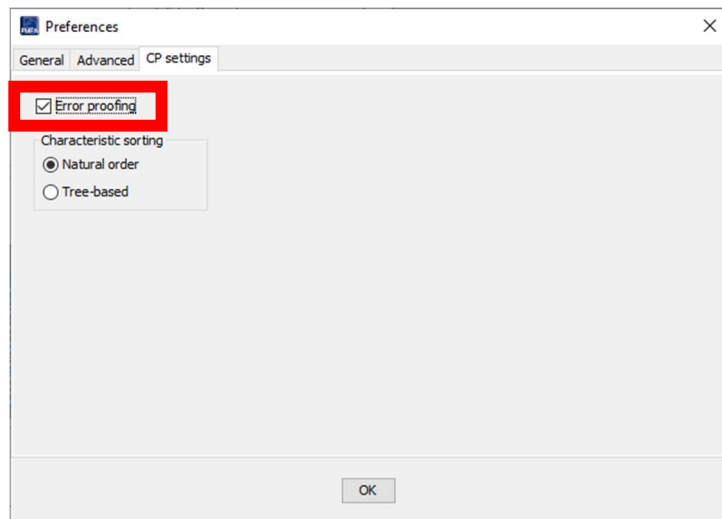


There may be times when red lines appear in the control plan. This happens when the characteristics are removed from the FMEA tree. In order to remove this highlight, you need to right-click on the selected row and select "Remove stale record".

Name / number of process / operation description	Machine, Device, Jig, Tools for Mfg.	Characteristics			Special Char. Class	Process / product specification / tolerance	
		No.	Product	Process			
OP 40 Drilling	Driller 450	1	Diameter			Acc. to drawing diameter 14 +/- 0,3	CM
		3	Drilled hole presence			Acc. to drawing - one hole (14 +/- 0,3)	Op
			Drilled hole presence				Me me mc
		2		Drill bit size			Op
				Remove stale record			




Additional column "Error proofing"

In the **CP Settings** tab opened from **Settings -> Preferences**, it is possible to add an additional column "Failure Prevention" to the Control Plan.



Name / number of process / operation description	Machine, Device, Jig, Tools for Mfg.	Characteristics			Special Char. Class	Methods					Failure prevention	Control Method	Reaction Plan
		No.	Product	Process		Process / product specification / tolerance	Evaluation/ Measurement Technique	Sample					
								Size	Freq.				
OP 40 Drilling	Driller 450	1	Diameter		Acc. to drawing diameter 14 +/- 0,3	CMM	3pcs	2h		Coordinate measuring machine sample checks	According to Instruction QMS 134-CP-R		
		3	Drilled hole presence		Acc. to drawing - one hole (14 +/- 0,3)	Operator	each drill bit	100%		Visual inspection by operator 100%	According to Instruction QMS 134-CP-R		
						Machine measurement module	each part	100%		Machine-based detection method that will detect the broken drill bit - automatic stop	According to Instruction QMS 134-CP-R		
			Drilled hole presence							Machine basic			
		2		Drill bit size			Operator	each drill bit	100%		Visual drill inspection by operator 100%	According to Instruction QMS 134-CP-R	

12. PF – Process Flow diagram

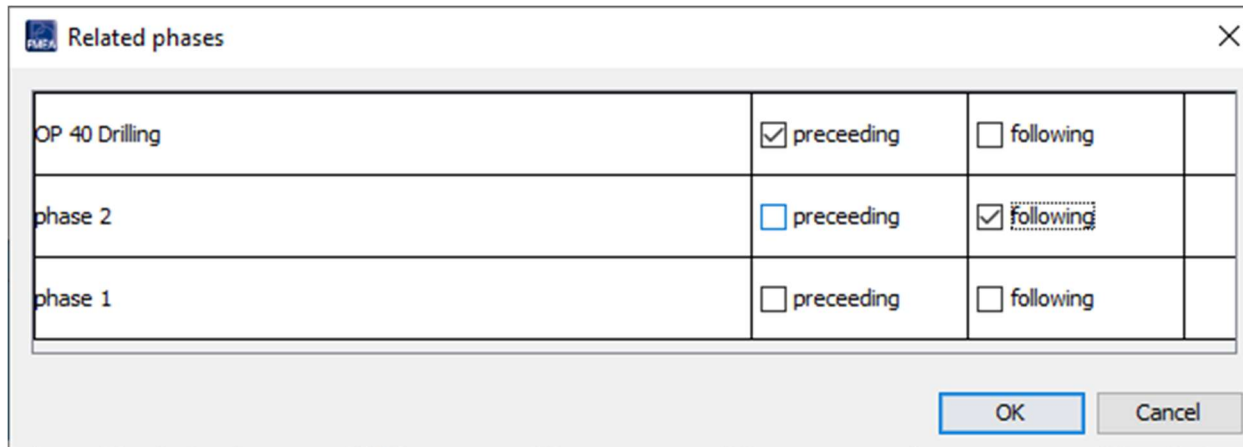
Row	Phase	Process characteristics	Preceding phases	Symbol	Following phases	Description	Product characteristics
1	OP 40 Drilling	Drill bit size			2		Diameter Drilled hole presence Drilled hole presence
2	phase 3		1		3		
3	phase 4		2				

The fields that are supplemented above are enlisted automatically from the tree.

The fields available for editing are: "**Preceding phases**", "**Symbol**", "**Following phases**" and "**Description**". - "**Description**" is a text box and to add text just click in the box twice and type text from the keyboard.

Preceding and following phases

To edit, double-click on the "**Preceding phases**" or "**Following phases**" cell.



The "Related phases" dialog box contains a table with three rows and three columns. The first column lists phase names, and the next two columns contain checkboxes for "preceeding" and "following" relationships. The "following" checkbox for "phase 2" is selected and highlighted with a dotted border.

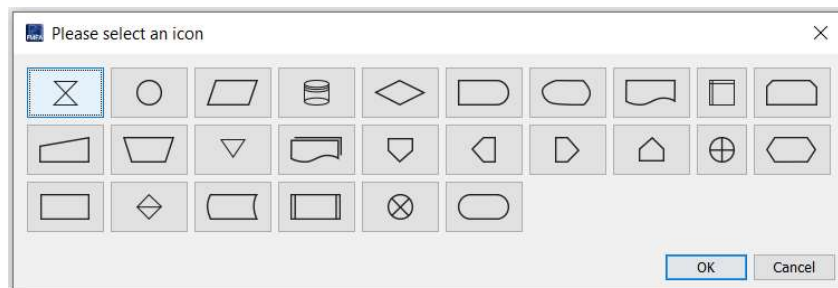
Phase	preceeding	following
OP 40 Drilling	<input checked="" type="checkbox"/> preceeding	<input type="checkbox"/> following
phase 2	<input type="checkbox"/> preceeding	<input checked="" type="checkbox"/> following
phase 1	<input type="checkbox"/> preceeding	<input type="checkbox"/> following

OK Cancel

We specify the uncheck phases (by clicking once in the selected square with the description "**Preceding**" or "**Following**" which phases are preceding and which are following.

Symbol

After double-clicking on the symbol field, we have the following icons to choose from.



The "Please select an icon" dialog box displays a grid of 21 different symbols. The first symbol, a circle with an 'X' inside, is selected and highlighted with a blue border. The symbols include various geometric shapes like circles, rectangles, triangles, and polygons, as well as more complex shapes like a cylinder and a house.

