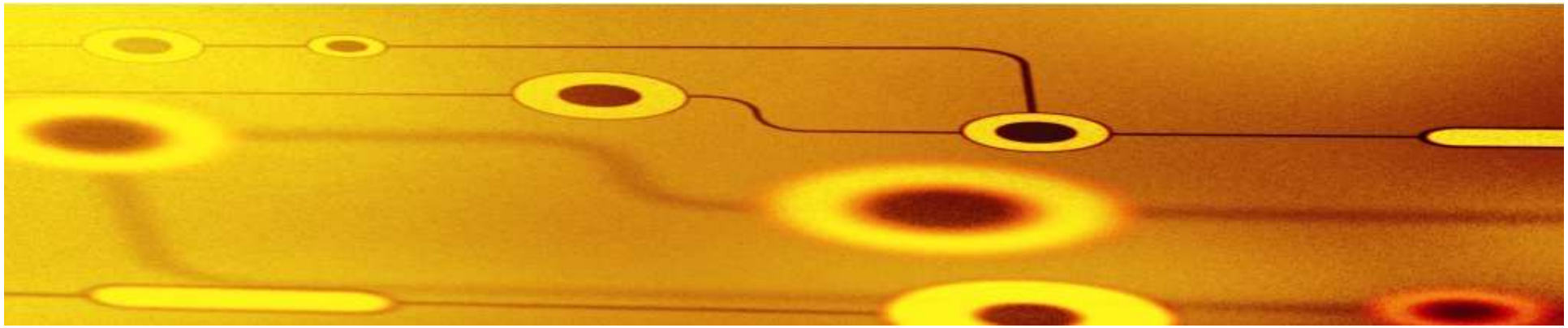
PLATO
SOLUTIONS BY SOFTWARE



SCIO ™-FMEA

FAILURE MODE AND EFFECTS ANALYSIS

PLATO SOLUTIONS BY SOFTWARE

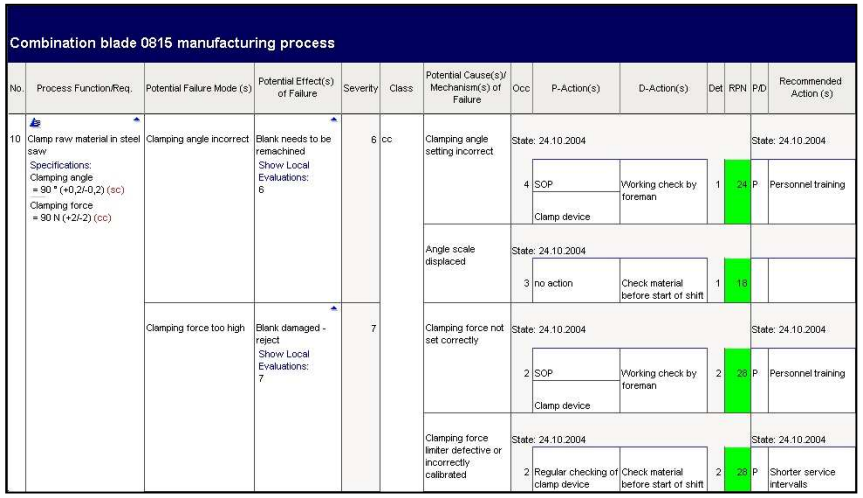
Which form is preferred – AIAG, VDA?

You can work in different forms:

- AIAG (QS 9000) - The current actions are displayed in a column
- AIAG 3rd Ed. - The current actions are displayed in two columns
- VDA 96 - All actions are shown in chronological order in one block
- VDA 86 - Compact assessments

  (VDA = German Association of the Automotive Industry)

You can switch back and forth between the forms at any time - in the work view and in the printout.



Combination blade 0815 manufacturing process

No.	Process Function/Req.	Potential Failure Mode (s)	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occ	P-Action(s)	D-Action(s)	Det	RPN	P/D	Recommended Action (s)
10	Clamp raw material in steel saw Specifications: Clamping angle = 90 ° (+0,2/-0,2) (sc) Clamping force = 90 N (+2/-2) (cc)	Clamping angle incorrect	Blank needs to be remachined Show Local Evaluations: 6	6	cc	Clamping angle setting incorrect	State: 24.10.2004 4	SOP Clamp device	Working check by foreman	1	24	P	Personnel training State: 24.10.2004
						Angle scale displaced	State: 24.10.2004 3	no action	Check material before start of shift	1	18		
		Clamping force too high	Blank damaged - reject Show Local Evaluations: 7	7		Clamping force not set correctly	State: 24.10.2004 2	SOP Clamp device	Working check by foreman	2	28	P	Personnel training State: 24.10.2004
						Clamping force limiter defective or incorrectly calibrated	State: 24.10.2004 2	Regular checking of clamp device	Check material before start of shift	2	28	P	Shorter service intervalls State: 24.10.2004

AIAG 3rd Edition

Filling in the FMEA form sheet

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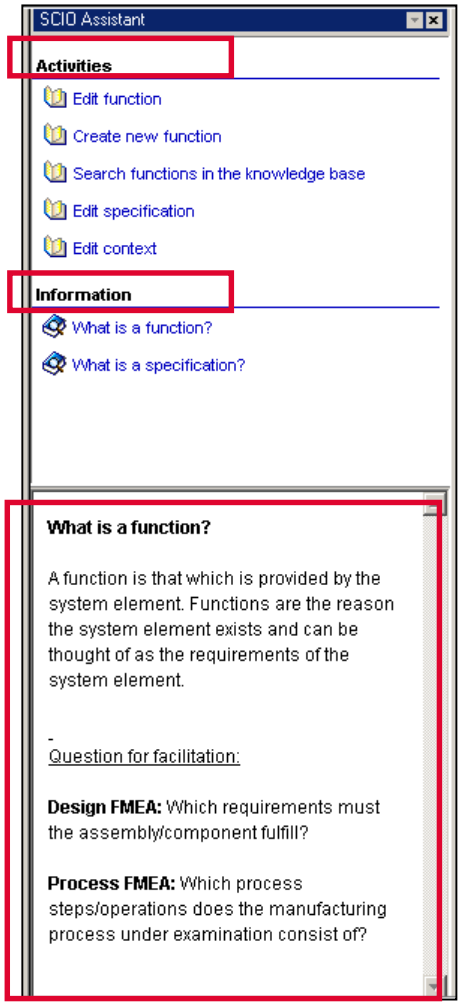
How to perform the analysis quickly and comfortably

The FMEA form is filled in like a table. Basic functionality such as copy, edit and insert functions, among others, are set up so that they optimally meet the needs of the user when generating or presenting an FMEA.



