

APIS IQ-Software – New Features for Version 6

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Chapter 1

Introduction

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The latest version can be requested from www.apis.de/en/wn6 .

15 Each new version of the APIS IQ-Software has a project designation which is independent of the planned version number.

For example, the *Brazil* project resulted in version 5. For the follow-up project, the *Condor* project, support for Unicode was defined as one of the goals. This goal has now been met with version 6.

20 The *Condor* has therefore turned into the longest and most comprehensive project to date in the history of the company. We can be upfront about it: all of the developers involved in the project can be proud – the functions available in version 6 are really quite impressive!

25 The already mentioned support for Unicode is just one topic in a range of more than 50 presented in this document. You will be surprised!

Reasons to switch to version 6

Each of the new functions can in itself be an important reason to switch to version 6. However, taken together they combine to form an impressive package which offers many advantages.

30 It is often useful to reduce these benefits to a handful of key arguments:

- *Unicode*
- *VDA and AIAG adaptation*
- *Global actions*

- *Filtering*
- 35 • *Failure net expansions*
- *Object Inspector*

In the field of collaboration there are key new features in the form of new functionalities:

- *Continuity for characteristics (D-FMEA to P-FMEA, CP, PFD)*
- 40 • *Collaboration with defined interface documents*

These two new features will only become available with later service packs.

Unicode

In the course of globalization, Asian languages are becoming increasingly more important, both in terms of operation and the contents of analyses. In the past, various
45 restrictions had to be taken into account when working with computers and the Windows operating system for Asian markets.

As of version 6, all of these special requirements have been eliminated. In some program flavors, Asian languages are even available as the user interface language, e.g. Chinese.

50 VDA and AIAG adaptation

The VDA (2nd edition) and AIAG (4th edition) standards published since the last version of the IQ-Software are supported by updated valuation catalogs, forms, statistical analyses, action categories etc.

The change to version 6 is recommended if the requirements of the above current
55 standards are to be met.

Global actions

The previous actions with identical names, responsibilities and deadlines can be defined as a global action.

In version 6, changes made to the responsibilities, status and deadline then result in
60 changes in all areas in which a “global action” is used.

Filtering

Filtering has proved itself to be a very useful and successful feature for tables, e.g. the FMEA form. Filters are also used when searching through FME files.

The filtering concept is intelligently widened to structures, lists and nets in version
65 6. This means significantly greater flexibility during working and better efficiency. In nearly all of the editors, users will not want to be without the filtering options.

Failure net expansions

70 The analysis of modern systems with built-in fault detection and fault responses requires an approach which goes beyond simple cause-and-effect thinking. The process of observing all operating states on mechatronic systems is also a challenging task. Classic FMEA only offers inadequate support for these tasks.

Version 6 of the APIS IQ-Software offers features and functions which can be used to meet the challenges of modern systems.

Object Inspector

75 The Object Inspector is an editor in which all object properties can be displayed and edited, including the attribute values of all variants. However, dependent and linked objects can also be displayed and added.

80 With the fully revised Object Inspector in version 6, highly user-friendly direct data input with simply filtered selection lists is possible. The *reuse* concept is supported by the simplified access to existing information. Redundant information is avoided.

Chapter 2

General information

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95 %indexKonvertierung!FME-Datei!zu Version 6

2.1 Conversion

Version 6 uses a different data model to version 5.1. This is the reason why — just like on every other version change — already existing FME files need to be converted.

100 If an FME file was created with an earlier version then it will not be usable until it has been converted. Accordingly, the conversion process takes place automatically in some cases. Key points:

- *If an old FME file is opened, the following message appears: “The document has the data format of version 5.1. Convert document?” You can only continue by clicking on “Yes”.*
- 105 • *A converted FME file can no longer be opened with version 5.1 of the software! For this reason it is recommended that backup copies are made.*
- *All documents in a directory tree can be converted via the function **FILE | AUTO-CONVERT...** Here, backup copies of the existing FME files are saved as FM\$ files. The FM\$ files can be deleted once they are no longer needed as backup files.*

110 2.2 Program startup

When version 6 of the program is started, around 45 MBytes are loaded into the main memory (instead of the previous 25 MBytes on version 5.1), and a Java Virtual Machine (Java VM)¹ is launched.

115 The Java VM is the basis for importing further graphics formats, e.g. TIFF, and it is required in order to be able to display useful additional information in some dialog boxes. This also enables new features in the area of calendar information, e.g. the generation of ICS files.²

120 In order to ensure problem-free usage of the IQ-Software, a suitable version of the Java Runtime Environment (JRE)^{3 4}, which is contained in the Java VM, is always supplied and used. However, nothing is installed on the computer in this context; parallel usage is possible with existing Java components

2.3 Look-and-Feel

When using version 6 for the first time, it is noticeable that the toolbars have a color gradient in the background. Larger buttons are now displayed for selecting an area/range in the Data Manager, and there is now also a toolbar for input collectors.

125 In principle, there is no need to describe all of these changes in detail, as they only represent changes required to bring the displays and representations up to date with the latest standards. The additional toolbar for input collectors is discussed in chapter 3.3 (page 9). The most important consequence of this is that screenshots can look out of date if they are generated with an older version of the software.

2.4 MSI Installation

An MSI packet file is made available on the installation medium for installation of the APIS IQ-Software (IQ-TOOLS.MSI). Alternatively, the IQ-Software can also still be installed by running SETUP.EXE.

135 Windows installer

Automated installation is possible when using the Windows Installer; in addition individual, company-specific circumstances can also be taken into account. For this purpose an exchange of information takes place with a Windows Installer Server, or the necessary information is transferred in the form of parameters. Company-specific adaptation of the MSI packet file is also possible.

1 http://en.wikipedia.org/wiki/Java_Virtual_Machine

2 <http://en.wikipedia.org/wiki/ICalendar>

3 http://en.wikipedia.org/wiki/Java_Runtime_Environment

4 Status 02/2009: Java SE 6.0 with Update 12

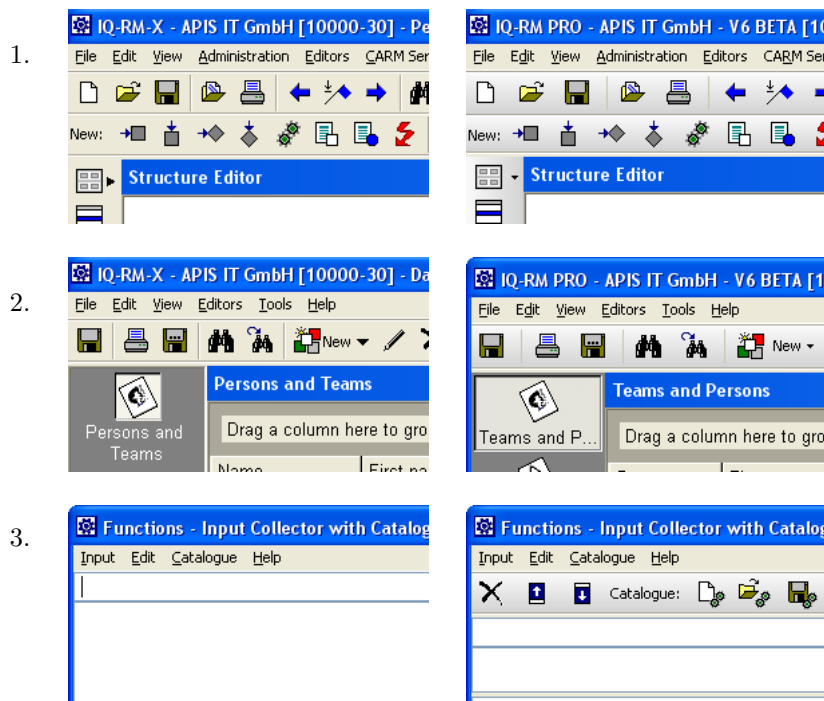


Figure 2.1: Comparison of version 5.1 and 6 — 1. Personal Desktop, 2. Data Manager, 3. Input Collector for Functions

The MSI packet file contains information which is required for installation (and deinstallation). It takes into account different installation scenarios. IQ-Software users will not normally come into contact with the Windows Installer function.

User specific administration directory

- 145 The IQ-Software checks whether a license is being started for the first time. In the process, the user can define his/her own administration directory

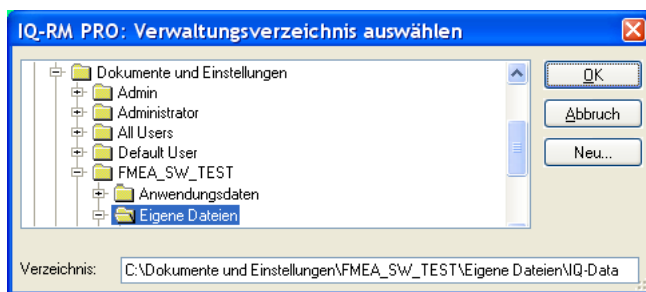


Figure 2.2: *Dialog for defining the administration directory (on a Windows PC with a German user interface)*

Chapter 3

Key new features

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3.1 Windows registry

The data from the IQ workstation settings are saved for the specific user in the registry. Previously, these data were saved in `APIS-IQ.INI`.

The registry is divided into areas which can only be generated and modified by the administrator and others for which simple user rights are sufficient. The areas for which simple user rights are sufficient are normally also managed on an individual basis for each logged-on Windows user in the registry.