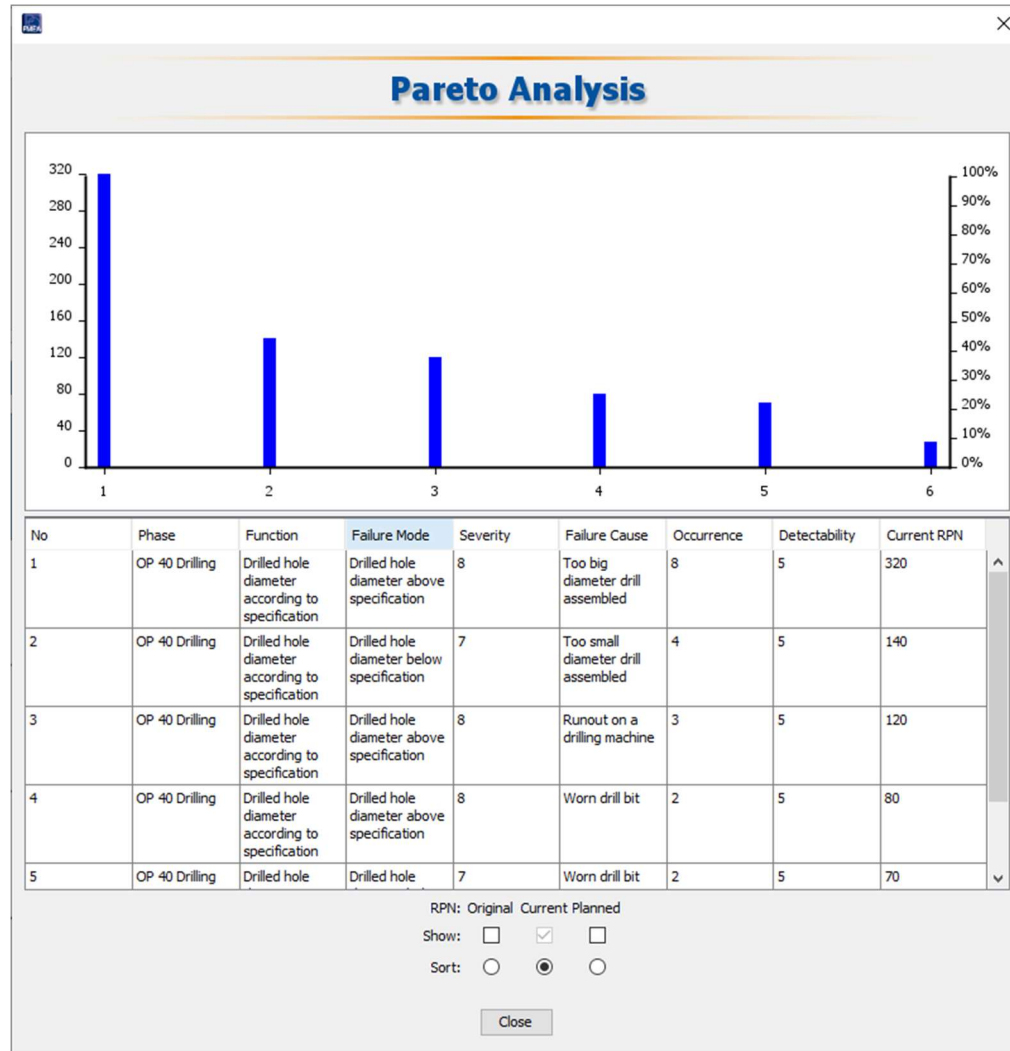
OK Cancel

To select an icon, click on it and then confirm "**OK**".

13. Statistics

13.1 Pareto analysis

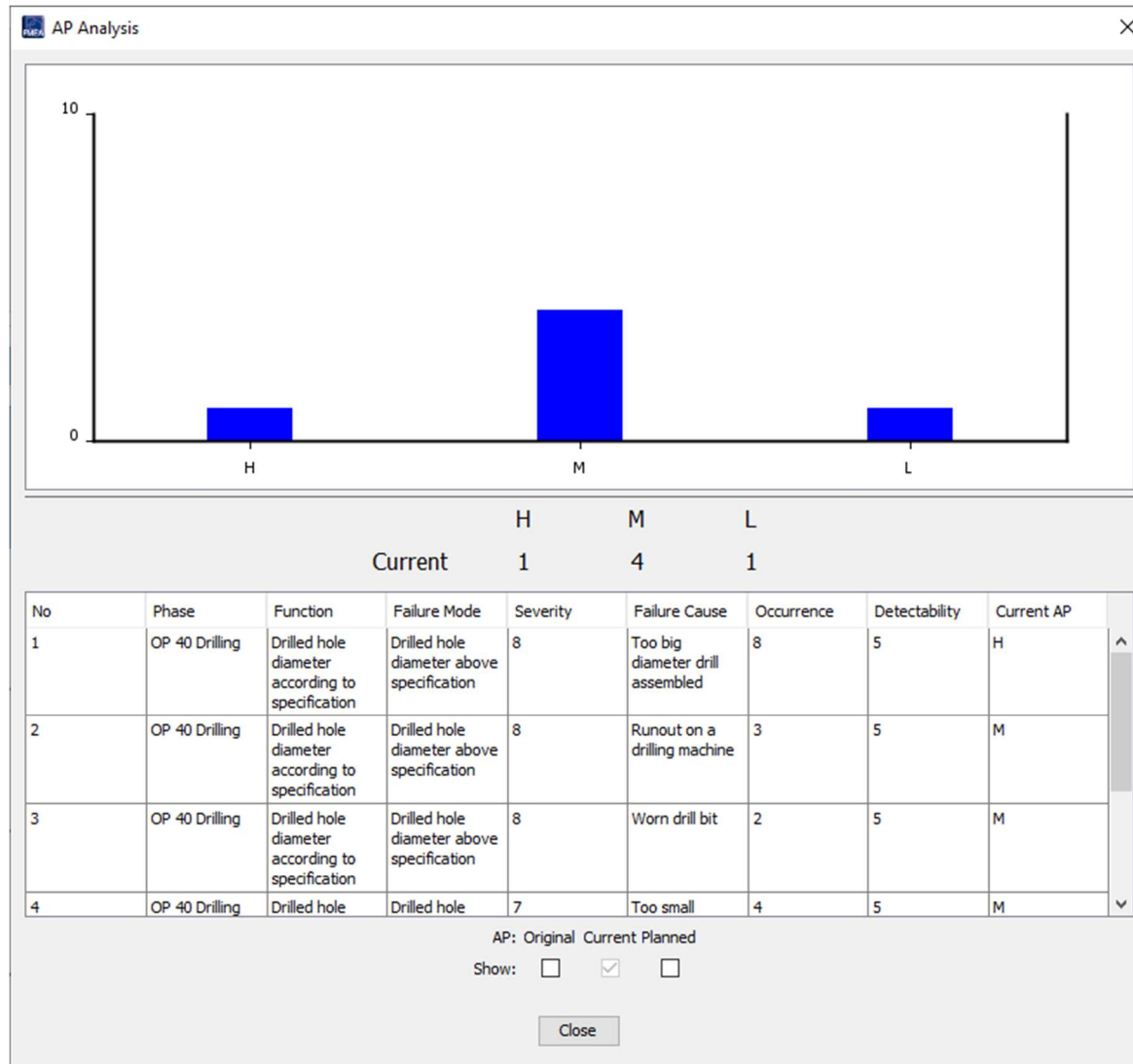
Pareto's analysis opens by clicking on the menu in "**Statistics**" and then "**Pareto analysis**". Pareto analysis can be displayed for three different cases: original risk, current risk and planned risk. You can also sort the results as in the image below. They will display or sort when you select a square in a row and column of interest to us.



13.2 AP Risk chart

The software includes a bar chart showing the number of specific priorities of activities – high, medium and low. Under the graph there is a table in which we have written out in detail all the causes included in the summary along with accurate assessments.

We open the function from the toolbar "**Statistics**" → "**AP risk chart**".



13.3 Risk matrix

The risk matrix will appear in the selection window how many evaluation data occurs in FMEA analysis. You can choose the displayed risks: original, current, planned.

The function is opened from the "**Statistics**" toolbar, the following matrices are available in the software:

- Matrix SxO;
- Matrix DxO;
- Matrix SxD;
- Matrix AP - on the AP matrix, we have a summary of the number of all assessments in terms of the priority level of action (high, medium, low) and a specific assessment: the severity (S), the occurrence (O) and the detection (D).