Support for inexperienced users → Assistant:

- The actions possible are displayed depending on the context
- Actions are started directly from the Wizard

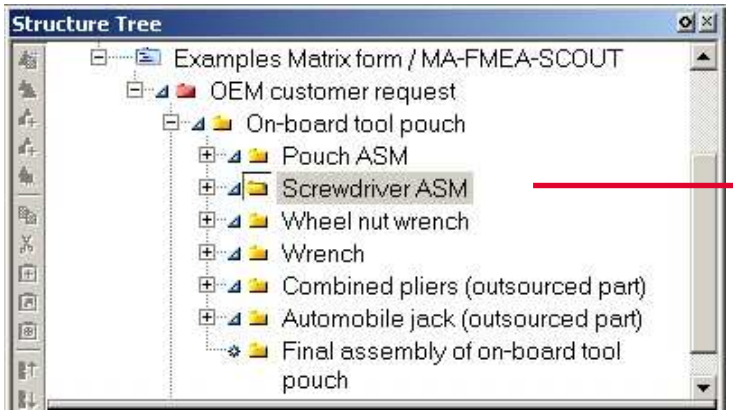
Following the basic method → Assistant :

- Contents are explained depending on the context
- Methodical tips help the user perform the analysis

Use Basic FMEA

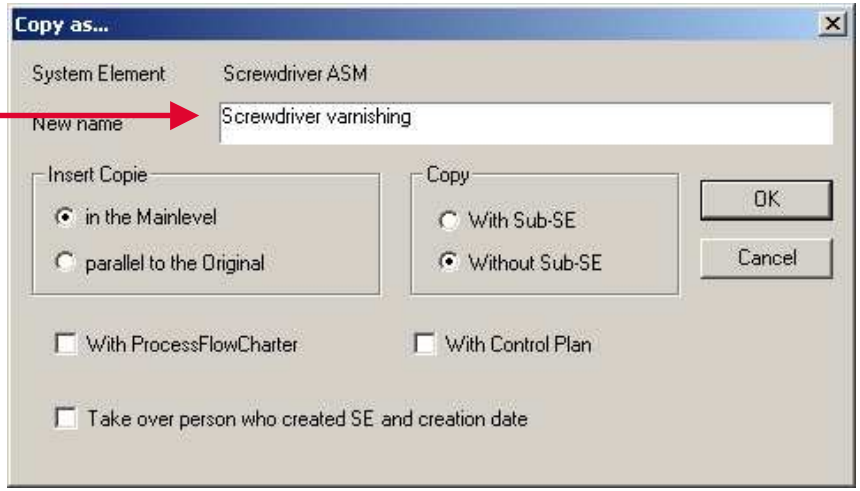
How do you keep the amount of work needed to generate and manage FMEAs low?

- Basic FMEAs or basic systems can be created for basic modules performing common tasks. They are easy to copy and maintain.
- Individual FMEAs can be produced from these basic systems and FMEAs.
- A change to a basic FMEA causes the entries in all individual FMEAs to be updated.



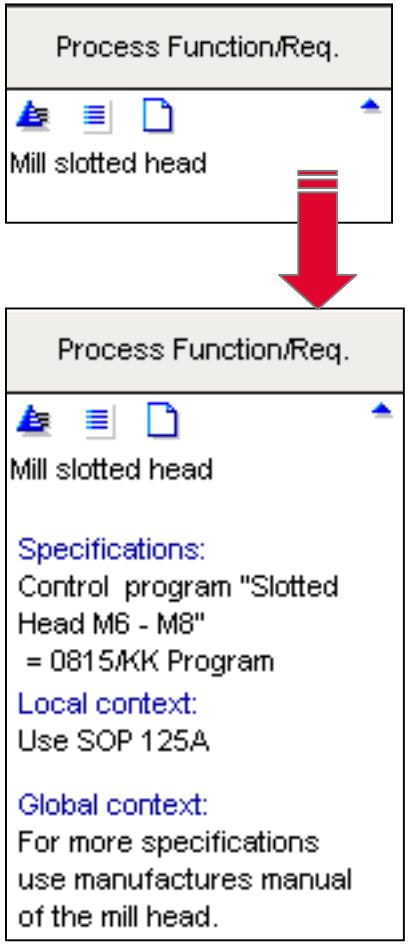
Basic FMEA

Creating a new FMEA from the basic FMEA



Additional Information

How are drawings and inspection instructions documented?
Where can functions be specified?



Comprehensive information on the cells in a form is documented and can be displayed directly in a cell if necessary.

Specifications: target values, tolerances, and critical features

Comments: additional information

Documents: images, drawings, inspection instructions, and hyperlinks (Intranet, Internet, etc.)

Opt. column info: specially marked

Change Management

How do you make global changes to FMEAs?

Standard setting: a change only affects one term

Change management:

- Display all occurrences of a term
- Specific selection of a single FMEA to be changed
- Rules for translations, management of foreign-language FMEAs
- Change histories for every cell contain full documentation

Knowledge-based Search

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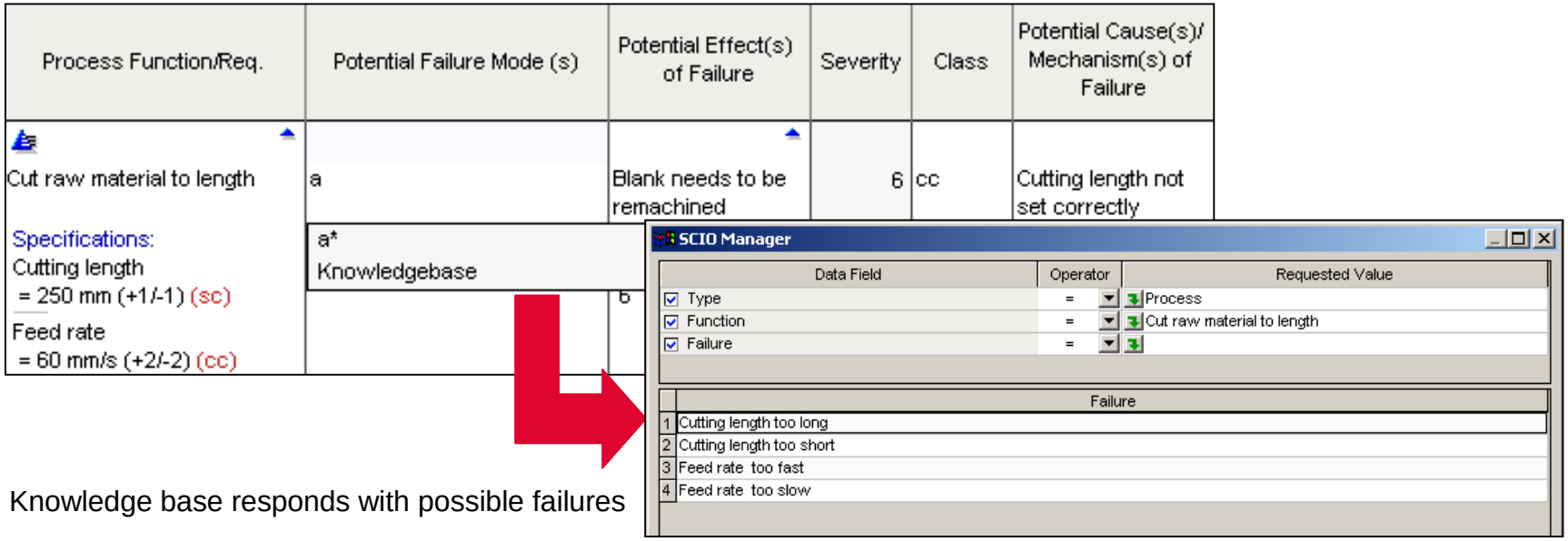
Which failures are already known for precisely this function?