During installation of the IQ-Software by the administrator the individual part of the registry remains empty with regard to the IQ-Software. During the initial start of the APIS IQ Tool program the individual entries are generated and initialized.

For experienced PC users only: In order to find the areas in the registry in which the IQ-Software saves the workstation settings, it is useful to launch the Regedit editor and to then search for an entry which is always present, e.g. the key `EnableDrbfm`.

HKEY_USERS and HKEY_CURRENT_USER — HKU and HKCU

`HKEY_USERS` (HKU) is an area of the registry with general validity. For the currently logged-on Windows user there is also a separate area, `HKEY_CURRENT_USER` (HKCU).
Note: The HKCU entries for the IQ-Software are also visible in identical form as HKU entries.

180 If a user changes a workstation setting, e.g. the user language, then the change is made at HKCU. As experienced IQ user can draw conclusions from the naming of the entry in the registry about the corresponding control option in the IQ-Software.

3.2 Unicode

185 Information in FME files is stored in Unicode format. As a result, the previous restriction to ANSI characters no longer applies. Complete support for Unicode is only included with the program flavors **APIS IQ-FMEA PRO** and **APIS IQ-RM PRO**.

There are operator languages with Unicode characters, e.g. Chinese, in both program flavors which support Unicode.

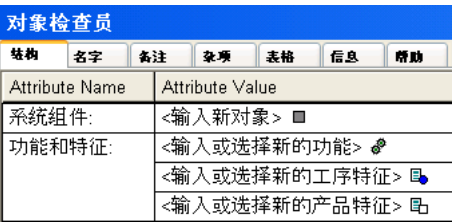


Figure 3.1: Object Inspector for operating language Chinese.

190 The FME files can be opened with all program flavors of the IQ-Software. If Unicode support is not available then there will be restrictions in terms of the display and/or editing.

Conversion of ANSI to Unicode

195 In the case of ANSI languages with 255 characters, there are several character codes (code pages) which are used to make allowance for the special features of different languages. The particular characters which can be displayed depend on the code page. In order to correctly display all possible characters for a language, the code page must be identical during input and during display.

When converting from version 5.1 to version 6 — ANSI to Unicode — the relevant standard code pages for the different languages are taken into account.

200 If data have been acquired with the incorrect code page then the characters which are displayed incorrectly should be corrected afterwards. As large parts of the code pages are identical, this will only affect individual characters, if at all.

It should be assumed that that the correct code page was used with the ANSI languages to date, as otherwise it would not have been possible to take into account the special features of the languages mentioned above.

205 3.3 Input collector with toolbar

In order to simplify use, the dialogs for input collectors now also contain a toolbar.

Conversion from ANSI to Unicode

Codepage

1250	Polish, Czech, Slovak, Hungarian, Romanian, Albanian
1251	Russian, Bulgarian
1252	Danish, Dutch, English, Finnish, French, German, Italian, Norwegian, Polish, Portuguese, Slovenian, Spanish, Swedish
1253	Greek
1254	Turkish

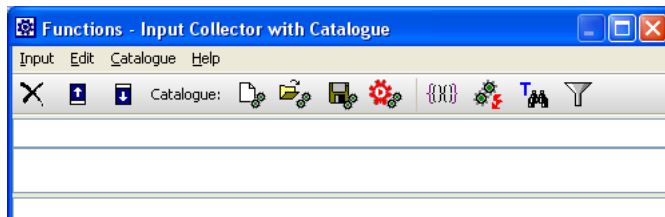


Figure 3.2: *Input collector with a toolbar (example: functions)*

Some of the symbols activate permanent changes to the way the relevant input collector behaves. If a status is activated via the icon then the surroundings of the icon change. The display simulates the appearance of a “pushbutton” (= toggle icon).



- 210
- a New... (catalogue entry)
 - b Read Catalogue File...
 - c Export as TXT (content of catalogue)
 - d Load CARM-Server List
 - e Info... (instance count)
 - f Inherit Known Failures (toggle icon)
 - g Incremental Search (toggle icon)

All icons are linked to the input collector control options which already existed on previous versions (V5.1 or earlier). However, with the aid of the toggle icons the visualization of the settings is improved, and this makes it easier to make changes to the settings as well.

- 215 One useful settings option is e.g. “Transfer known failure” (see Fig. 3.3).

3.4 Structure Editor with hot-click icons

With the Structure Editor, the structure tree is displayed in the graphics window and the structure list in the second window. In the structure list there is a list view for the selected system elements of the structure tree. If no system element is selected in

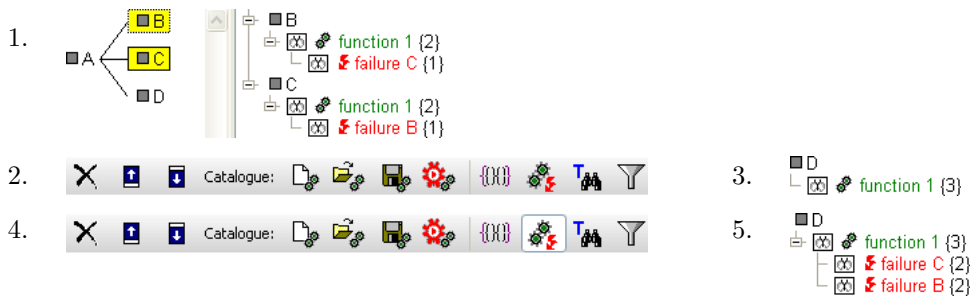


Figure 3.3: Reuse of “Funktion 1” for system element D via input collector functions with catalogue (see Fig. 3.2) — 1. Initial situation, 2. No transfer of known failures, 3. ... and results, 4. With transfer of known failures, 5. ... and results

220 the graphics window then the structure list is empty.

As part of the simplification process, it is now also possible to display and then use the “hot-click symbols”¹ in the graphics window via the display options.

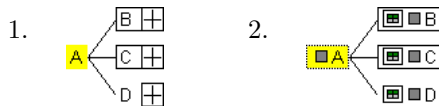


Figure 3.4: Structure tree with FMEA form symbol — 1. Old , 2. New (hot-click icons).

The label previously used in the graphics window for “FMEA form” has been replaced with the “FMEA form” hot-click icon.

225 3.5 Structure Editor with filter

The data shown in the Structure Editor can now also be filtered.

If a filter is activated then the subset of existing information to which the filter criterion applies is displayed. The program always shows all relevant system elements and objects in the dependency chain, starting from the root element up to the filtered object. This makes it clear where the filtered information is located.

The usual control options are available for filtering. Any user familiar with the use of filters with FMEA forms or deadline tracking will immediately be able to find their way around.

235 There are some pre-defined system filters, e.g. “Changes of structure version” or “Deadlines open”. If a filter is active then the filter symbol in the status bar is shown with a red background. The function key F6 can be used to deactivate the filter.

¹ Hot-click symbols in the graphics pane: Object type symbol, Process Flow Diagram, FMEA forms, Control Plan, Notes, User defined attributes, Bookmark icon

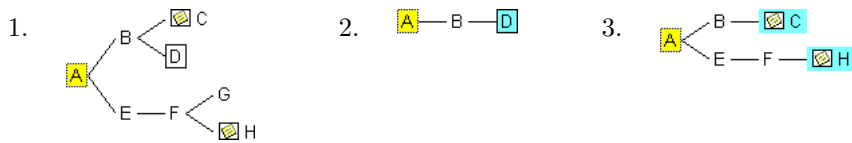


Figure 3.5: Structure tree with filter option — 1. Structure tree, 2. ... with system filter “Deadlines open” (deadlines are only open in D), 3. ... with filter “SE with notes”.

System elements to which the filter criterion applies are shown with a colored background after filtering.² This makes it clear whether the filtering criterion applies to multiple system elements in a path.

240 3.6 FFA Editor with filter

The displayed data can now also be filtered in the FFA Editor.

If a filter is activated then the subset of existing information to which the filter criterion applies is displayed.

245 The details are the same as for the filtering in the graphical part of the Structure Editor, i.e. there are pre-defined system filters, items are displayed in the status bar, and the function key F6 can be used for disabling.

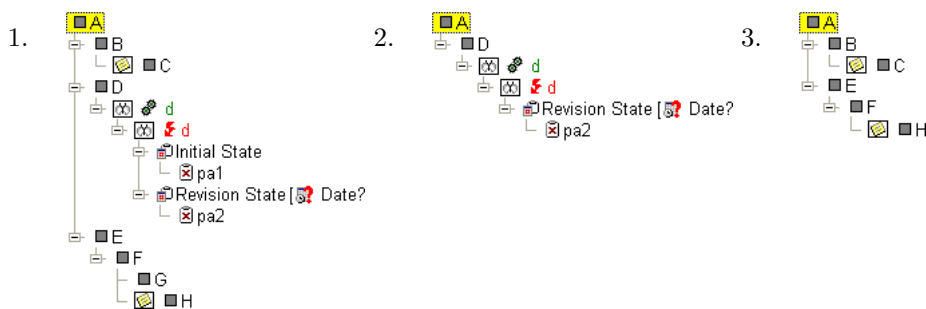


Figure 3.6: FFA Editor with filtering option — 1. Structure List, 2. ... with system filter “Deadlines open”, 3. ... with filter “SE with notes”.