13.4 Risk classification of AP

The risk classification AP displays in the table the number of occurrences of H/M/L assessments in relation to the AP table template selected in the draft of the AP table:

AP Classification

Risk Classification

Simplified matrix (AIAG&VDA ed. 1 only)

5	3		6	13			9				2
	4										
	5										
	6										
	7										
	8										
	9										
	10										
6	1			1							
	2		8	4			1				
	3		11	14	2		4				
	4										
	5										
	6										
	7										
	8										
	9										
	10										
7	1				1						
	2		12	2	1	1			1		22
	3		14	19	12		1		1		7
	4			3	1						
	5										
	6										
	7										
	8										
	9										
	10										
8	1	1	1	1							2
	2		82	3	8	3	5		2		72
	3		69	72	51	8	33		4		46
	4			5	9	3	3				2
	5										
	6										
	7										
	8										
	9				1						
	10										

Red (H) - High importance of risk mitigation measures
Yellow (M) - Average importance of risk mitigation measures
Green (L) - Low importance of risk mitigation measures

CloseExport

For the selected AP table according to AIAG & VDA ed.1 you can open the simplified matrix:

AP Classification

Risk Classification

Simplified matrix (AIAG&VDA ed. 1 only)

Severity	Occurrence	Detectability			
		1	2 - 4	5 - 6	7 - 10
1	1 - 10				
2 - 10	1	1	5		2
2 - 3	2 - 7		12		
	8 - 10				
4 - 6	2 - 3		78	19	4
	4 - 5		1		2
	6 - 7				
	8 - 10		1		
7 - 8	2 - 3		345	51	155
	4 - 5		18	6	2
	6 - 7				
	8 - 10		1		
9 - 10	2 - 3		8		
	4 - 5				
	6 - 10				

Red (H) - High importance of risk mitigation measures
Yellow (M) - Average importance of risk mitigation measures
Green (L) - Low importance of risk mitigation measures

CloseExport

Using the "Export" button, the table is exported to a .xls file:

PlikNarzędzia główneWstawianieRysowanieUkład stronyFormułyDaneRecenzjaWidokAutomatyzacjaPomocPower Pivot

Wklej

WytnijKopiujMalarz formatów

Arial10A⁺A⁻BBIU[~]Wyrównanie

Zawijaj tekst

Ogólne

Formatowanie warunkoweFormatuj jako tabelę

NormalDane w

G18

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Severity	Occurrence	Detectability										
2			1	2	3	4	5	6	7	8	9	10	
3	1	1											
4		2											
5		3											
6		4											
7		5											
8		6											
9		7											
10		8											
11		9											
12		10											
13	2	1											
14		2		2									
15		3		2	8								
16		4											
17		5											
18		6											
19		7											
20		8											
21		9											
22		10											
23	3	1											
24		2											
25		3											
26		4											
27		5											
28		6											
29		7											
30		8											
31		9											
32		10											
33	4	1											
34		2		1	1	2							
35		3		3		6							
36		4				1							
37		5											
38		6								2			

Sheet0

GotowyUłatwienia dostępu: dobrze przygotowane

13.5 Tasks

When you select "Tasks", a window will open with the number of tasks to be completed, tasks divided among employees. When you double-click on the employee, a window will open with detailed information about the tasks, status, or actions taken. You can view completed tasks and print a task list for a worker.

Employees list

Select the employee to display the data for

Name	Position	Department	Number of remaining tasks
John Smith	Production Engineer	Engineering	5

OK

Tasks

Employee's tasks list

John Smith

No	Phase	Function	Failure Mode	Failure Ca...	Recommended Acti...	Due Date	Notes
1	OP 40 Drilling	Drilled hole diameter according to specification	Drilled hole diameter above specification	Too big diameter drill assembled	MSA for FC: Visual drill bit inspection by operator 100%	2022-10-04 (40)	
2	OP 40 Drilling	Drilled hole diameter according to specification	Drilled hole diameter above specification	Worn drill bit	Procedure for process change release	2022-10-13 (41)	
3	OP 40 Drilling	Drilled hole diameter	Drilled hole diameter	Too small diameter drill	Procedure for process change release	2022-10-13 (41)	

☐ Show completed tasks

Print

Close

14. Revision history

The revision history can be opened from the settings bar in the project tab, or from the icon below the settings bar.

After opening, we can add revisions along with the number, date and indication of which place in the software it applies to (FMEA, CP, PF).

Revisions history

Filter: and/or FMEA CP PF or ☐ ☐ ☐

Date	Revision number	Description	FMEA	CP	PF
2021-09-15 (37)			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Add

Export

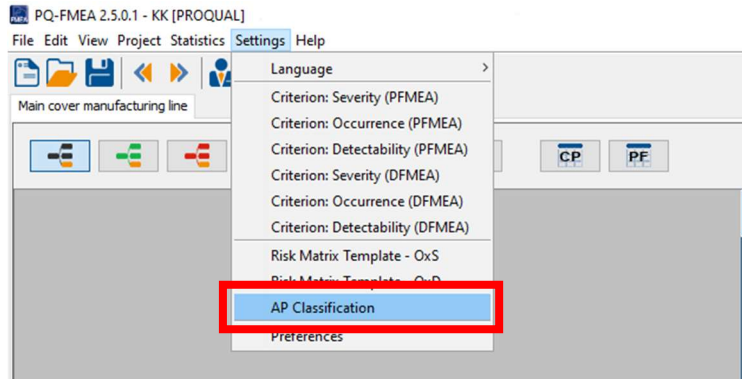
Generate PDF

Close

15. AP Customization

In PQ-FMEA+ it is possible to set a different AP than the one available in the standard issued by AIAG & VDA ed.1.

To use this function, go to the "Settings" tab and click on the "AP Classification" option.



After selecting this function, a window will open where we can:

- Add new AP tables

To add a new table, name it in the text box and click "Add".

AP Classification

AIAG & VDA ed. 1 (default) Remove Set as default Custom Table Add

Severity	Occurrence	Detectability									
		1	2	3	4	5	6	7	8	9	10
	1	L	L	L	L	L	L	L	L	L	L
	2	L	L	L	L	L	L	L	L	L	L
	3	L	L	L	L	L	L	L	L	L	L
	4	L	L	L	L	L	L	L	L	L	L
	5	L	L	L	L	L	L	L	L	L	L

Red (H) - High importance of risk mitigation measures
Yellow (M) - Average importance of risk mitigation measures
Green (L) - Low importance of risk mitigation measures

? Save and close Cancel and close Export Import

The newly created table will display the default table settings, which we can immediately edit according to our own preferences.

AP Classification

AP Classification

Custom Table Remove Set as default Add

Severity	Occurrence	Detectability									
		1	2	3	4	5	6	7	8	9	10
1	1	L	L	L	L	L	L	L	L	L	L
	2	L	L	L	L	L	L	L	L	L	L
	3	L	L	L	L	L	L	L	L	L	L
	4	L	L	L	L	L	L	L	L	L	L
	5	L	L	L	L	L	L	L	L	L	L
	6	L	L	L	L	L	L	L	L	L	L
	7	L	L	L	L	L	L	L	L	L	L
	8	L	L	L	L	L	L	L	L	L	L
	9	L	L	L	L	L	L	L	L	L	L
	10	L	L	L	L	L	L	L	L	L	L
2	1	L	L	L	L	L	L	L	L	L	L
	2	L	L	L	L	L	L	L	L	L	L
	3	L	L	L	L	L	L	L	L	L	L
	4	L	L	L	L	L	L	L	L	L	L
	5	L	L	L	L	L	L	L	L	L	L
	6	L	L	L	L	L	L	L	L	L	L
	7	L	L	L	L	L	L	L	L	L	L
	8	L	L	L	L	M	M	M	M	M	M
	9	L	L	L	L	M	M	M	M	M	M
	10	L	L	L	L	M	M	M	M	M	M
3	1	L	L	L	L	L	L	L	L	L	L
	2	L	L	L	L	L	L	L	L	L	L
	3	L	L	L	L	L	L	L	L	L	L
	4	L	L	L	L	L	L	L	L	L	L
	5	L	L	L	L	L	L	L	L	L	L
	6	L	L	L	L	L	L	L	L	L	L
	7	L	L	L	L	L	L	L	L	L	L
	8	L	L	L	L	M	M	M	M	M	M
	9	L	L	L	L	M	M	M	M	M	M

Red (H) - High importance of risk mitigation measures
Yellow (M) - Average importance of risk mitigation measures
Green (L) - Low importance of risk mitigation measures

? Save and close Cancel and close Export Import

- **Edit created tables**

To edit a table, select the created table from the drop-down list (the AIAG & VDA ed. 1 table is not editable).