Search through the entire knowledge base (database)

All known relationships and interactions are searched for without any restrictions on the project. Suggestions regarding the failures related to functions, the causes of failures, etc., are provided in this manner. The knowledge stored in the database is always available and up-to-date.



Knowledge base responds with possible failures

Suggestions from CAQ lists

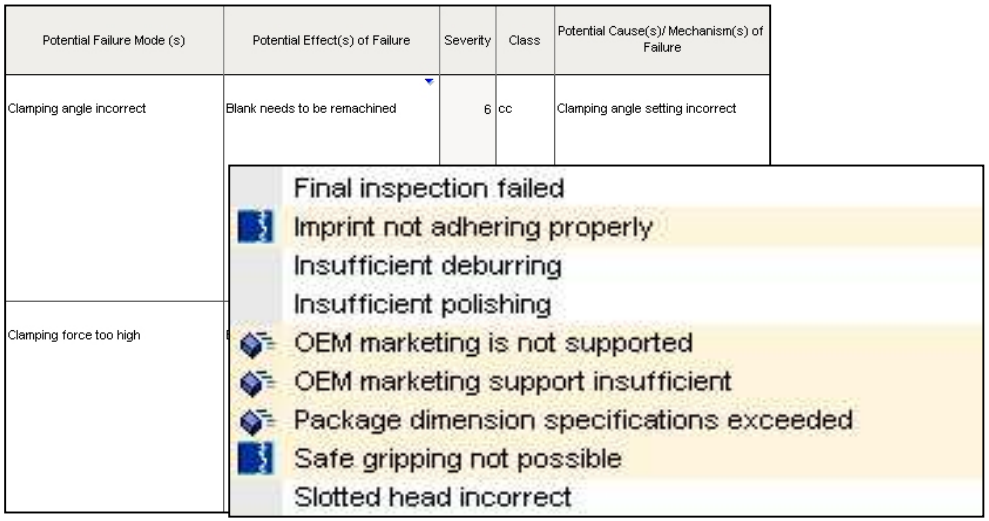
How are terms from lists or CAQ systems used in analyses?

Terms collected in team meetings, for example, can be integrated into SCIO™ without having to store them in the database. They are available in the form sheet as suggestions.

The CAQ system from the GUARDUS Solutions AG returns failure catalogs that are displayed as direct input aids. Failures can be copied immediately into the form.

Symbols identify the origin of lists:

= Failure catalog from GUARDUS



Standardized Assessments

What kind of support is provided to perform assessments?

Comparability

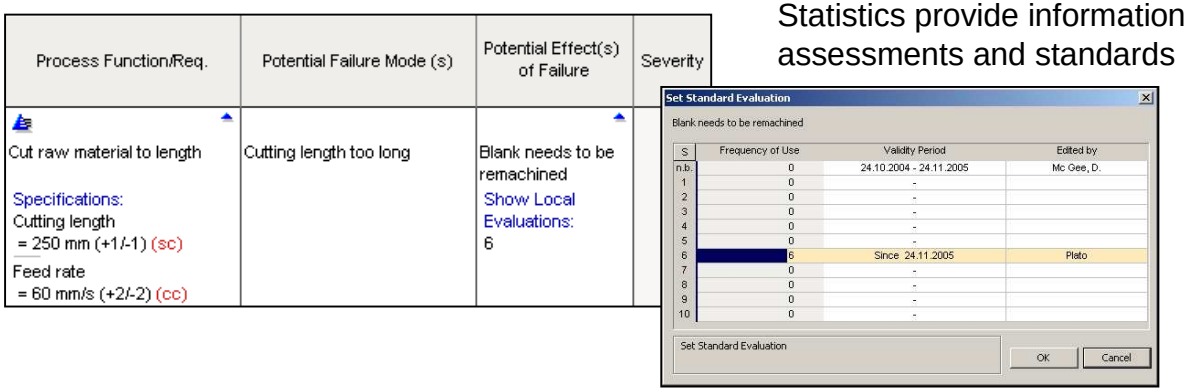
Assessment standards can be specified for the effects of failures and for causes. They ensure that the same event is not assessed differently within the company.

Statistics

A history of assessments provides information on how previous assessments were made and supports the specification of assessment standards.

Adapted Catalogs

Separate assessment catalogs are defined when required by projects, customers, or industries.



Statistics provide information on assessments and standards

Marking Actions in the Form

Which actions endanger the project?

To what extent are actions implemented or rejected?

Categories mark actions (example based on the GYR Status Report):

RED	Project is in danger
YELLOW	Deadline is in danger
GREEN	Currently being processed

RPN	P/D	Recommended Action (s)	Responsibility	Target Completion Date	P/D	Action Taken	Sev	Occ	Det	RPN	Status
294	P	Personnel training	Brand M.	24.11.2004	P	Personnel training Category: In process	7	2	7	98	Closed
210	P	Shorter service intervalls	Sunflower M.	08.10.2006	P	Shorter service intervalls Category: Project at risk	7	2	6	*84	40
324	P	Personnel training	Brand M.	24.11.2004	P	Personnel training Category: Deadline at risk	9	2	6	108	Closed

Managing Actions with SCIO™

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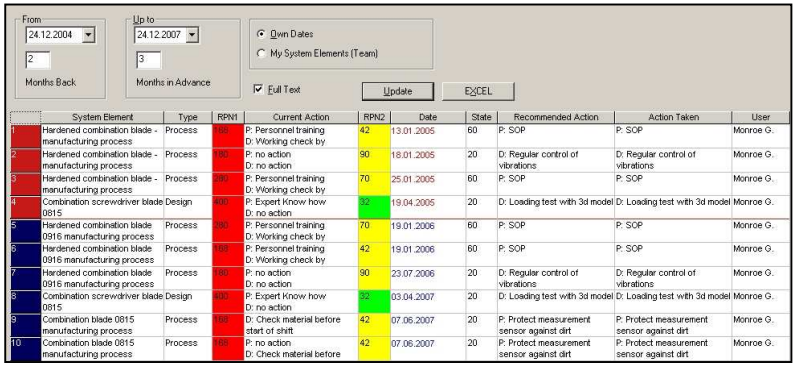
Which deadline is due? Which actions need to be performed?

Deadline overviews show future deadlines and expired deadlines for employees.

The project leader or person responsible can send a notice via e-mail directly from his or her deadline overview.