3.7 Function Net Editor with filter

250 In the Function Net, all relevant functions are displayed to which the filtering criterion applies, starting from the focus element. Similarly to all other editors, it is also possible to filter here according to criteria which are not visible. However, this does not mean that it does not make any sense to use these filtering criteria.

² The colors used for highlighting are defined under WORKSTATION SETTINGS | FONTS AND COLORS...

For example, if a function net is filtered with the system filter “Deadlines open”, then at least the functions which are visible as nodes still have open actions.

During filtering the focus element always remains visible, even if the filtering criterion does not apply to it.

The details are the same as for the filtering in the graphical part of the Structure Editor, i.e. there are pre-defined system filters, items are displayed in the status bar, and the function key F6 can be used for disabling.

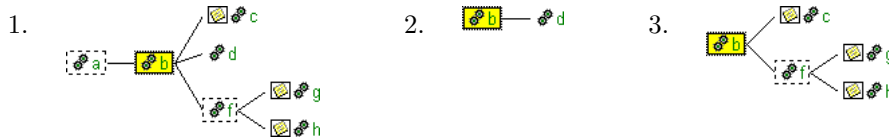


Figure 3.7: Function net with filtering option — 1. Function net, 2. ... with system filter “Deadlines open” (deadlines are only open in d), 3. ... with filter “Function with note”.

Fig. 3.7 shows the process of filtering by functions which have a note. A detail filter is also possible in which the criterion “Function is anchored with a note on one system element”.

3.8 Failure Net Editor with filter

In the Failure Net, all relevant failures are displayed to which the filtering criterion applies, starting from the focus element.

If a failure net is filtered with the system filter “Deadlines open”, then the failures for which actions are still open are visible as nodes. With these failures, the existing actions can be displayed via the corresponding display option.

During filtering the focus element always remains visible, even if the filtering criterion does not apply to it.

The details are the same as for the filtering in the graphical part of the Structure Editor, i.e. there are pre-defined system filters, items are displayed in the status bar, and the function key F6 can be used for disabling.

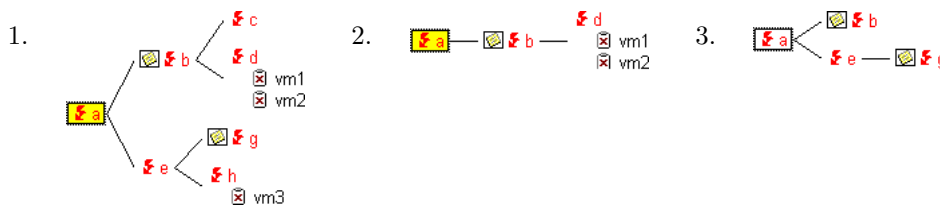


Figure 3.8: Failure Net with filtering option — 1. Failure Net, 2. ... with system filter “Deadlines open”, 3. ... with filter “failure with notes”.

Fig. 3.8 shows the process of filtering by failures which have a note. A detail filter

is also possible in which the criterion “Failure is anchored with a note on one system element”.

3.9 Mixed arrangement of functions, product and process features

Functions and product/process features can be arranged in a mixed sequence as dependent objects for a system or process element. This means that the previous restrictions in terms of the arrangement no longer apply. Previously, the rule applied that first all of the functions, then all of the product features and then all of the process features were present for a system element.

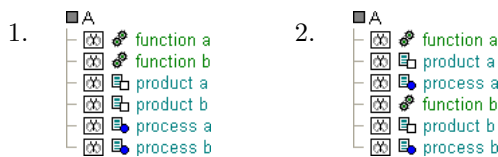


Figure 3.9: Arrangement of dependent objects (functions, product and process characteristics — 1. Defined sequence of the objects (re-sorting is possible within an object type), 2. Mixed sequence

3.10 Expanded failure net

Analysis of mechatronic systems

During the analysis of (mechatronic³) systems it is important to consider all operating states (*operating conditions*). Failure detection (*error detection*) and failure responses (*error response*) are additional options which can be used to describe the behavior of a system.

Ultimately, it needs to be documented how a system behaves in the different operating conditions and how it preferably remains ready for operation until an acceptable and safe condition is reached. Here, the error response can also take the form of switching over to a different operating condition, e. g. emergency running, or notification of the user about the partial failure of a system.

At the same time, there are also always discussions about how to best handle actions which form a structural part of a system. This is particularly important when they cause the failure sequence and therefore their significance to be changed. We are therefore concerned with actions here which, unlike those in classic FMEA, do not change the probability of occurrence or discovery.

³ Mechatronic systems comprise mechanical systems, electronics and software.

Together with a committee of APIS IQ-Software users, a practical approach was developed in which the familiar failure network can be supplemented with additional objects (see Fig. 3.10).

Use of this feature is available in all program flavors from version 6. Users who would prefer to continue working as in the past, i.e. only with failure functions in the failure net, should not activate this additional function in the workstation settings.

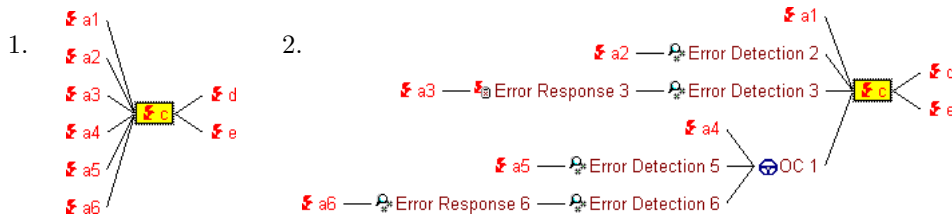


Figure 3.10: Failure net with operating condition, error detection and error response — 1. Failure net (simple), 2. Failure net with additional objects in the causality chains up to the failure sequences

New object types - operating condition, error detection and error response

The newly introduced object types operating condition, error detection and error response are easy to detect in the failure net, as they each have their own symbol and the font color is slightly different to that of the failure functions.



- a **Operating condition** (typified objekt)
- b **Error detection** (derived from a function)
- c **Error response** (derived from a function)

Expanded failure net

With the expanded failure net the analysis of (mechatronic) systems can be improved.

The error detection and error response are derived from a previously defined function. This means that it is possible to consider fault recognition and fault response errors. This is because practice has shown that new (detection) functions can also be linked to new errors. These also need to be assessed in terms of risk.

If the link between the failure functions is only present in defined operating conditions then it is now possible to integrate an arbitrary number of operating conditions in a failure net. The aim is to achieve an acceptable situation in all possible operating conditions.

320 **3.11 Object Inspector**

The Object Inspector has been thoroughly revised and expanded (see Fig. 3.11):

- *Grouped object attributes for better findability*
- *User-friendly detection of object attributes and new objects*
- *Detailed explanation of the object attributes can be shown*
- 325 • *Detailed representation of the variant-specific attributes of the inspected object*

Objects can now also be modified; it is also possible to collect new objects in the Object Inspector.

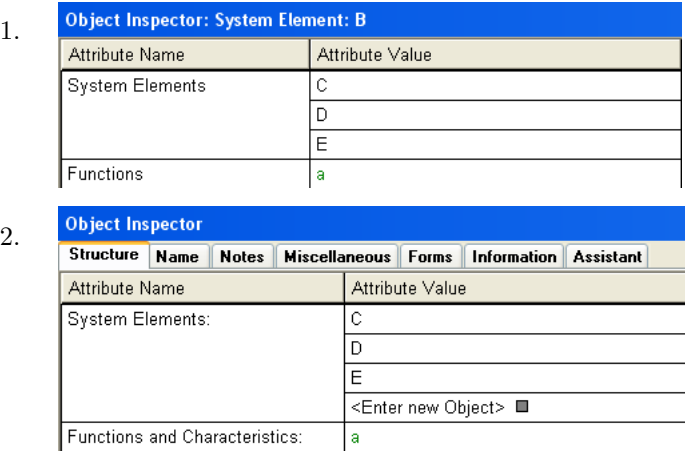


Figure 3.11: *Object Inspector — 1. Version 5.1, 2. Version 6 with grouped object attributes.*

3.12 DRBFM

Previous DRBFM functionality

330 Design Review Based on Failure Mode (DRBFM) is supported by a DRBFM form. The DRBFM function can be activated via the workstation settings **TOOLS | WORKSTATION SETTINGS**.... One of the outcomes of this is that there is the menu entry **ADMINISTRATION | DRBFM MANAGEMENT (FORMS/PROJECTS)** as a result.

335 The DRBFM worksheet has a number of special features, but otherwise it is – just like any other QM document – a named report in which the contents of the FME file are displayed and in which work can be performed.

With DRBFM, already existing information from the FMEA can be accessed, and new information is in turn also visible and usable in the FMEA.

With the introduction of DRBFM, additional features have also become usable for FMEA, e.g. the option of being able to consider multiple cause levels. For DRBFM this has enabled the “5-Why” questioning technique.

With the simple DRBFM functionality, the focus on changes is supported through the generation of a DRBFM form based on “Changes to the last structure version”. There is also the possibility of adopting individual objects in the DRBFM form and excluding others. This can be used, for example, to distinguish between old and new functions.