AP Classification

AP Classification

AIAG & VDA ed. 1 Remove Set as default Add

AIAG & VDA ed. 1
custom table

Severity	Occurrence	Detectability									
		1	2	3	4	5	6	7	8	9	10
	1	L	L	L	L	L	L	L	L	L	L
	2	L	L	L	L	L	L	L	L	L	L
	3	L	L	L	L	L	L	L	L	L	L

Then, in the selected table, right-click on the field you want to edit and select the value you are interested in for this field (H, M, L).

AP Classification

AP Classification

custom table Remove Set as default Add

Severity	Occurrence	Detectability									
		1	2	3	4	5	6	7	8	9	10
1	1	L	L	L	L	L	L	L	L	L	L
	2	L	L	L	L	L	L	L	L	L	L
	3	L	L	L	L	L	L	L	L	L	L
	4	L	L	L	L	L	L	L	L	L	L
	5	L	L	L	L	L	L	L	L	L	L
	6	L	L	L	L	L	L	L	L	L	L
	7	L	L	L	L	L	L	L	L	L	L
	8	L	L	L	L	L	L	L	L	L	L
	9	L	L	L	L	L	L	L	L	L	L
	10	L	L	L	L	L	L	L	L	L	L

Legend: H (High), M (Medium), L (Low)

AP Classification

AP Classification

custom table Remove Set as default Add

Severity	Occurrence	Detectability									
		1	2	3	4	5	6	7	8	9	10
1	1	L	L	L	L	L	L	L	L	L	L
	2	L	L	L	L	L	L	L	L	L	L
	3	L	L	L	L	H	L	L	L	L	L
	4	L	L	L	L	H	L	L	L	L	L
	5	L	L	L	L	L	L	L	L	L	L
	6	L	L	L	L	L	L	L	L	L	L
	7	L	L	L	L	L	L	L	L	L	L
	8	L	L	L	L	L	L	L	L	L	L
	9	L	L	L	L	L	L	L	L	L	L
	10	L	L	L	L	L	L	L	L	L	L

- **Export and import a table pattern.**

The function we have added allows you to export the table template to a .xls file, in which we can make changes according to our requirements (e.g. sent from the customer) and then upload such a table to PQ-FMEA+.

To do this, select the "Export" option in the "AP Classification".

9	H	H	H	H	H	H	H	H	H	H	H
Red (H) - High importance of risk mitigation measures Yellow (M) - Average importance of risk mitigation measures Green (L) - Low importance of risk mitigation measures											
<div> <input type="button" value="?"/> <input type="button" value="Save and close"/> <input type="button" value="Cancel and close"/> <input type="button" value="Export"/> <input type="button" value="Import"/> </div>											

Open the exported file in Excel and change the selected values. To avoid errors, only the H, M, or L values can be edited.

Autozapis

customtable

Wyszukaj

Plik

Narzędzia główne

Wstawianie

Rysowanie

Układ strony

Formuły

Dane

Recenzja

Widok

Automatyzacja

Pomoc

Power Pivot

Wklej

Wytnij

Kopiuj

Malarz formatów

Schowek

Czcionka

Wyrównanie

Liczba

Formatowanie warunkowe

Formatuj jako tabelę

Normalny

E5

fx

L

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Severity	Occurrence	Detectability										
2			1	2	3	4	5	6	7	8	9	10	
3	1	1	L	L	L	L	L	L	L	L	L	L	
4		2	L	L	L	L	L	L	L	L	L	L	
5		3	L	L	L	L	L	L	L	L	L	L	
6		4	L	L	L	L	L	L	L	L	L	L	
7		5	L	L	L	L	L	L	L	L	L	L	
8		6	L	L	L	L	L	L	L	L	L	L	
9		7	L	L	L	L	L	L	L	L	L	L	
10		8	L	L	L	L	L	L	L	L	L	L	
11		9	L	L	L	L	L	L	L	L	L	L	
12		10	L	L	L	L	L	L	L	L	L	L	
13	2	1	L	L	L	L	L	L	L	L	L	L	
14		2	L	L	L	L	L	L	L	L	L	L	
15		3	L	L	L	L	L	L	L	L	L	L	
16		4	L	L	L	L	L	L	L	L	L	L	
17		5	L	L	L	L	L	L	L	L	L	L	
18		6	L	L	L	L	L	L	L	L	L	L	
19		7	L	L	L	L	L	L	L	L	L	L	
20		8	L	L	L	L	M	M	M	M	M	M	
21		9	L	L	L	L	M	M	M	M	M	M	
22		10	L	L	L	L	M	M	M	M	M	M	
23	1	L	L	L	L	L	L	L	L	L	L		

Autozapis

customtable

Wyszukaj

Plik

Narzędzia główne

Wstawianie

Rysowanie

Układ strony

Formuły

Dane

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Wytnij

Kopiuj

Malarz formatów

Schowek

Czcionka

Wyrównanie

Liczba

Formatowanie warunkowe

Formatuj jako tabelę

Normalny

Q14

fx

L

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Severity	Occurrence	Detectability										
2			1	2	3	4	5	6	7	8	9	10	
3	1	1	H	H	H	H	H	H	H	H	H	H	
4		2	H	H	H	H	H	H	H	H	H	H	
5		3	H	H	H	H	H	H	H	H	H	H	
6		4	H	H	H	H	H	H	H	H	H	H	
7		5	H	H	H	H	H	H	H	H	H	H	
8		6	H	H	H	H	H	H	H	H	H	H	
9		7	H	H	H	H	H	H	H	H	H	H	
10		8	H	H	H	H	H	H	H	H	H	H	
11		9	H	H	H	H	H	H	H	H	H	H	
12		10	H	H	H	H	H	H	H	H	H	H	
13	2	1	H	H	H	H	H	H	H	H	H	H	
14		2	H	H	H	H	H	H	H	H	H	H	
15		3	H	H	H	H	H	H	H	H	H	H	
16		4	H	H	H	H	H	H	H	H	H	H	
17		5	H	H	H	H	H	H	H	H	H	H	
18		6	L	L	L	L	L	L	L	L	L	L	
19		7	L	L	L	L	L	L	L	L	L	L	
20		8	L	L	L	L	M	M	M	M	M	M	
21		9	L	L	L	L	M	M	M	M	M	M	
22		10	L	L	L	L	M	M	M	M	M	M	
23	1	L	L	L	L	L	L	L	L	L	L		

The file after editing should be saved and later in the window "AP Classification" Import into the program.

AP Classification

custom table



Remove

Set as default

Add

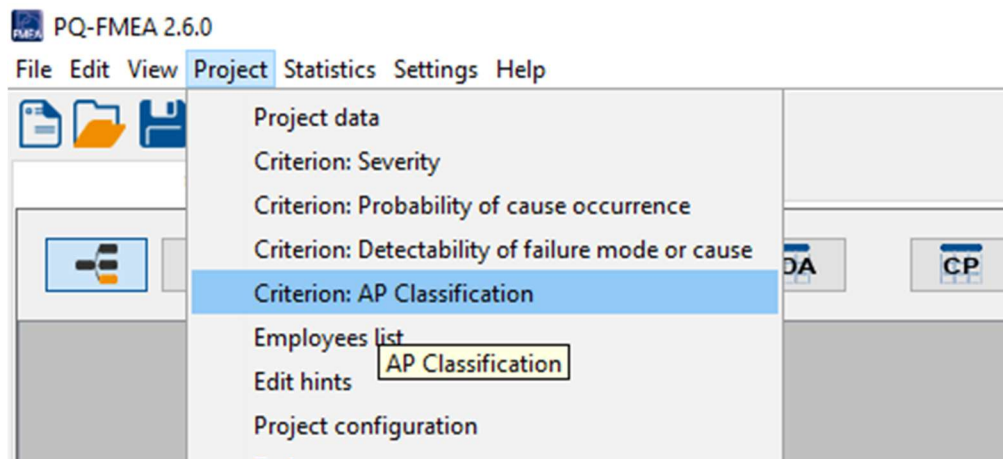
Severity	Occurrence	Detectability									
		1	2	3	4	5	6	7	8	9	10
1	1	H	H	H	H	H	H	H	H	H	H
	2	H	H	H	H	H	H	H	H	H	H
	3	H	H	H	H	H	H	H	H	H	H
	4	H	H	H	H	H	H	H	H	H	H
	5	H	H	H	H	H	H	H	H	H	H
	6	H	H	H	H	H	H	H	H	H	H
	7	H	H	H	H	H	H	H	H	H	H
	8	H	H	H	H	H	H	H	H	H	H
	9	H	H	H	H	H	H	H	H	H	H
	10	H	H	H	H	H	H	H	H	H	H
2	1	H	H	H	H	H	H	H	H	H	H
	2	H	H	H	H	H	H	H	H	H	H
	3	H	H	H	H	H	H	H	H	H	H
	4	H	H	H	H	H	H	H	H	H	H
	5	H	H	H	H	H	H	H	H	H	H
	6	L	L	L	L	L	L	L	L	L	L
	7	L	L	L	L	L	L	L	L	L	L
	8	L	L	L	L	M	M	M	M	M	M
	9	L	L	L	L	M	M	M	M	M	M
	10	L	L	L	L	M	M	M	M	M	M
3	1	L	L	L	L	L	L	L	L	L	L
	2	L	L	L	L	L	L	L	L	L	L
	3	L	L	L	L	L	L	L	L	L	L
	4	L	L	L	L	L	L	L	L	L	L
	5	L	L	L	L	L	L	L	L	L	L

After you make changes, save your changes using the Save and Close button.