It is possible to sort the columns



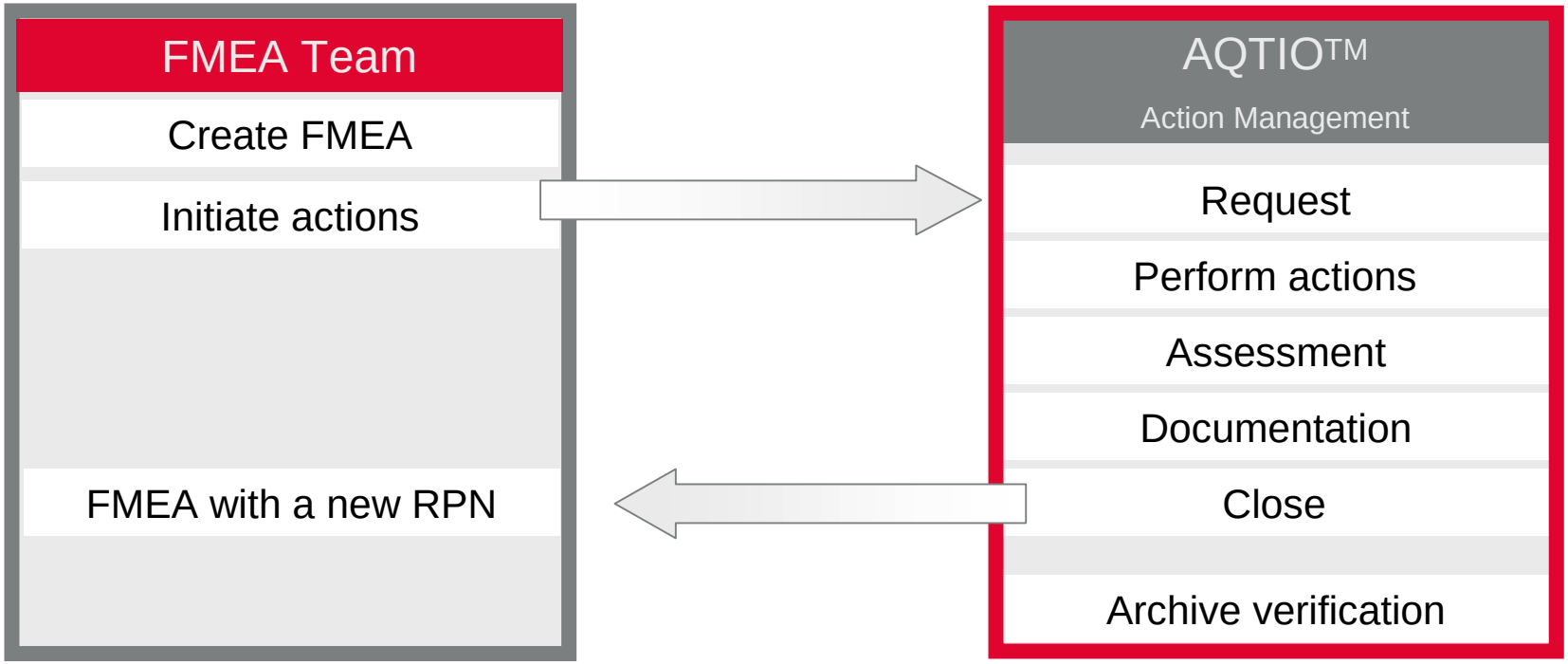
	System Element	Type	RPN1	Current Action	RPN2	Date	State	Recommended Action	Action Taken	User
1	Hardened combination blade - manufacturing process	Process	180	P: Personnel training D: Working check by	42	13.01.2005	60	P: SOP	P: SOP	Monroe G.
2	Hardened combination blade - manufacturing process	Process	180	P: no action D: no action	90	18.01.2005	20	D: Regular control of vibrations	D: Regular control of vibrations	Monroe G.
3	Hardened combination blade - manufacturing process	Process	180	P: Personnel training D: Working check by	70	25.01.2005	60	P: SOP	P: SOP	Monroe G.
4	Combination screwdriver blade 0815	Design	400	P: Expert Know how D: no action	32	19.04.2005	20	D: Loading test with 3d model	D: Loading test with 3d model	Monroe G.
5	Hardened combination blade 0916 manufacturing process	Process	180	P: Personnel training D: Working check by	70	19.01.2006	60	P: SOP	P: SOP	Monroe G.
6	Hardened combination blade 0916 manufacturing process	Process	180	P: Personnel training D: Working check by	42	19.01.2006	60	P: SOP	P: SOP	Monroe G.
7	Hardened combination blade 0916 manufacturing process	Process	180	P: no action D: no action	90	23.07.2006	20	D: Regular control of vibrations	D: Regular control of vibrations	Monroe G.
8	Combination screwdriver blade 0815	Design	400	P: Expert Know how D: no action	32	03.04.2007	20	D: Loading test with 3d model	D: Loading test with 3d model	Monroe G.
9	Combination blade 0815 manufacturing process	Process	168	D: Check material before start of shift	42	07.06.2007	20	P: Protect measurement sensor against dirt	P: Protect measurement sensor against dirt	Monroe G.
10	Combination blade 0815 manufacturing process	Process	168	P: no action D: Check material before	42	07.06.2007	20	P: Protect measurement sensor against dirt	P: Protect measurement sensor against dirt	Monroe G.

An action is often just copied and then pasted in a variety of locations. This procedure generates linked actions. In turn, this reduces the amount of work necessary to manage identical actions.

P/D	Recommended Action (s)	Responsibility	Target Completion Date	P/D	Action Taken	Sev	Occ	Det	RPN	Status
State: 24.10.2004			08.10.2006							0
P	Shorter service intervalls	Sunflower M.	08.10.2006	P	Shorter service intervalls	9	1	6	*54	40
P	Optimize SOP for calibration	Monroe G.	11.04.2006	P	Optimize SOP for calibration					80
State: 24.11.2005										0
P	Optimize SOP for calibration	Monroe G.	11.04.2006	P	Optimize SOP for calibration	6	2	6	*72	80

Managing Actions with AQTIO™

How are FMEA actions integrated into the daily routine?

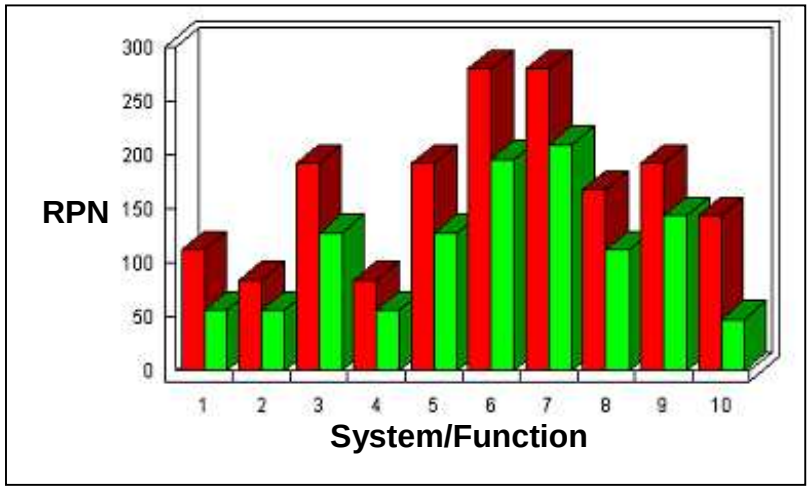


Advantages of an action management system:

- ✓ Nothing is forgotten - The system informs via e-mail!
- ✓ Easy handling - No understanding of methodology (e.g. FMEA) required!
- ✓ Effective workflow - Initiate and manage partial actions
- ✓ Security - Verification documented in compliance with standards

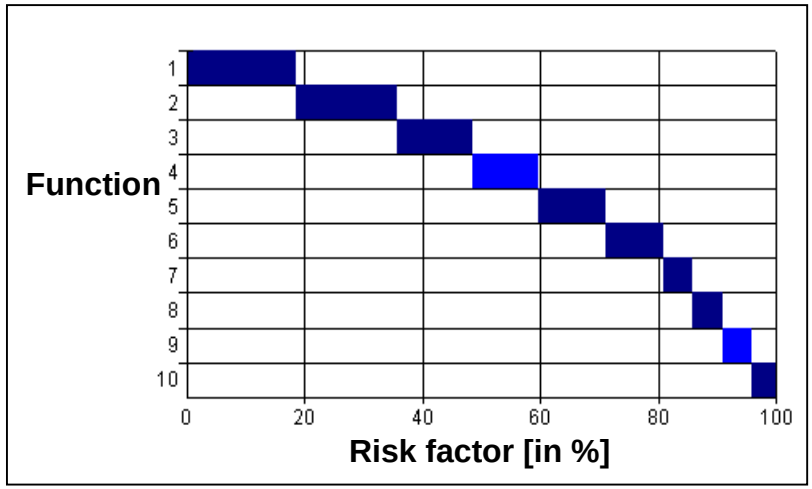
Graphic Evaluation

Where are risks in a project, where are improvements necessary?



RPN Analysis

The comparison of initial RPN values (red) and improvements (green) demonstrates the effectiveness of the actions in the FMEA.



Pareto Analysis

The risk distribution is determined to identify higher risks in the FMEA, in the entire project, or in the department of the company.

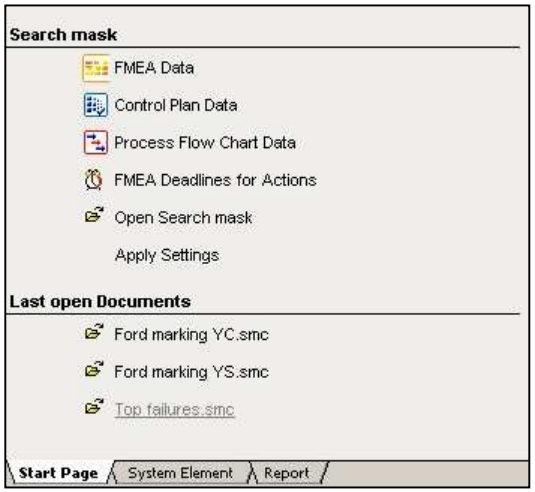
Which data will be evaluated?

The complete contents of the database are available to the SCIO Manager as search and evaluation tools. Comprehensive analysis capabilities provide evaluations for:

- Management reports
- Identification and prioritization of high risks and deadlines
- Open actions in the project
- Examining failures and their causes (Fault Tree)
- Changes to existing analyses

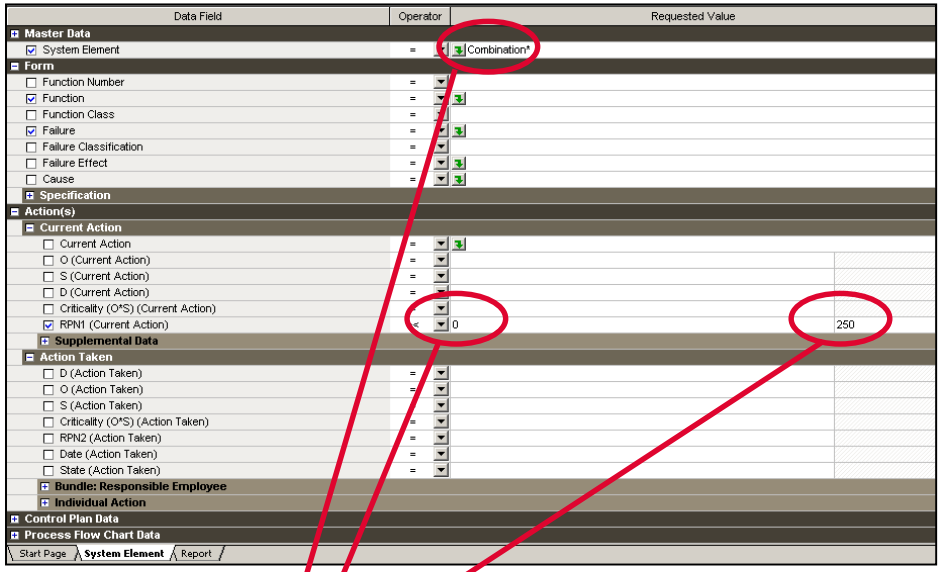
Configurable search masks:

Preconfigured user search queries:



Search Queries and Results

Which criteria are available to perform a search?



- It is possible to search through the entire database for all data fields.
- Search queries can be combined as desired.
- The results are transferred directly to Excel or copied to the clipboard for further processing elsewhere.