Expanded DRBFM functionality

As part of a project entitled “DRBFM - Change-based approach”, further features have been implemented. In addition to the DRBFM worksheet there are the following new worksheets / editors:

- *Awareness Sheet*
- *Changes Comparison Table*
- *Functional Focal Point Table*
- *Concern Points Identification Table*



- 355
- a* **Awareness Sheet Editor**
 - b* **Changes Comparison Editor** (Intentional and Incidental Changes Comparison Table)
 - c* **Function Focal Point Table**
 - d* **Concern Points Identification Table**
 - e* **DRBFM Worksheet**

In the expanded DRBFM functionality there are new object types, e.g. “DRBFM Project”, “DRBFM Product Change” and “DRBFM Change Category”.

New object attributes have also been defined, e.g. for functions the “Category”, “Limits” and “Conditions”. The following are pre-defined for the function categories:

- 360
- *Basic function*
 - *Additional functions*
 - *Unit function*
 - *Harm prevention function*
 - *Self protection function*

365 Additional functions are provided for embedding graphics. DRBFM worksheets can be plotted with empty spaces in A0 format. This means that, in addition to direct inputs, it is also possible to continue working on PIN walls and then update the documentation in the FME file.




Design Review Based on Failure Mode (DRBFM) - Work Sheet			
Concerns regarding change	Any other concerns? (Review)	Root Cause (5 x why?)	Other causes (Review)
Concern 1 			
Concern 2 			
Concern 3			

Figure 3.12: DRBFM worksheet (detail) with freely positioned graphics (without empty spaces).

DRBFM Workshops

Unfortunately, it is not possible to cover the full extent of the additional features and functions which have been implemented. More detailed information is taught in the **APIS DRBFM Workshop**. Please visit <http://www.apis.de> for more information about the services on offer from APIS.

3.13 Revision state categories

It is possible to assign a category to the revision states, e. g.:

- *Development*
- *Customer operation*
- *Service*

These categories of actions — according to VDA —, which are pre-defined on delivery, can be added to and changed by the user.

The category can be allocated via the Properties dialog of the revision state. These categories are available for the filters and the statistical evaluations.

In the Data Manager under “Attributes and Categories” there is an option for changing or adding to the three pre-defined categories (combo box in the toolbar: **CATEGORIES FOR REVISION STATES**). The categories for the revision states can be saved in the template file.

3.14 Global action

The naming of actions is saved in a catalog, and the instances of the action are held in the revision states. Previously, the attribute values were only saved for the instances, e.g. person responsible and deadline. The attribute values were always independent of each other.

When an action with multiple instances was renamed, it became obvious that the naming of the action was catalog-based. A dialog pops up to ask which instances should be renamed. In this context we speak of “typified objects”; with a corresponding display option it is also possible to show the counter for the number of instances, e.g. { 2 }.

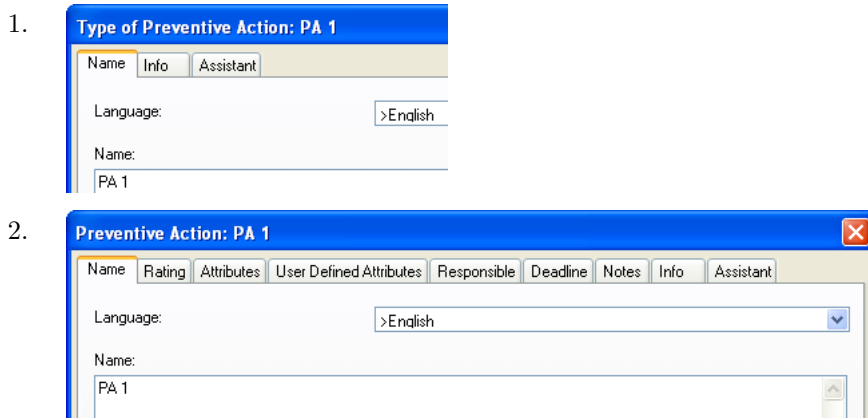


Figure 3.13: Preventive action “PA 1” (Version 5.1) — 1. Type properties, 2. Instance properties

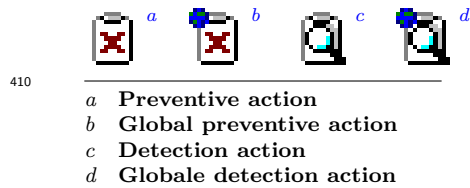
If actions are to have the same person responsible and deadline for different failure causes, this can be done manually.

All actions are listed alphabetically in a table. There, all instances which are to be worked on at the same time can be highlighted and assigned a person responsible, deadline and status at the same time. In the table representation the differences in terms of the attributes are also easy to see.

Standard action (global action)

In addition, the actions in the type catalog (from version 6) can also be assigned a person responsible (*Responsibility*) and a deadline (see Fig. 3.14/1). This attribute values initially only serve for the initialization of instances, without anything actually changing at the instances. Basically, what it does is to avoid paperwork.

If the option **IS GLOBAL ACTION** is activated then the symbol for the object type changes.



Far more significant than the changed symbol, however, is the fact that it is then no longer possible to individually change the person responsible, deadline or status. This is because the program is working with the attributes of the catalog entry, not the attributes of the instance.

415 If one of these attribute values is changed, then this naturally has an impact on all instances — there are “global” consequences — and therefore the action is also referred to as a “global preventive action” or “global detection action”.

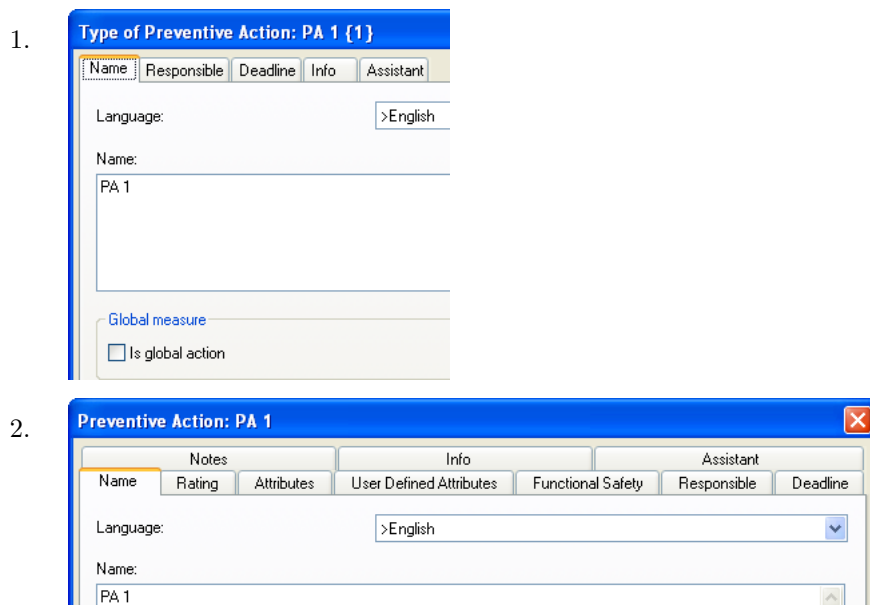


Figure 3.14: Preventive action “PA 1” (Version 6) — 1. Type properties, 2. Instance properties

420 With *global actions*, all changes to the person responsible, deadline and status also impact on the catalog entry. This is independent of whether the change is made in the instance or in the catalog entry. The changes in these areas are always — as was intended — global!

3.15 Template file

The template file (`NORMAL.FMT`⁴ is the storage location for the administration data with which new FME files are initialized. It is also possible to assign selected administration data from the FMT file to already existing FME files. Here, already existing administration data are either overwritten or supplemented.

Read access to the administration data in `Normal.FMT` is obtained via a dialog which is opened via `TOOLS | LOAD TEMPLATE...`. In order to keep a clear overview, the administration data there are grouped into a number of areas, the “template components”.

For example, the settings which can be modified via `TOOLS | DOCUMENT SETTINGS...` are saved in the Document Settings area.

Write access to Normal.FMT

The file `Normal.FMT` is saved in the Workgroup directory. In the case of standard installations, only users with Admin rights can write to this file. In this case, selecting `TOOLS | UPDATE TEMPLATE...` will trigger the message “Access to the file is denied...”.

If a user wishes to work with a writable `Normal.FMT` file, then the user will either need to be granted write access rights for the existing `Normal.FMT` file by the administrator, or the paths will need to be set to the Workgroup directory or to the `Normal.FMT` in the Windows registry.

Expansions of the template file

The following areas have been added to the template file:

- *Symbolic deadlines*
- *Notes category*
- *Function categories, e. g. for DRBFM*
- *Operating conditions*⁵
- *DRBFM Modification Types*
- *Categories for the revision state*⁶
- *Statistical Analysis Shemes*

The number of displayed template components depends on the program flavor of the IQ-Software and on the enabled functions. Fig. 3.15 shows which component is added after the expanded DRBFM functionality is enabled (see chapter 3.12, page 16).

⁴ FMT is derived from *FMEA file template*.

⁵ Operating conditions are part of the document settings

⁶ The category for the revision state is part of the document settings.