9	H	H	H	H	H	H	H	H	H	H	H	▼
Red (H) - High importance of risk mitigation measures Yellow (M) - Average importance of risk mitigation measures Green (L) - Low importance of risk mitigation measures												
<div> <input type="button" value="?"/> <input type="button" value="Save and close"/> <input type="button" value="Cancel and close"/> <input type="button" value="Export"/> <input type="button" value="Import"/> </div>												

To customize your project and statistics in the file for the new AP matrix, it must be assigned to a given project.

To do this, in the "Project" tab, select "Criteria: AP classification".



In the window that opens, select the name of the table you want to use in the project from the drop-down list above the table and click the "Save and close" button.

AP Classification

AIAG & VDA ed. 1 ▼

AIAG & VDA ed. 1

custom table

Severity	Occurrence	Detectability									
		1	2	3	4	5	6	7	8	9	10
1		L	L	L	L	L	L	L	L	L	L

3	L	L	L	L	L	L	L	L	L	L	L
4	L	L	L	L	L	L	L	M	M	M	M
5	L	L	L	L	L	L	L	M	M	M	M

Red (H) - High importance of risk mitigation measures
 Yellow (M) - Average importance of risk mitigation measures
 Green (L) - Low importance of risk mitigation measures

16. Chain of functions / errors

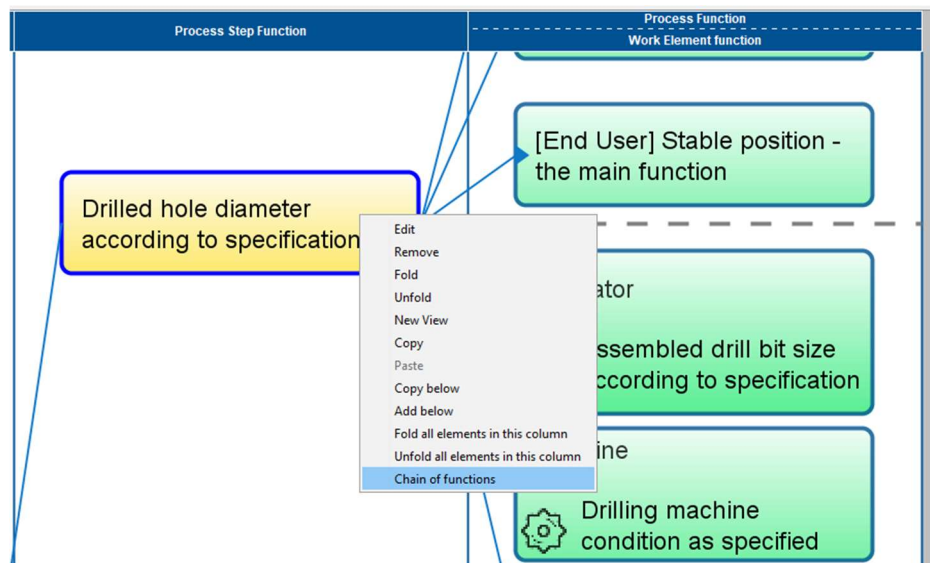
In the green or red tree, it is possible to display a table with the flow of the selected element of the function structure (green tree) or of the error structure (red tree). The function works for PFMEA and DFMEA.

16.1 Chain of functions (green tree)

The function chain can be opened by right-clicking on the selected element in the green tree:

- DFMEA: Focus element function, next higher level function, next lower level function,
- PFMEA: process step function, process function, work element function,

And select "Function Chain" from the list that opens with the right mouse button.



Depending on the function from which the function chain was opened, a window with the function flow and related functions will open:

Chain of functions

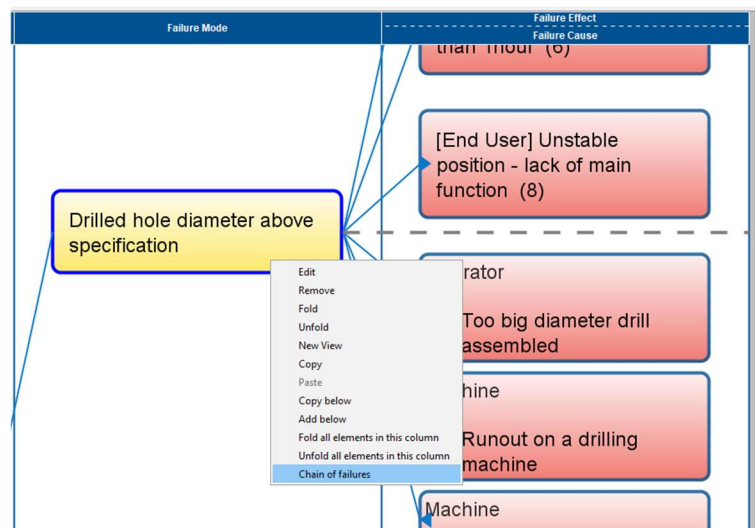
Process Step Function

Process Function	Process Step Function	Work Element function
[Main cover manufacturing line] [Internal] Productivity - scrap/rework level in the target	[OP 40 Drilling] Drilled hole diameter according to specification	[Operator] Assembled drill bit size according to specification
[Main cover manufacturing line] [External] Possible to assembly		[Machine] Drilling machine condition as specified
[Main cover manufacturing line] [End User] Stable position - the main function		[Machine] Drill condition as specified

Close

16.2 Chain of errors (red tree)

The chain of errors can be opened by right-clicking on the selected element in the red tree (DFMEA and PFMEA), failure mode, failure effect and failure cause, and selecting "Chain of errors" from the list opened by the right mouse button.



Depending on the cell from which the chain of errors was opened, a window will open with the error flow and associated causes/effects/errors:

Chain of failures

</

17. Additional settings

17.1 Highlight of causes

In the "**Highlight of causes**" window, a software window will open after selecting a reason highlighter, where we will be able to select:

- at what values the cause is to illuminate,
- whether it should contain special characteristics,
- whether the reasons which do not meet the criteria are to be temporarily hidden.