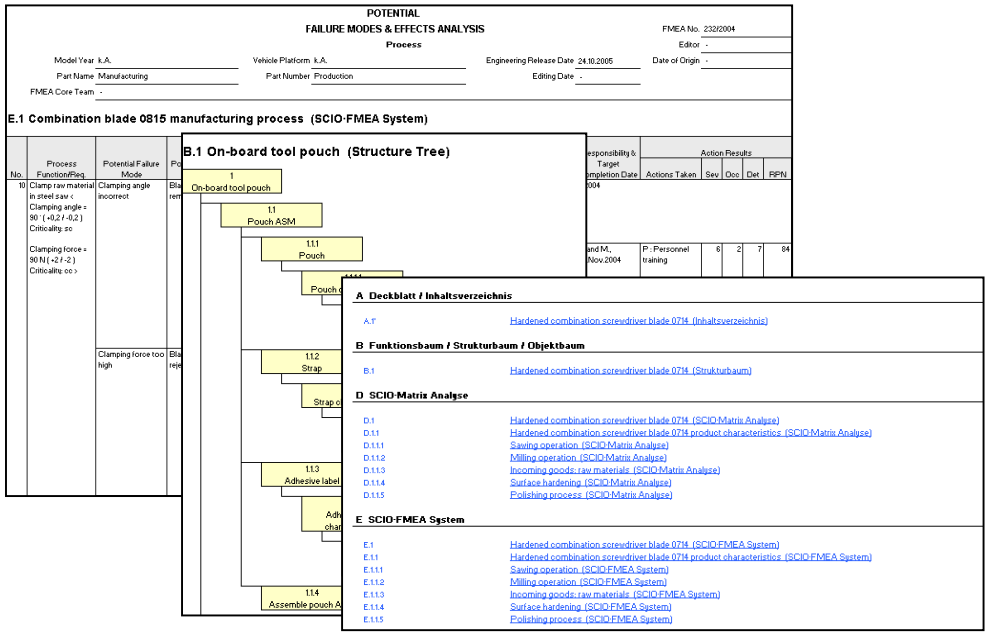
Any search term can be entered

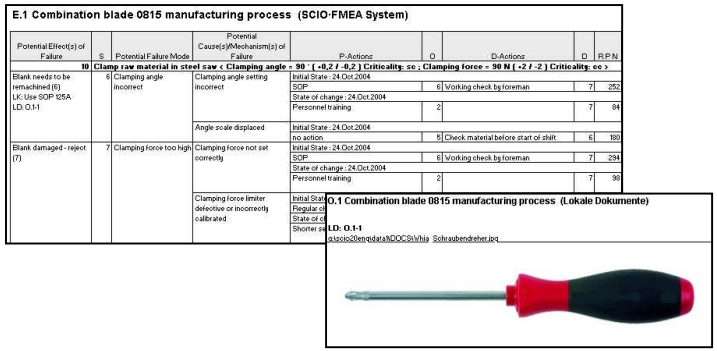
Search results:
RPN values color-coded according to the threshold values

	System Element	Function	Failure	RPN1 (Current Action)
1	Combination screwdriver blade 0815	Transfer torque	Torque transfer too low	60
2				210
3				200
4		Permit safe gripping	Safe gripping not possible	72
5				36
6				72
7				72
8				36
9		Ensure fit to crosshead screw	Fit to crosshead screw inadequate	105
10		Ensure fit to slotted screw	Fit to slotted screw inadequate	105
11		Ensure impact resistance	Screwdriver splinters when subject to standard impact	200
12		Ensure resistance to corrosion	Corrosion detected	32
13		Permit printing of company logo and VDE/TÜV seal	Unable to print	180
14				240
15			Imprint not adhering properly	150
16		Permit blade swap for 0816 series too	0816-series blades do not fit	72

Printing Documents

How do you print an FMEA?





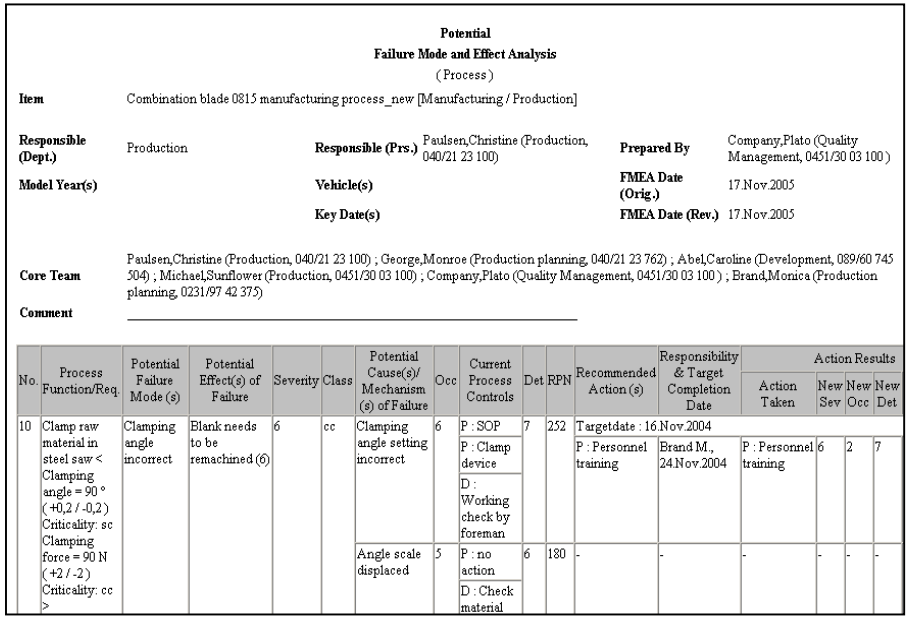
MS Excel generates complete workbooks:

- Cover sheet
- Table of contents
- Function structure
- Part structure
- Specification list

Comments and images are printed.

Publishing and exporting

What capabilities exist to present FMEAs in an Intranet?



Potential
Failure Mode and Effect Analysis
(Process)

Item Combination blade 0815 manufacturing process_new [Manufacturing / Production]

Responsible (Dept.) Production
Responsible (Prs.) Paulsen,Christine (Production, 040/21 23 100)
Prepared By Company,Plato (Quality Management, 0451/30 03 100)
Model Year(s)
Vehicle(s)
FMEA Date (Orig.) 17.Nov.2005
Key Date(s)
FMEA Date (Rev.) 17.Nov.2005

Core Team Paulsen,Christine (Production, 040/21 23 100) ; George,Monroe (Production planning, 040/21 23 762) ; Abel,Caroline (Development, 089/60 745 504) ; Michael,Sunflower (Production, 0451/30 03 100) ; Company,Plato (Quality Management, 0451/30 03 100) ; Brand,Monica (Production planning, 0231/97 42 375)

Comment _____

No.	Process Function/Req.	Potential Failure Mode (s)	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism (s) of Failure	Occ	Current Process Controls	Det	RPN	Recommended Action (s)	Responsibility & Target Completion Date	Action Results			
													Action Taken	New Sev	New Occ	New Det
10	Clamp raw material in steel saw < Clamping angle = 90 ° (+0,2 / -0,2) Criticality: sc Clamping force = 90 N (+2 / -2) Criticality: cc >	Clamping angle incorrect	Blank needs to be remachined (6)	6	cc	Clamping angle setting incorrect	6	P : SOP	7	252	Targetdate : 16.Nov.2004					
								P : Clamp device			P : Personnel training	Brand M., 24.Nov.2004	P : Personnel training	6	2	7
								D : Working check by foreman								
						Angle scale displaced	5	P : no action	6	180	-	-	-	-	-	-
								D : Check material								

- HTML documents are used to publish them in the Intranet
- Other data export formats include: Excel, TXT, XML
- SCIO™ files can be exported and then reimported at any time.

Archiving Revision States

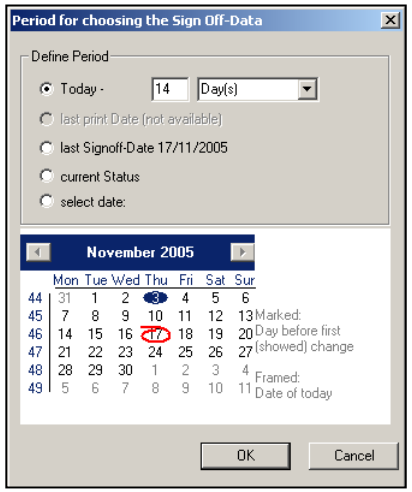
Which entries in the FMEA are new (since the last session)?