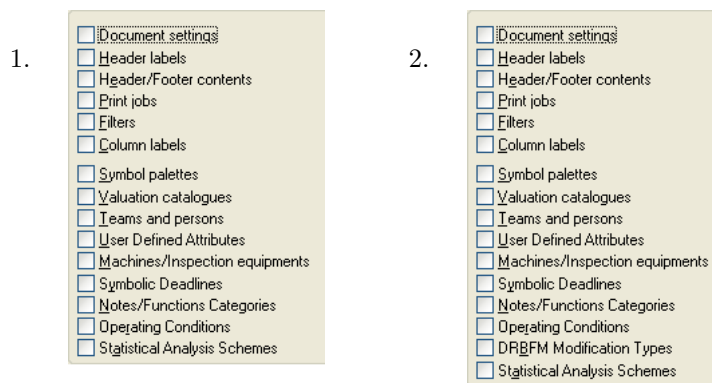


Figure 3.15: Template components in the FMT file — 1. Without expanded DRBFM functionality, 2. With expanded DRBFM functionality

Chapter 4

Further innovations

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465 The latest version can be requested from www.apis.de/en/wn6 .*

4.1 Font effects (HTML functionality)

In notes and other areas it is possible to use a limited number of HTML¹ features.
The available elements include in particular (hyper)links, pictures, line breaks and
markups in the text for font and paragraphs.

470 Within the text properties, it is possible to use different font effects (see Fig. 4.1).
“Superscript” and “Subscript” are now also supported as additional text effects.

The HTML features with the additional font effects are available in all areas in which
HTML features with font effects were already available in the past, e. g. in the FMEA
cover sheet.

4.2 Notes with text template “Example”

475 In notes (and FMEA cover sheets etc.) it is possible to collect standardized entries
with the aid of specified text templates. In the past (e. g. on version 5.1) the user
had to create an initial template before the dialogs for using and managing templates
became visible. For this reason this feature was often overlooked.

480 With a fixed, integrated example template, the control options and menu entries
now no longer depend on whether or not a user has already created his own template.

¹ Hypertext Markup Language (HTML)

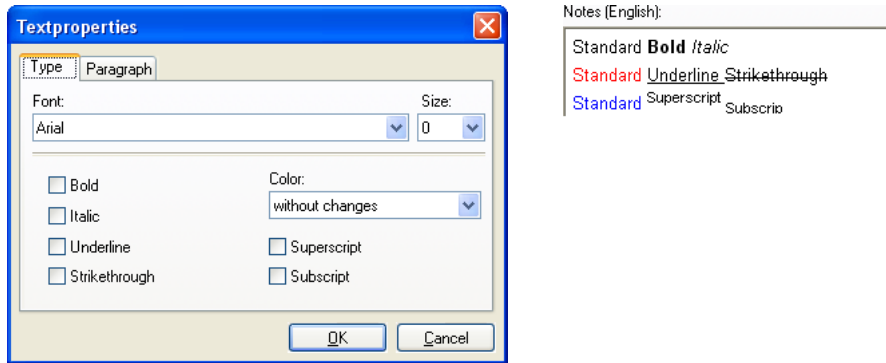


Figure 4.1: *Text properties dialog and example notes*

In addition, the placeholders are also specified in the revised template administration dialog. The following placeholders² can be integrated into a template:

- %d = date
- %t = time
- %v = team³
- %x = logged-on user
- %f = file name

Example of a self-generated template:

“Entry of %x at %d %t:”

In use this then becomes the following entry:

“Entry of Supervisor at 01.01.2009 10:01:01:”⁴ (Example)

4.3 Spelling check

A dictionary is available for checking the spelling (TOOLS | SPELL CHECK...). Users can add their own entries to the standard dictionary which is located in the Workgroup directory.

The spelling check is available in the Table Editors (FMEA form etc.), the Structure Editor and the FFA Editor.

Custom/special dictionary files can be used by altering the corresponding entries in the Windows registry. It is possible to change the path with the Workgroup directory, or to just specially define the location of the dictionary files. The path for

² These placeholders also exist for the headers and footers, which can be edited via the Print dialog.

³ In order to clearly identify a team, users should log on by selecting the team first and then the person.

⁴ Date format according windows setting

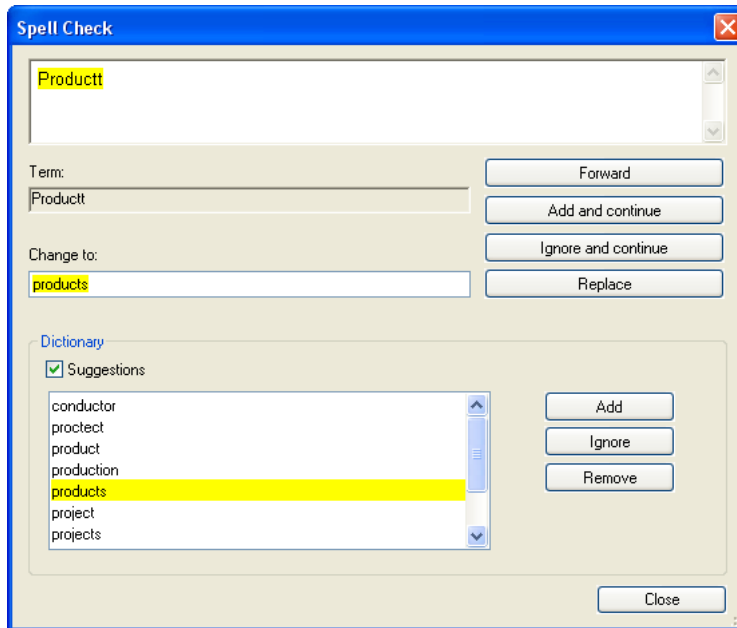


Figure 4.2: *Spelling check*

the dictionary file is changed with the entry “spellcheckDir=”. The corresponding dictionary files for each language must be present in the location to which this entry points (spellcheck_<ISO_Lang_Name>.txt, with ISO_Lang_Name ::= ‘de’ | ‘en’ | ...).

4.4 Colored palette symbols

The classification symbols and the symbols which can be integrated in the process flow diagram are combined into palettes. Each symbol can be selected from a large number of pre-defined symbols (currently more than 350 symbols⁵; see Fig. 4.4). Colored symbols can also be accommodated there.

If a corresponding palette entry is used, then there is a colored symbol in the QM document (see Fig. 4.3).

4.5 Revision state

As part of the adaptation to the current VDA-FMEA, the revision state “awaiting decision” has been inserted. This means that the following are now available as the

⁵ Additional symbols can be realized free-of-charge as a pre-defined symbol. Please send any required symbols as an image to sales@apis.de.

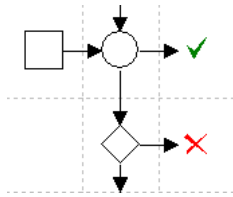


Figure 4.3: *Process flow diagram with colored symbols*

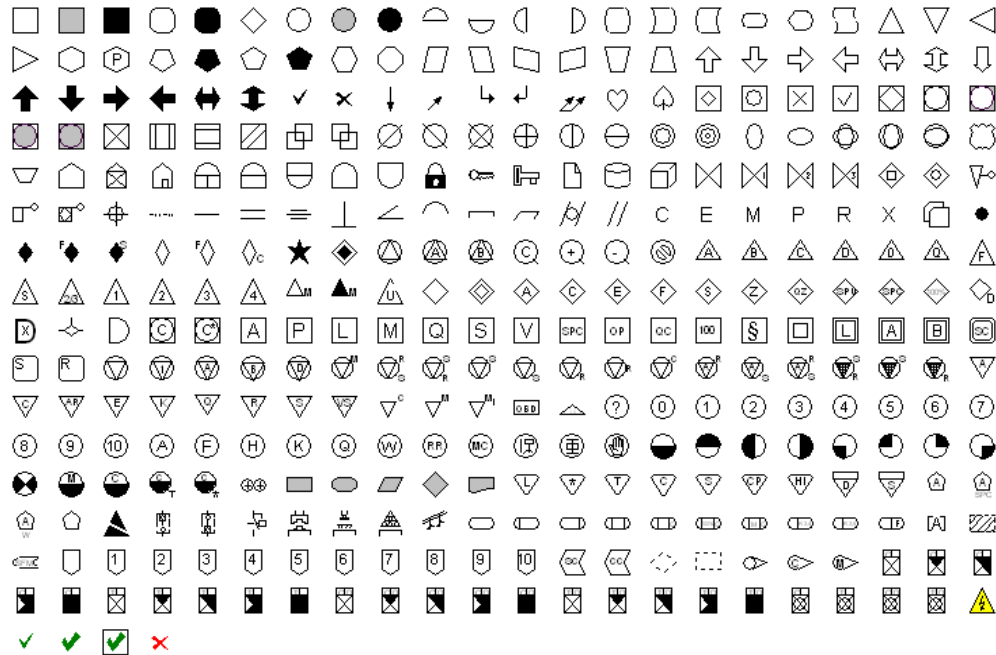


Figure 4.4: *Pre-defined symbols for palettes*

status of an action:

- *untouched*
- *under consideration*
- *in revision*
- *completed (also referred to as “revised”)*
- *abandoned*

4.6 FMEA form with autofilter

The autofilter “Context to the selected Cause” filters all causes which have the same name and numbering as the marked cause (these should also be identical with autonumbering). The following are filtered:

- Failure modes with Causes with:

$$Name = Marking \text{ AND } Numbering = Marking$$

- Causes with:

$$Name = Marking \text{ AND } Numbering = Marking$$

In this way it can be checked very quickly in the form where the changes to the marked cause will have an effect.