Highlight Failure Causes

SEV >

OCC >

OCC x SEV >

RPN >

☐ H ☐ M ☐ L

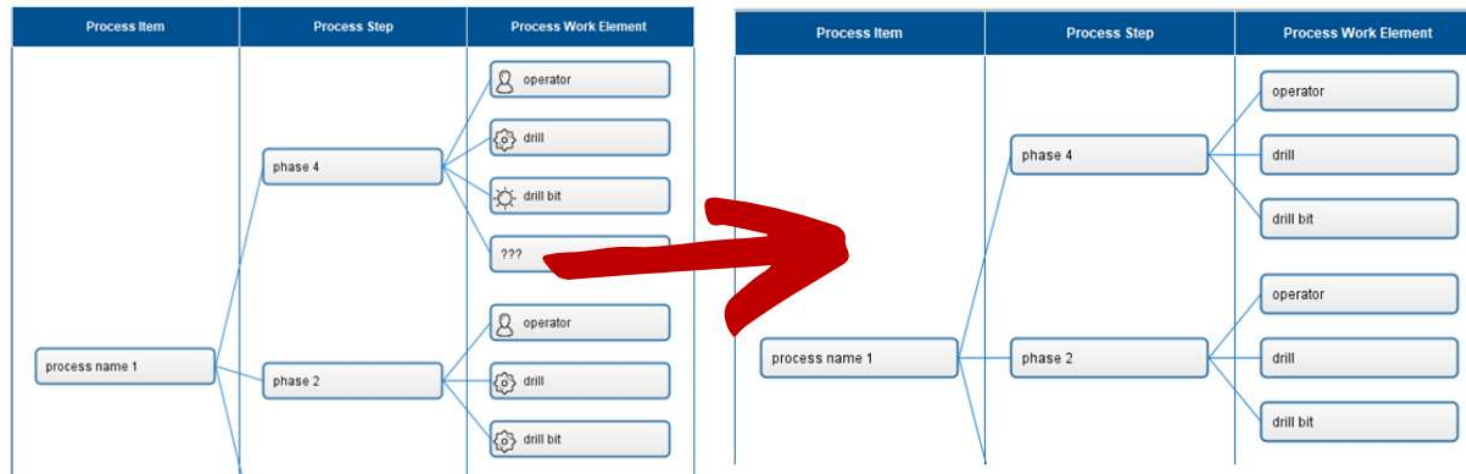
Color

☐ Only special characteristics

☐ Hide remaining causes

Done Cancel

Analiza Modułu (Bok 2)		Analiza Funkcji (Bok 3)		Analiza Modułu (Bok 4)	
1. Element procesu	2. Rola procesu	3. Element procesu	4. Funkcja elementu procesu	5. Funkcja elementu procesu	6. Funkcja elementu procesu
System, proces, metoda lub inny proces	Numer elementu i funkcja	Id	Funkcja systemu, urządzenia, komponentu lub procesu	1. Funkcja elementu procesu	2. Funkcja elementu procesu
nazwa procesu	faza 2	operator	Montowanie	funkcja fazy 1	operator
		montaż			
nazwa procesu	faza 3	operator	Montowanie	funkcja fazy 1	operator
		montaż			
nazwa procesu	faza 4	operator	Montowanie	funkcja fazy 1	operator
		montaż			



17.2 List of employees

Here or using the human icon on the top navigation bar, we can create, import and export employee lists.

Name	Position	Department
Jan kowalski	Operator	Distribution
Thomas Edin	Director	Production
Mark Twain	Operator	Production

17.3 Project Configuration

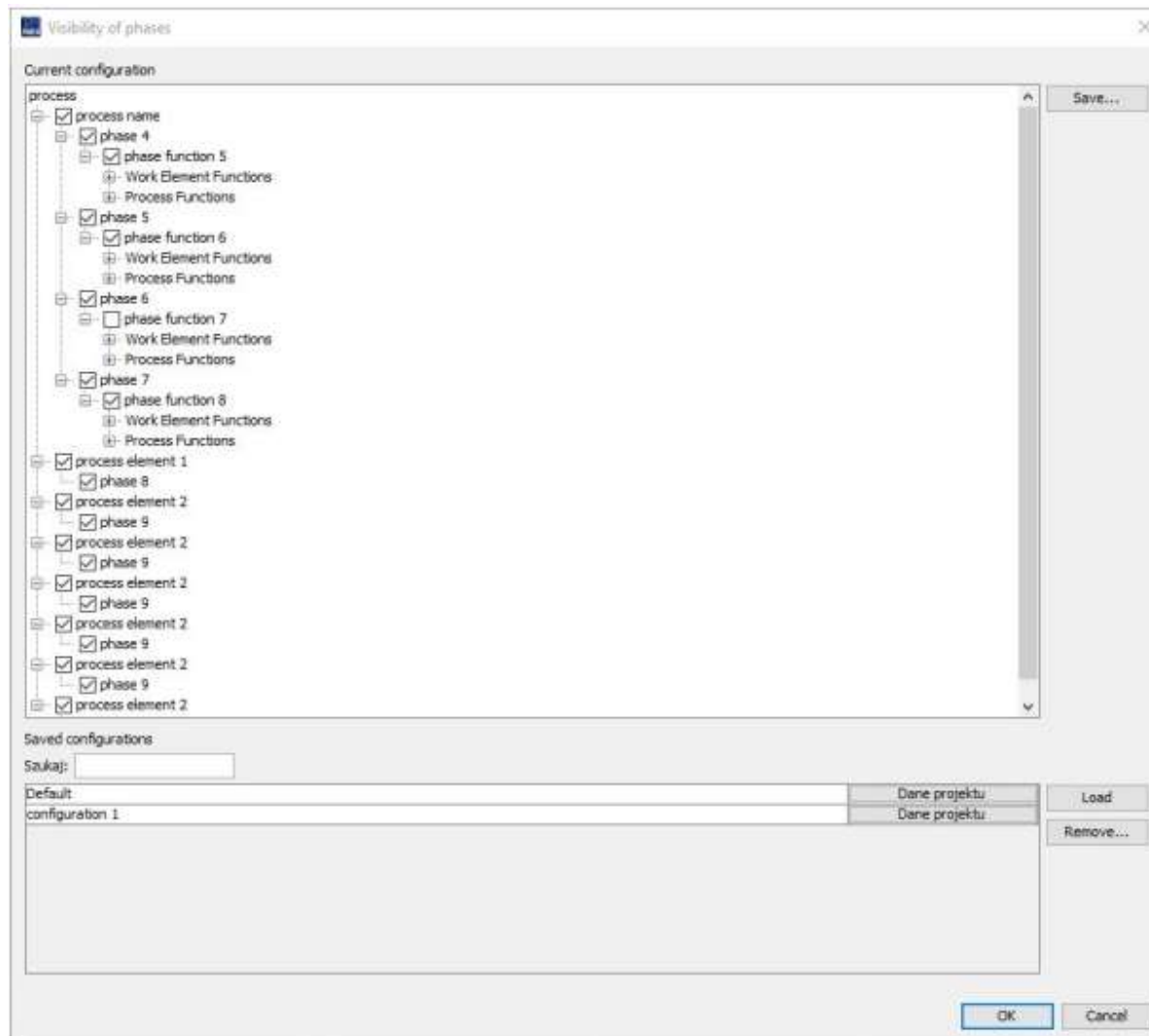
Project configuration is a function that enables conducting a common analysis for various processes, e.g. in the case when the process is carried out for two clients and differs in terms of process elements.

To open the project configuration, click "**Project**" → "**Project Configuration**" or use the quick access bar:



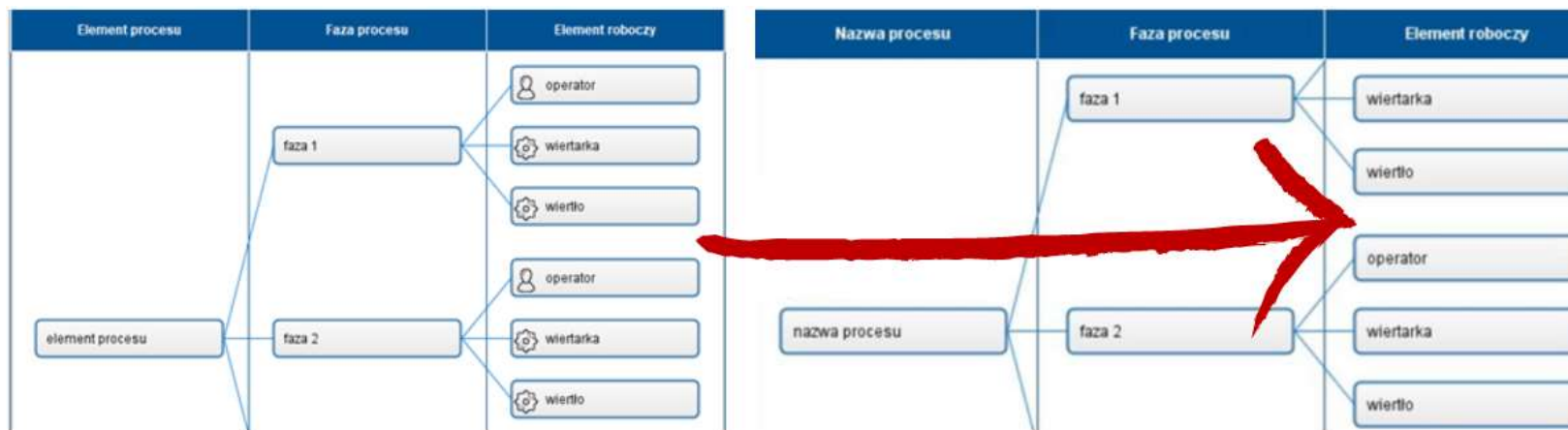
In the "**Project Configuration**" window, you can select which process elements, phases, phase functions, process functions and work item functions in a given configuration are to be visible and which are not. You can also save the setting data as e.g. "**customer A**" with process elements 1, 2 and 4 visible. You can create separate project data for each configuration.