No.	Process Function/Req.	Potential Failure Mode (s)	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occ	Current Process Controls	Det	RPN	Recommended Action (s)	Responsibility & Target Completion Date	Action Results					
													Action Taken	Sev	Occ	Det	RPN	Status
10	Clamp raw material in steel saw < Clamping angle = 90 ° (+0,2 / -0,2) Criticality: sc Clamping force = 90 N (+2 / -2) Criticality: cc >	Clamping angle outside of tolerance	Blank needs to be remachined (6)	6	cc	Clamping angle setting incorrect	6	P : SOP	7	252	Targetdate : 16.Nov.2004							Completed
								D : Working check by foreman			P : Personnel training	Brand M., 24.Nov.2004	P : Personnel training	6	2	7	84	Completed
						Angle scale displaced	5	P : no action	6	180	-	-	-	-	-	-	-	-
								D : Check material before start of shift										
		Clamping force too high	Blank damaged - reject (7)	7		Clamping force not set correctly	6	P : SOP	7	294	Targetdate : 24.Nov.2004							Completed
								D : Working check by foreman			P : Personnel training	Brand M., 24.Nov.2004	P : Personnel training	7	2	7	98	Completed
						Clamping force limiter defective or incorrectly calibrated	5	P : Regular checking of clamp device	6	210	Targetdate : 09.Oct.2006							0
								D : Check material before start of shift			P : Shorter service intervalls	Sunflower M., 08.Oct.2006	P : Shorter service intervalls	7	2	6	*84	40
		Clamping force too low	Blank jumps uncontrollably out of the steel saw	9		Clamping force not set correctly	6	P : SOP	6	324	Targetdate : 24.Nov.2004							Completed
								D : Working check by foreman			P : Personnel training	Mc Gee, D., 24.Nov.2004	P : Personnel training	9	2	6	108	Completed

No.	Process Function/Req.	Potential Failure Mode (s)	Potential Effect(s) of Failure	Severity	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occ	Current Process Controls	Det	RPN	Recommended Action (s)	Responsibility & Target Completion Date	Action Results					
													Action Taken	Sev	Occ	Det	RPN	Status
10	Clamp raw material in steel saw < Clamping angle = 90 ° (+0,2 / -0,2) Criticality: sc Clamping force = 90 N (+2 / -2) Criticality: cc >	Clamping angle incorrect	Blank needs to be remachined (6)	6	cc	Clamping angle setting incorrect	6	P : SOP	7	252	Targetdate : 16.Nov.2004							Completed
								D : Working check by foreman			P : Personnel training	Brand M., 24.Nov.2004	P : Personnel training	6	2	7	84	Completed
						Angle scale displaced	5	P : no action	6	180	-	-	-	-	-	-	-	-
								D : Check material before start of shift										
		Clamping force too high	Blank damaged - reject (7)	7		Clamping force not set correctly	6	P : SOP	7	294	Targetdate : 24.Nov.2004							Completed
								D : Working check by foreman			P : Personnel training	Brand M., 24.Nov.2004	P : Personnel training	7	2	7	98	Completed
						Clamping force limiter defective or incorrectly calibrated	5	P : Regular checking of clamp device	6	210	Targetdate : 09.Oct.2006							0
								D : Check material before start of shift			P : Shorter service intervalls	Sunflower M., 08.Oct.2006	P : Shorter service intervalls	7	2	6	*84	40
		Clamping force too low	Blank jumps uncontrollably out of the steel saw	9		Clamping force not set correctly	6	P : SOP	6	324	Targetdate : 24.Nov.2004							Completed
								D : Working check by foreman			P : Personnel training	Mc Gee, D., 24.Nov.2004	P : Personnel training	9	2	6	108	Completed

You can archive the processing status at any time.

If necessary, "old" states can be activated and processed further.



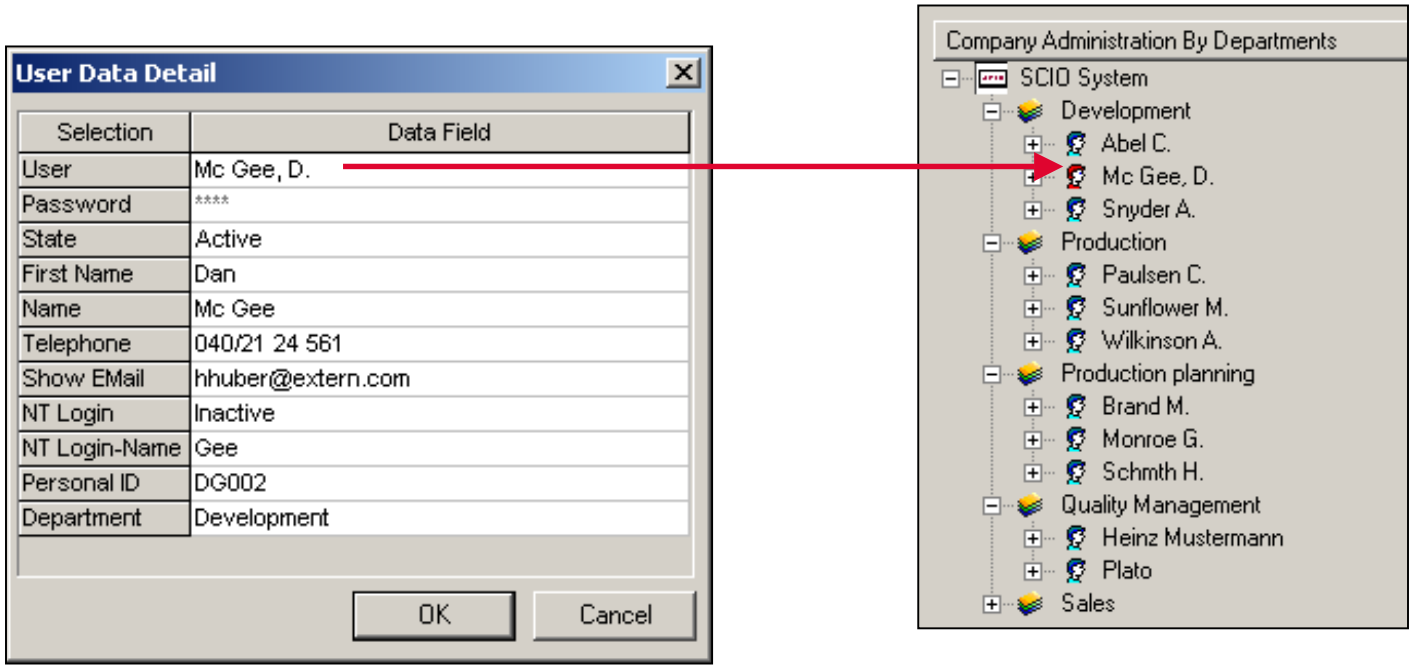
Changes between two revision states are highlighted in color.

Rights to Access the Database

How can the use of FMEA be restricted for certain individuals?

Every user has password-protected access.

The company is organized into departments and subdepartments. Employees are integrated into this structure. They receive assignments according to their data access rights. In this manner you can specify, for example, whether an FMEA can only be read by the user or if the user is also allowed to make changes.