Caution: In some circumstances there may, however, be consequences in other FMEA forms. If you suspect that this may be the case, also enable the display option **COUNTER OF EFFECTS AND CAUSES** in the area “Context information for causes and effects”. If, after filtering, fewer failure modes are visible than would have been expected after the “Counter of effects and causes”, then e.g. the failure net can be used to check at which points changes in the area of the cause have an effect.

1.

FMEA Forms Editor VDA 96: B (A [Design])			
Effects	S	Failure Modes	Causes
System Element: <input type="checkbox"/> B			
Functions: b			
		b1	FU 1
			FU 2
		b2	FU 1
		b3	FU 3
		b4	FU 1
System Element: <input type="checkbox"/> C			
Functions: c			
		c1	FU 1
			FU 2
		c2	FU 4

2.

FMEA Forms Editor VDA 96: B (A [Design])			
Effects	S	Failure Modes	Causes
System Element: <input type="checkbox"/> B			
Functions: b			
		b1	FU 1
		b2	FU 1
		b4	FU 1
System Element: <input type="checkbox"/> C			
Functions: c			
		c1	FU 1

Figure 4.5: Autofilter “Context information for causes and effects” in the FMEA form
- 1. Form with failure modes and causes (without counter), 2. ... filtered.

4.7 System filter in IQ Explorer

Variantspecific defined Objectattributes

The system filter “Variantspecific defined Objectattributes” returns all objects for which variant-specific values have been assigned. Either all variants in the database are used, or the program uses the selected variants in the Document Search tab.

1.

FMEA Forms Editor VDA 96: B (A [Design])			
Effects	S	Failure Modes	Causes
System Element: <input type="checkbox"/> B			
Functions: b			
	b1	<div>« 5/0 » !</div> <div> ? FU 1</div>	
		<div>« 2/0 » !</div> <div> ? FU 2</div>	
	b2	<div>« 5/0 » !</div> <div> ? FU 1</div>	
	b3	<div>« 1/0 »</div> <div> ? FU 3</div>	
	b4	<div>« 5/0 » !</div> <div> ? FU 1</div>	

System Element: <input type="checkbox"/> C			
Functions: c			
	c1	<div>« 5/0 » !</div> <div> ? FU 1</div>	
		<div>« 2/0 » !</div> <div> ? FU 2</div>	
	c2	<div>« 1/0 »</div> <div> ? FU 4</div>	

2.

FMEA Forms Editor VDA 96: B (A [Design])			
Effects	S	Failure Modes	Causes
System Element: <input type="checkbox"/> B			
Functions: b			
	b1	<div>« 5/0 » !</div> <div> ? FU 1</div>	
	b2	<div>« 5/0 » !</div> <div> ? FU 1</div>	
	b4	<div>« 5/0 » !</div> <div> ? FU 1</div>	

System Element: <input type="checkbox"/> C			
Functions: c			
	c1	<div>« 5/0 » !</div> <div> ? FU 1</div>	

Figure 4.6: Autofilter “Context information for causes and effects” in the FMEA form
- 1. Form with failure modes and causes (with counter), 2. ... filtered.

If the filter is active and results are present in the results list, then a “Variants value comparison matrix” is displayed in the information table (*Info Table*). The columns in this matrix comprise the mother structure and the selected (or all) variants. The rows are all of the search results for the same database. The cells in the tables list the variant specific values where present. For improved clarity they are highlighted in the chosen highlight color. Cells for which no variant specific values have been assigned remain empty.

Object properties “corresponding” / “not corresponding”

The system filter “Object properties ‘corresponding’ / ‘not corresponding’ (currently) returns all failures and/or actions for which there are corresponding (matching) or not corresponding (non-matching) object properties. Via the checkbox “Name” you can control which object type (failure and/or action) should be searched. With this system filter, further criteria can be selected depending on the object type which should also be taken into account (button in the Search dialog: Properties).

As the actions are always grouped by name, the Name checkbox is deselected and disabled by the program if a further criterion is added. If only the names are selected then all actions/failures with the same name are always listed as a group (i. e. without taking into account any other attributes).

1.	Result	2.	Result
	S=9 drive control is out of spec {1}		S=9 loss of function during life time
	S=8 wrong {1}		loss of function during life time {1}
	S=8 wrong {1}		S=8 wrong {1}
	S=7 wrong {1}		S=8 wrong {1}
	S=7 required force is too high {2}		S=7 wrong {1}
	special tools for assembly required		wrong {1}
	S=5 does not comply with custom		
	exchange not possible without dan		
	S=9 loss of function during life time		
	loss of function during life time {1}		
	S=9 soldering connection breaks d		
	S=8 reduced fixation after soldering		
	S=9 does not resist environmental		
	S=9 faulty cables have a proof-of-te		
	wrong {1}		
	S=9 traceability of parts not possib		
	plug body is damaged {1}		
	S=7 required force is too high {2}		

Figure 4.7: Results list in IQ Explorer - 1. Search for all failure effects, 2. Result of the filter “Object properties non-matching” shows failure effects with different object attributes (here: S-valuation).

4.8 Filter criteria

Initial state / last revision state

The filtering criteria “Is not initial state” and “Is not last revision state” have been removed.

565 The same objective is met with the new criteria “Is initial state does NOT EQUAL true” and “Is last revision state does NOT EQUAL true”. With the filtering criteria, the operator can also be changed to DOES EQUAL; this offers additional filtering options.

If the two removed criteria are defined in old filters then the filters will continue to work. However, the filters can no longer be modified.

570 Last rated revision state

The criterion “Is last rated revision state” has been adopted for the actions group or for the revision state.

4.9 Statistics with risk matrix

575 The risk matrix according to VDA shows the number of causes with an S and O-valuation in a corresponding graphic. It is important here that every combination can be given a colored classification (red, yellow, green).

The colors of an analysis which has already been performed can be changed via the display options, but not yet by editing the analysis diagram.

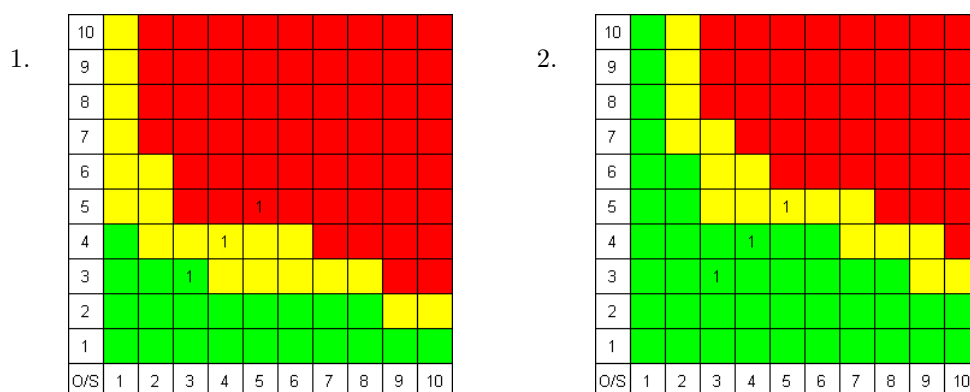


Figure 4.8: Risk matrix with red, yellow and green risk classes (according to VDA) — 1. First allocation color scheme, 2. Second, modified allocation color scheme.

4.10 Statistics with extended risk matrix

580 The extended risk matrix shows the number of failure causes in a matrix. All of the 420 theoretically possible combinations of $O * D$ and S are counted individually.

The fields of the matrix have a color classification system (red, yellow, green); similarly to the risk matrix the classification of a matrix field can be changed.

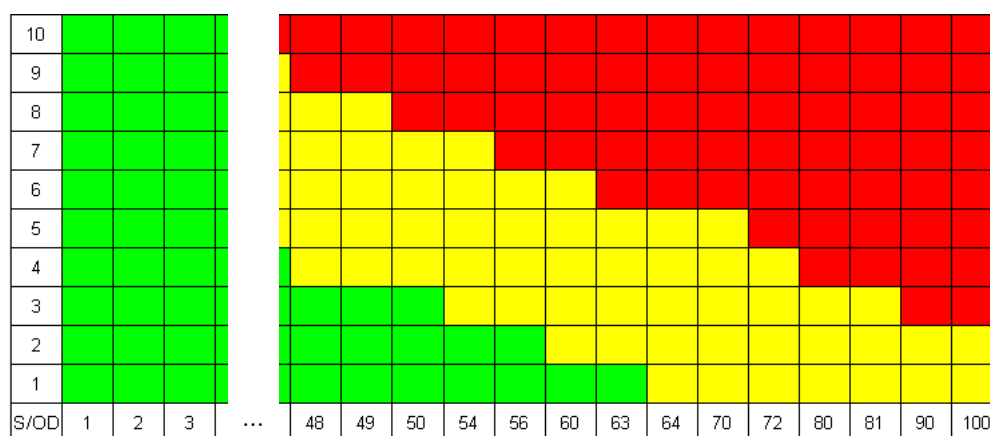


Figure 4.9: *Extended risk matrix — $S / O * D$*

An RPN can be calculated for each of the 420 cells of the matrix, as all of the
585 necessary information is present. However, there are different cells which correspond
to the same RPN, e. g. $RPN = 1 * (10 * 1)$ and $RPN = 10 * (1 * 1)$. In the extended

risk matrix, it is therefore possible to give a different color coding to the same RPN.⁶

4.11 Statistics with color selection

In the graphical representation of some analyses it is now possible to change the colors. The corresponding option can be found in the display dialog for the relevant analysis, i.e. a graphic needs to be visible first before the changes can be made.