To remove the saved configuration, use the **"Remove"** button.



17.4 Display Categories of Work Elements

To display symbols on black tree select **"View"** and then **"Display Categories of Work Elements"**



17.5 Display Row Numbers

To view row numbers on your forms, select "**View**" and then "**Display row numbers**".

When you select this option, each row in the FMEA worksheet will have its own ordinal number to make it easier to communicate in a team.

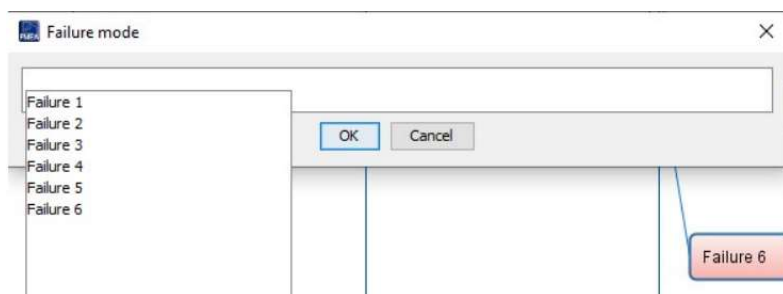
17.6 Automatic addition of work elements and replenishment of defects

Automatically add work items and automatically fill defects by cause and effect is enabled by default in the program.

When you add a phase on a black tree, three work elements are automatically added and one cause and one error effect is automatically added when adding an error. You can disable this option at any time.

17.7 Hints

Hints are available to most cells in the analysis *. When completing cells, just press the "**Space**" button to expand the list with the hints that you have already entered into the analysis or have been imported.



Additionally, it is possible to change the content of hints in many places of the analysis simultaneously.

To do this, go to **"Project" → "Edit hints"**, change the content of the hint you choose and press *Enter*.

"Replace" - replaces the texts in the analysis with the corrected one (you can choose one or more places);

"Replace and show" - replaces the texts in the analysis with the corrected one and exits the hint window showing the corrected cell.

Process Item	Process Step Function	Human	Machine	Surrounding	Method	Measurement	Material	Other	Control Method	Reaction Plan	No.	Filter Code	Special Char. Class	Failure Cause	Failure Mode	Work Element function	Phase
Preventive actions	Control actions	Potential failure effects	Process Function	Special Char. Class	Freq.	Size	Evaluation/Measurement Technique	Product Process Specification/Tolerance									
[External] Not possible to assembly line stop																	
[External] Not possible to assembly line stop full production shift								7									
[External] Difficult to assembly, line stop less than 1hour								6									
[Internal] No effect																	
[End User] No effect								1									
[External] Difficult to assembly, line stop less then 1hour 6																	
[External] Difficult to assembly																	
[Internal] Reduced productivity - Scrap level above the target																	
[End User] Unstable position - lack of main function																	
[External] Not possible to assembly																	
[End User] Unstable position - lack of main function 8																	
[Internal] Reduced productivity - rework level above the target								5									
[Internal] Reduced productivity - Scrap level above the target								7									
[External] Unstable position - lack of main function																	
[End User] Unstable position - lack of main function								8									
[End User] No effect																	
[External] (

Buttons: Add a new one, Remove, Close, Import, Export

Hints can be imported and exported to other analyses using the **"Import"/"Export"** buttons.

**cells in which hints are available:*

- *PFMEA: Process Item, Process Step Function, Human, Machine, Surrounding, Method, Measurement, Material, Other, Control Method, Reaction Plan, No. , Filter Code, Failure Cause, Failure Mode, Work Element function, Phase, Preventive actions, Control actions, Potential failure effects, Process Function, Special Characteristics Class, Frequency, Size, Evaluation/Measurement Technique, Product Process Specification/Tolerance*
- *DFMEA: Focus Element Function, Focus Element, Next Higher Level, Next Higher Level Function, Human, Machine, Surrounding, Method, Measurement, Material, Other, Preventive actions, Control actions, Potential failure effects, Process Function, Filter Code, Failure Cause, Failure Mode, Next Lower Level Function, Next Lower Level*

17.8 Task Manager

In the **Project** → **Task Manager** tab, we have the ability to manage employees' tasks from the 6th step of FMEA analysis (Optimization). After opening the window, we see a list of all tasks that have been entered in FMEA forms:

Task manager

Task manager

ExportImport

Action type	Recommended Actions	Name	Position	Department	Target Completi...	Status	Completion Date	Action Taken	Number
Detection Action	MSA for FC: Visual drill bit inspection by operator 100%	John Smith	Production Engineer	Engineering	2022-10-04	Open			1
Prevention Action	Procedure for process change release	John Smith	Production Engineer	Engineering	2022-10-13	Pending decision			4
Detection Action	MSA for visual inspection by operator	John Smith	Production Engineer	Engineering	2022-10-13	Open			0
Prevention Action	One type of drill bit diameter on the machine - decision to produce one type of product on the line	John Smith	Production Engineer	Engineering	2020-06-28	Open			0


RemoveOKPDF Export

Tables can be filtered by entries from each column by right-clicking on the column header, and the "Apply" button after selecting the filtration criteria:

Action type	Recommended Actions	Name	Position
Detection Action			Production
Prevention Action	<input checked="" type="checkbox"/> (All) <input checked="" type="checkbox"/> MSA for FC: Visual drill bit inspection by oper <input checked="" type="checkbox"/> MSA for visual inspection by operator <input checked="" type="checkbox"/> One type of drill bit diameter on the machine		Production
Detection Action			Production
Prevention Action			Production

Apply Cancel

Task tables can be exported and imported to other files using the "Export" and "Import" buttons:



Export

Import

ent	Target Completi...	Status	Completion Date	Action Taken	Number
ng	2022-10-04	Open			1

All tasks can be exported to PDF using the "Export to PDF" button:

Remove

OK

PDF Export

Task manager									
Project Instrucion			Person responsible			FMEA Number/Version			
Number/Name of product			Date of first FMEA Jun 20, 2023			Last revision date Jun 13, 2023			
Action type	Recommended Actions	Name	Position	Department	Target Completion Date	Status	Completion Date	Action Taken	Number
Detection Action	MSA for FC: Visual drill bit inspection by operator 100%	John Smith	Production Engineer	Engineering	2022-10-04	Open			1
Prevention Action	Procedure for process change release	John Smith	Production Engineer	Engineering	2022-10-13	Pending decision			4

After marking a task with the left mouse button and clicking the "Delete" button, the task is removed from the Task Manager and all places in the form where it appears:

Task manager

Task manager

ExportImport

Action type	Recommended Actions	Name	Position	Department	Target Completi...	Status	Completion Date	Action Taken	Number
Detection Action	MSA for FC: Visual drill bit inspection by operator 100%	John Smith	Production Engineer	Engineering	2022-10-04	Open			1
Prevention Action	Procedure for process change release	John Smith	Production Engineer	Engineering	2022-10-13	Pending decision			4
Detection Action	MSA for visual inspection by operator	John Smith	Production Engineer	Engineering	2022-10-13	Open			0
Prevention Action	One type of drill bit diameter on the machine - decision to produce one type of product on the line	John Smith	Production Engineer	Engineering	2020-06-28	Open			0

RemoveOKPDF Export

When you double-click the left mouse button in the task, the window of the selected task opens, the window shows the entire content of the task together with the places in the analysis where it occurs.