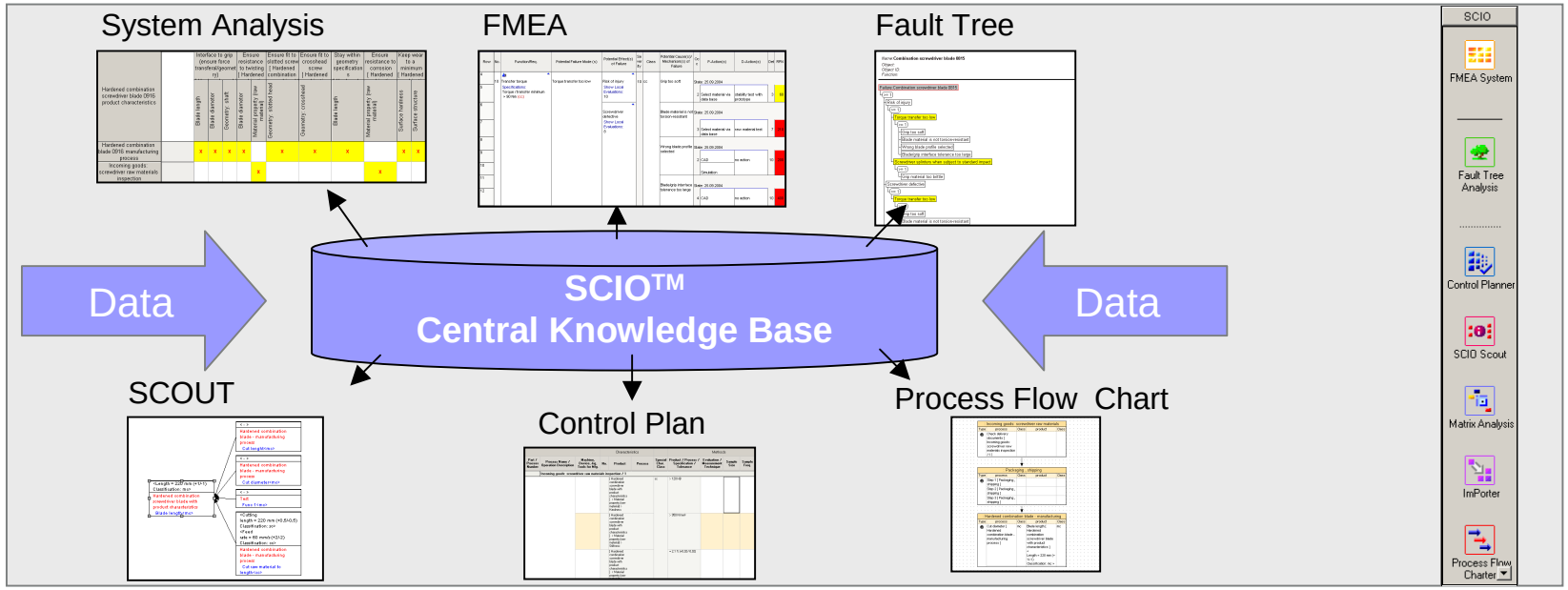


What are the advantages of a central database?

FMEA uses - like all SCIO™ modules - the central SCIO™ database. Depending on the task, the data for a subject/system are displayed in the form of an FMEA or a production control plan, etc.

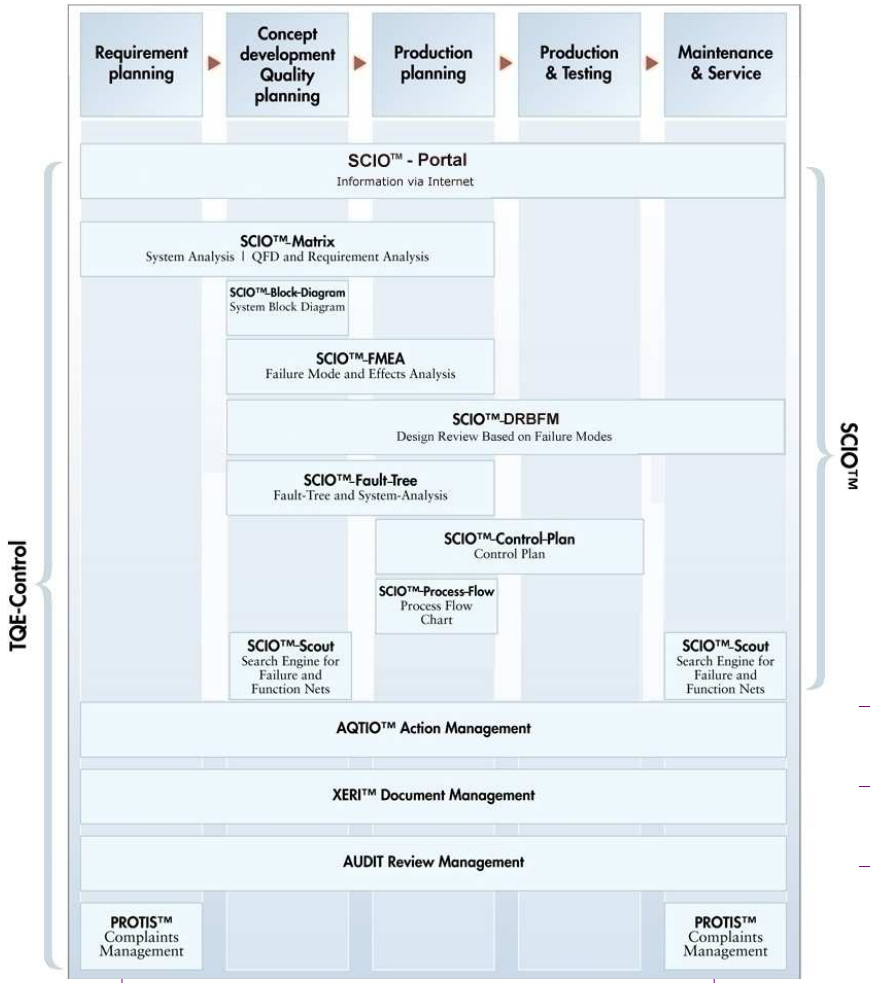
Changes and additions to the shared database are automatically propagated to all SCIO™ modules.

An application bar provides the fastest way to switch between the forms and views.



TQE™ - Total Quality Engineering

How is SCIO™ integrated into the company's organisation?



TQE™ connects !

Development processes are documented, audited, improved.

All tasks have a follow up and are supervised.

→ **Measures**

→ **Documents , Templates**

→ **Manage Audits**

→ **Complaints**

SCIO ™ in practice

Experienced specialists are available for the integration of SCIO™ into your company process and the practical use. PLATO supports you right in your company. In foreign locations, of course in English language.

Project support

- Implementing the software solution in the company
- Pilot project and Audit support

Training

- User- and methodology-training

Workshops

- Moderation (e.g. facilitation of FMEA-team-sessions)
- Individual topics

Further information: **www.plato-ag.com/platohp/english/**