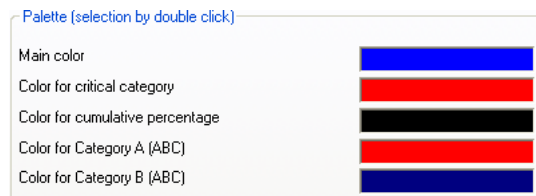


Figure 4.10: Dialog for adjusting the colors (example: pareto analysis with standard colors)

Colors can be modified on the following analyses:

- Pareto analysis
- Differential analysis
- Frequency analysis
- Actions per person responsible

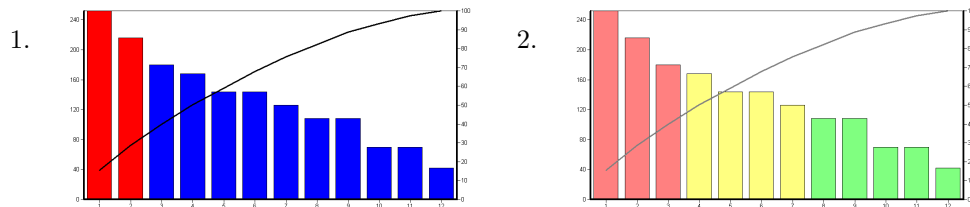


Figure 4.11: Colors used in statistical analysis — 1. Pareto analysis with standard colors, 2. Pareto or ABC analysis with modified colors.

4.12 Statistics with evaluation of structures

In pareto analysis, differential analysis and frequency analysis the calculated RPN is used to classify failure causes in classes. In the risk matrix the S and O-valuation numbers are used.

⁶ In the FMEA form there is also color coding with red, yellow and green for the RPN. There, the program works with RPN class limits which can be changed by the user.

In older descriptions of FMEA methodology, the risk assessment is always carried out in the FMEA form. This automatically generates a close link between the FMEA form and the associated statistics; the analysis type “Evaluation of forms” is suitable.

Valuation numbers without FMEA form

605 In order to also meet the requirements of alternative input and display options — it is possible to collect the valuation numbers and calculate the RPN for failure functions without (!) there being an FMEA form — it is now also possible to change to the analysis type “Evaluation of structures”. This is possible for all primary analyses (pareto analysis, differential analysis, frequency analysis and risk matrix).

610 Both evaluations are comparable if all of the evaluated failure functions are contained as failure causes in exactly one FMEA form, i. e. the evaluation takes place in the classically described manner in the FMEA form, and if there is only one FMEA form per element.

4.13 Statistics for root causes

615 In the display options for the form specific pareto evaluation, as well as “Direct causes only” it is now also possible to switch over to “Root causes only”.

Note: If you switch over to “Root causes only” then an entry is only made in the statistics if there are also O- and D-valuations for the root cause.

4.14 Variant specific search

620 It is possible to perform a variant specific search when searching with the IQ-Explorer (see Fig. 4.12).

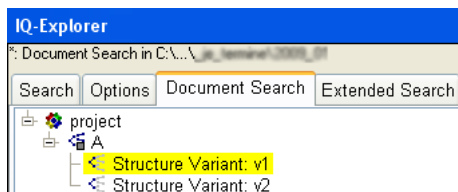


Figure 4.12: Selection of variants with IQ Explorer (example: “v1” is selected).

The behavior of the IQ Software has been optimized in conjunction with the variant specific search:

- 625 • If a structure or a project is selected, then the search is performed in the parent structure, even if a variant is selected in another editor. If no selection is made in the IQ Explorer then a variant may be used which has been selected in a different editor!

- If several variants are selected then the same results are listed more than once in the results list if there are variant specific values. The variant name is then displayed in the Structure column.
- If forms and variants are selected at the same time then the forms are now evaluated in turn over all selected variants.⁷
- If a structure and a variant which is subordinate to the structure are selected at the same time then the values are always used which relate to the selected variant.

4.15 Autosynchronizing with IQ Explorer

If you are working with search results where the place of finding is no longer available, e.g. when working with saved search results or after consolidation, then the program automatically searches in the currently open FME files for the place of finding.

Note: During synchronizing the system uses the identity numbers (ID) of the objects as the criterion, not the visible name.

4.16 PIM with information for bookmarks

There is now an additional display option which allows information to be displayed instead of the comment for a bookmark (VIEW | SHOW INFO FOR BOOKMARKS). This option is not saved when the IQ-Software is shut down.

If this option is enabled then the information about cross-referenced objects is shown in the text area, i.e. the area where normally the comment for a bookmark can be collected, in the detailed view (see Fig. 4.13).

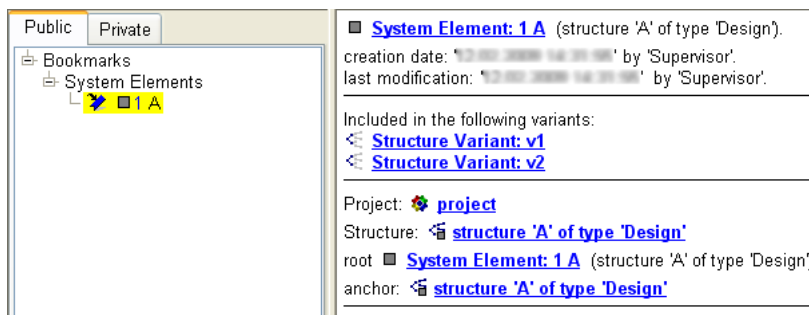


Figure 4.13: PIM – bookmark with information in the comment area..

⁷ In the past, either variants or structures or forms were used in the variant specific search.

4.17 Print job with info and summary

In the print jobs for the presentation printout, it is defined which documents should be printed. The option “Info and summary” under “File related documents” can be used to output a text compilation for the file contents (FMEA summary etc.) at the same time.

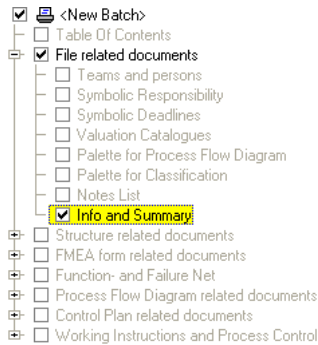


Figure 4.14: Presentation print — Print batch.

Project:

creation date: '13.04.2009 15:58:27' by 'Supervisor'.
last modification: '13.04.2009 15:58:27' by 'Supervisor'.

Structure:

<Structure 'A' of type 'Design'
creation date: '13.04.2009 15:58:27' by 'Supervisor'.
last modification: '13.04.2009 15:58:27' by 'Supervisor'.
last modification within the structure '13.04.2009 15:58:27': ■ [System Element: 1 A](#) (structure 'A' of type 'Design').

Structure:

<Structure 'B' of type 'Design'
creation date: '13.04.2009 15:58:27' by 'Supervisor'.
last modification: '13.04.2009 15:58:27' by 'Supervisor'.
last modification within the structure '13.04.2009 15:58:27': < [Structure Variant: V2](#)

1. Structure Variant (0 excluded and variantspecific Objects and Values):

< [Structure Variant: V1](#)
creation date: '13.04.2009 15:58:27' by 'Supervisor'.
last modification: '13.04.2009 15:58:27' by 'Supervisor'.

2. Structure Variant (0 excluded and variantspecific Objects and Values):

< [Structure Variant: V2](#)
creation date: '13.04.2009 15:58:27' by 'Supervisor'.
last modification: '13.04.2009 15:58:27' by 'Supervisor'.

Figure 4.15: Presentation print — Example of info and summary.

4.18 Print batch with DRBFM

If the extended DRBFM functionality has been enabled in the IQ Software⁸, then there is also the option to print out all associated documents together with the print jobs for the presentation printout (see Chapter 3.12).

⁸ Extended DRBFM functionality: **TOOLS | WORKSTATION SETTINGS... | SETTINGS**

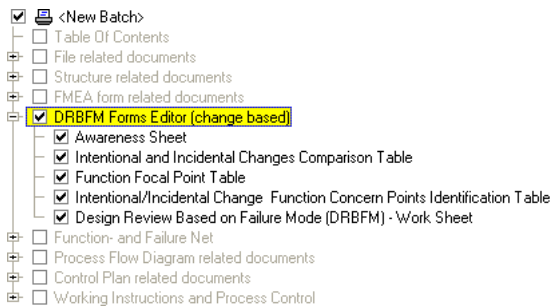


Figure 4.16: *Presentation print — Print batch with DRBFM documents.*

4.19 Presentation print with symbolic responsibility and symbolic deadlines

Symbolic ‘deadlines’ and ‘responsibility’ have been added.

660 4.20 Web Publisher upgrades

The Web Publisher generates a website. The documents can then be viewed with a web browser. A navigation page is created in the process in order to enable access to all documents.

In principle, this function corresponds to the function of the presentation printout. However, the user defines web publishing jobs rather than physical print jobs.

All of the new features for presentation printouts mentioned in the chapters “4.17 Print job with info and summary”, “4.18 Print batch with DRBFM” and “4.19 Presentation print with symbolic responsibility and symbolic deadlines” are also available for the Web Publisher.

670 4.21 Function with requirements

Previous dependencies and object properties

Functions are assigned to the system elements, where they are also anchored. Failures can be anchored at the functions.