Task manager

Task manager

Edit

Action type	Recommended Actions	Name	Position	Department	Target Complet...	Status	Completion Date	Action Taken	Number
Prevention Action	Procedure for process change release	John Smith	Production Engineer	Engineering	2022-10-13	Pending decision			

Occurrences: 4

Process element	Phase	Failure Mode	Failure Cause	Notes
Main cover manufacturing line	OP 40 Drilling	Drilled hole diameter above specification	Worn drill bit	
Main cover manufacturing line	OP 40 Drilling	Drilled hole diameter below specification	Too small diameter drill assembled	
Main cover manufacturing line	OP 40 Drilling	Drilled hole diameter below specification	Worn drill bit	
Main cover manufacturing line	OP 40 Drilling	Lack of hole	Broken drill bit	

Remove

OK

A task can be edited directly from the Task Manager. After pressing the "Edit" button, the editing window opens, in which we can overwrite the data and after confirming with the "Ok" button, the data is edited for all occurrences of the task in the forms:

Prevention Action/Detection Action

Prevention Action/Detection Action

Prevention Action

Detection Action

Procedure for process change release

Responsible Person's Name: John Smith (Production Engineer, Engineering) Edit list

Target completion date: 2022-10-13 (41)

Status: Pending decision

Action taken

Completion date

OK

Process Step

Process Work Element

Operator

Task manager

Department	Target Complet...	Status	Completion Date	Action Taken	Number
Engineering	2022-10-13	Pending decision			

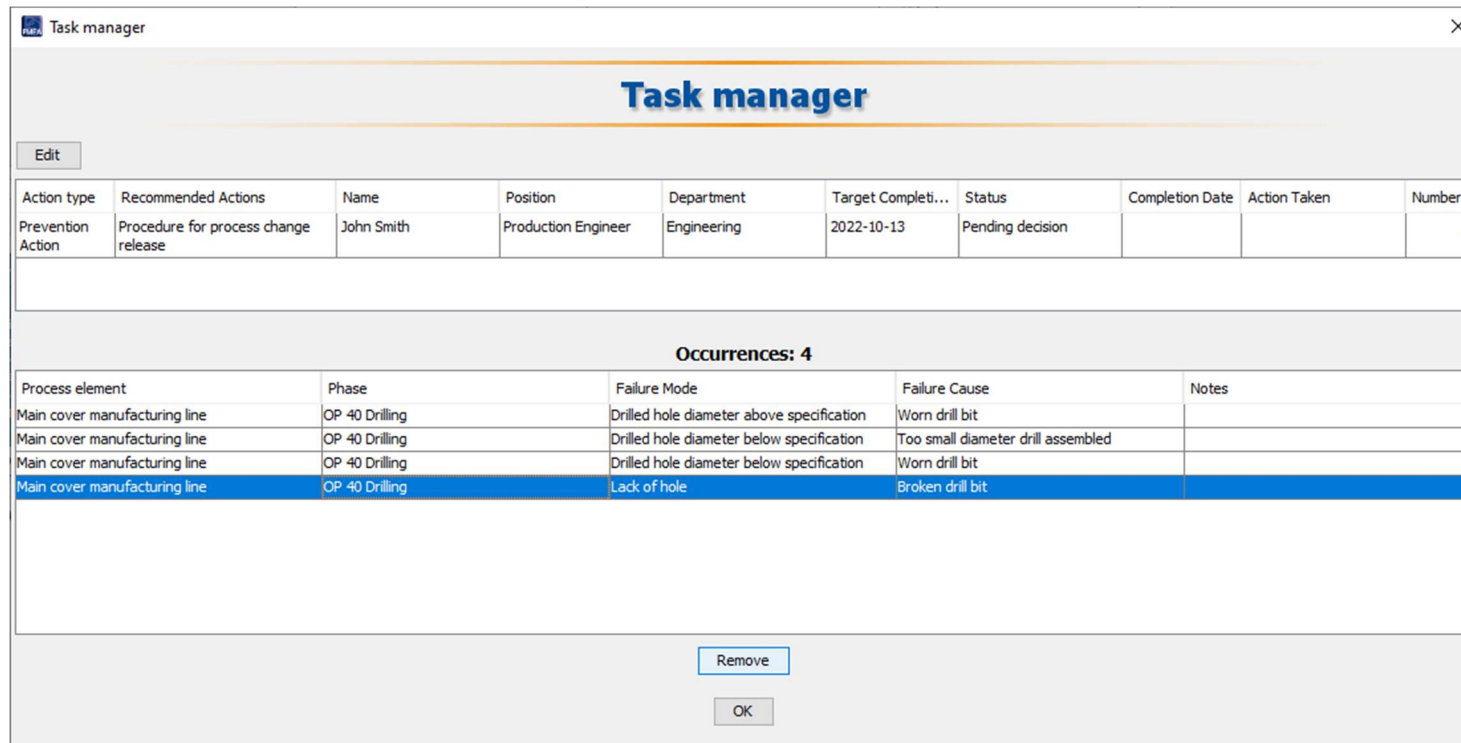
Occurrences: 4

Process element	Phase	Failure Mode	Failure Cause	Notes
Main cover manufacturing line	OP 40 Drilling	Drilled hole diameter above specification	Worn drill bit	
Main cover manufacturing line	OP 40 Drilling	Drilled hole diameter below specification	Too small diameter drill assembled	
Main cover manufacturing line	OP 40 Drilling	Drilled hole diameter below specification	Worn drill bit	
Main cover manufacturing line	OP 40 Drilling	Lack of hole	Broken drill bit	

Remove

OK

Each of the instances in the FMEA form can be deleted individually directly in the selected task. Just select the instance with the left mouse button and click the "Delete" button:



Task manager

Edit

Action type	Recommended Actions	Name	Position	Department	Target Completi...	Status	Completion Date	Action Taken	Number
Prevention Action	Procedure for process change release	John Smith	Production Engineer	Engineering	2022-10-13	Pending decision			4

Occurrences: 4

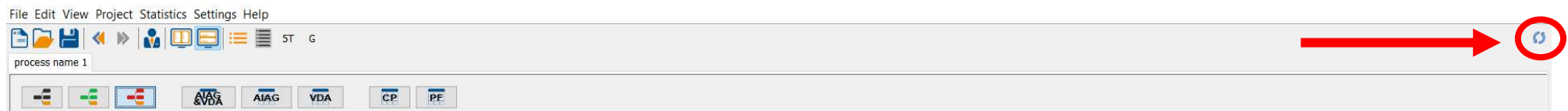
Process element	Phase	Failure Mode	Failure Cause	Notes
Main cover manufacturing line	OP 40 Drilling	Drilled hole diameter above specification	Worn drill bit	
Main cover manufacturing line	OP 40 Drilling	Drilled hole diameter below specification	Too small diameter drill assembled	
Main cover manufacturing line	OP 40 Drilling	Drilled hole diameter below specification	Worn drill bit	
Main cover manufacturing line	OP 40 Drilling	Lack of hole	Broken drill bit	

Remove

OK

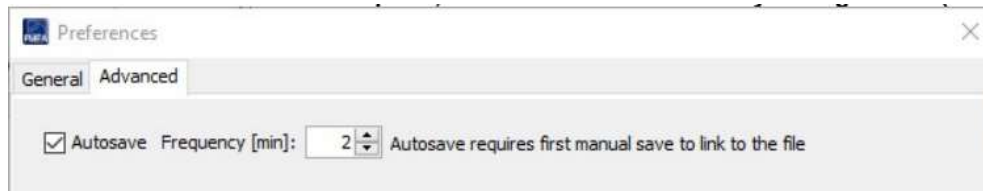
17.9 Refreshing the view

In the case of any problem with automatic refreshing, we can use the refresh in the upper right corner to refresh the view.



17.10 Auto-save

In the program, in the "Settings" → "Preferences" tab, we have the option of setting an autosave with a specific frequency. Autosave will help in the event of a sudden power outage or a problem with the computer. It is important that the autosave works from the moment the file is first saved on the computer, so it is best to start work by saving the file (even an empty one).



17.11 Taskbar options



Describing from the left:

- New Project;
- Open - open from disk from the selected .fmea file;
- Save;
- Undo;
- Restore;
- Employees list;
- Vertical view;
- Horizontal view;
- Project Configuration;
- Revision history;
- 5T Table;
- Creation of the "Generic" column.

17.12 Help

„**User guide**” - here is the program manual.

„**About...**” - information about the installed version of PQ-FMEA and JAVA version.

If you have problems with the software, please contact us. Phone and mail available at:

www.pq-fmea.com