Product and process characteristics, which can also have failures, can also be anchored at the system elements.

Functions and characteristics differ in that only the actual situation is documented for functions, without there being spaced for a specification and test. With the characteristics, the specification and test can be documented with corresponding attributes.

As the specification can also contain numerical values, it is common practice to describe the functions as qualitative requirements and the characteristics as quantitative requirements.

New object type: Requirement

A requirement is a dependent object of the function which is designed to enable the allocation of quantitative information, in a similar way to what is possible for a characteristic.

685

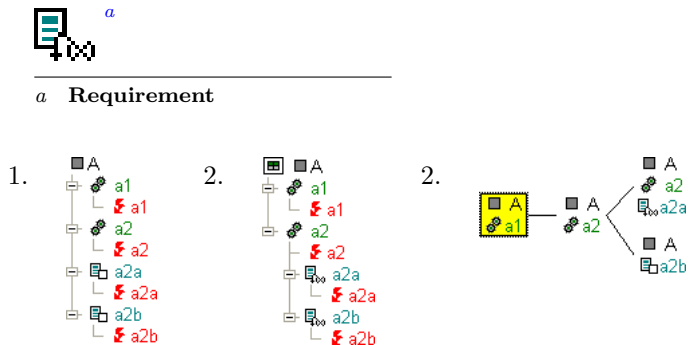


Figure 4.17: System element with functions, characteristics and requirements —
1. Previous options, 2. Functions with requirements, 3. Function net with one requirement.

It can therefore be said that the requirement differs from the property in terms of the anchoring point and the symbol.

690

The requirements can also be integrated in a function net, and there is a display option for also displaying as additional information the function at which the requirement is anchored.

Requirement management - customer requirement

695

For users of the requirement management features, there is a risk that the requirements assigned to the projects and the requirements in the structure cannot be clearly kept apart. For this reason the designation is changed in the requirement management. The previous requirement becomes the *customer requirement*.

4.22 Referenced documents and graphics

700

Wherever HTML features are present (notes, FMEA cover sheet etc.) it is possible to establish references to documents. For example, a link can be created, and it is also possible to embed graphics. The process of embedding graphics does not significantly affect the size of the FME file, as a link is created with a reference to information which is saved externally.

In Fig. 4.18 a PDF file is embedded via a link (= underlined text) and there is a link to a graphics file, the content of which is displayed directly.

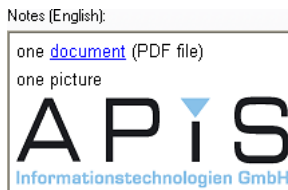


Figure 4.18: *Referenced documents and graphics.*

705 Embedding and extracting

If the document which is saved externally is renamed, deleted or moved, then the link will be broken as a result. This means that it will no longer work and it will need to be repaired.

710 It is also possible to embed the files and thereby integrate them in the FME file. However, the file size of the FME file may change dramatically as a result, but the display remains unchanged.⁹

Expanded features are now available for handling referenced documents and graphics (context menu: **EMBED REFERENCED DOCUMENTS/GRAPHICS** and **EXTRACT REFERENCED DOCUMENTS/GRAPHICS**).

715 The control option is available both in every note and in the list of notes. If the file which is to be extracted already exists, then a decision can be taken whether to overwrite the file, save it with a new name or cancel the process.

The command relates to the opened note or — in the notes list — to all opened (= visible) notes. If all of the notes in the notes list are open (i.e. visible) then it is 720 easily possible to embed all referenced documents.

Deleting documents and graphics which are no longer used

After embedding, it can happen that a link to the embedded document is deleted without the document or graphic being physically removed. These documents and 725 graphics which are no longer needed can be deleted via the context menu in the notes list.

4.23 XML(MSR) interface

The XML(MSR) interface has been adapted as regards content to the data model of version 6 and writes the XML file according to the current default DTD¹⁰. In addition, Unicode encoding (UTF-8¹¹) is now also used.¹²

9 If the mouse pointer is moved over a link or graphic then an information bubble will appear which indicates whether it is still an external document, or whether it is an embedded document.

10 MSRFMEA_2_2_0.ML.DTD

11 UTF-8: 8-bit Unicode Transformation Format (encoding for Unicode characters).

12 Previously: MSRFMEA_2_1_2.ML.DTD and ISO-8859-1 character encoding

730 If the corresponding Document Type Definition (DTD) is saved in the target directory of the XML file, then it is possible to validate the XML export file in relation to this DTD (see chapter 4.33, page 48).

There are further export options with the XML(MSR) interface. In connection with the character encoding, there is for example the option **EXPORT CHARACTER AS XML ENTITIES**. However, this option should not be chosen under normal circumstances.

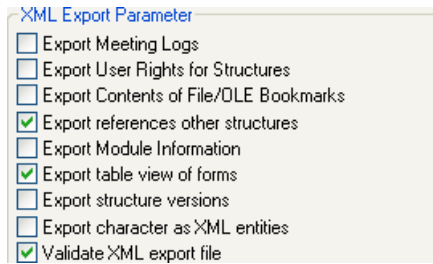


Figure 4.19: XML export parameters in the workstation settings.

4.24 Variant specific information

If you work with variants in the APIS IQ-Software then there is an option for removing objects and restoring removed (= masked) objects again. It is also possible to remove only the net link between e.g. two failures.

740 Attribute values in variants

The variant specific attribute values provide an important feature. The following principle applies: Attribute values are inherited from the (master) structure to the variant. If an attribute belongs to the variant specific information then the inherited value can be overwritten in the variant.

745 There are the following types of variant specific information:

- **FMEA form:** Cover sheet data, header
- **System element:** Classification, item code, machines
- **Characteristic:** Classification, value, deviation, operator, unit
- **Function:** Classification
- 750 • **Failures:** Classification, S-valuation
- **Action:** O-valuation, D-valuation, deadline, responsibility

Fig. 4.20 shows how the variant specific information is represented in the Object Inspector. In the case of this example, the specification (= value) is only present in the variants and the unit only in the structure. The unit mm is automatically inherited by every variant.

Value:	
Value (V1):	12
Value (V2):	14
Unit:	mm
Unit (V1):	
Unit (V2):	

Figure 4.20: View of specification values in the Object Inspector

Deleting the variant specific information

In order to reset all variant specific information, the context menu in the project management for a selected variant contains the menu option **DELETE ALL VARIANT SPECIFIC VALUES...**

760 After deleting the variant specific values, the values from the (Master) structure are displayed again in the variant. The other variant specific areas remain unchanged (removed objects and network links).

4.25 Customization Manager

765 After starting the APIS IQ-Software, the user is provided with a user-friendly and Windows-compliant user interface in the form of the Personal Desktop.

Activating function modules

770 So that menu items and icons which are not required remain hidden, some of the expansions and upgrades are only available as function modules after activation. This means that the user has to *actively* choose to work with the features which are initially hidden.

Dies betrifft z. B.¹³ folgende Funktionalitäten, die über die entsprechenden Arbeitssplatzeinstellungen aktiviert werden können:

This affects e. g. the following features¹⁴, which can be enabled via the corresponding workstation settings:

- 775 • ***DRBFM function***
ENABLE DRBFM
- ***Expanded DRBFM function***¹⁵
ENABLE DRBFM EXTENSION
- 780 • ***Requirement management***
ENABLE REQUIREMENT MANAGEMENT

13 Hier werden nur Funktionalitäten genannt, die in allen Ausbaustufen verfügbar sind

14 Only features which are available in all program flavors are mentioned here.

15 See chapter 3.12 DRBFM (page 16)

- **Failure net expansions**¹⁶

FAILURE NET WITH OPERATING CONDITION, ERROR DETECTION AND ERROR RESPONSE

Hiding menu items and icons

785 However, the Customization Manager is the tool of choice if you want to hide existing menu items and icons in the basic settings. With the aid of the Customization Manager (TOOLS | WORKSTATION SETTINGS | CUSTOMIZATION MANAGER...) it is possible to individually remove any menu item and any icon for every individual editor (compare Figs. 4.21 with 4.22), and it is possible to save as many configurations as required.

790 This means that it is possible to create a modified configuration for every processing phase, e. g. for an FMEA. It is also possible to create configurations which correspond to the field of activity or the level of knowledge of the user.



Figure 4.21: Menus and symbols in the Personal Desktop

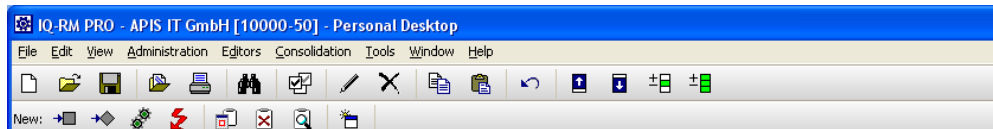


Figure 4.22: Menus and symbols in the Personal Desktop – customized configuration

If there is more than one configuration then one of them can be chosen when the IQ-Software is started. If you would like to always work with a particular configuration during every session, then you should define it as the default configuration.

795 The default configuration can be reset to the original settings via TOOLS | WORKSTATION SETTINGS | RESET DEFAULT CUSTOMIZATION.

Exporting/importing configurations

Configurations cannot only be used locally — they can also be exported and imported. Customized configurations can thus also be made available to other users.

800 A configuration can now also be activated without closing the Customization Manager. With this faster option for changing the active configuration, it is easy to check whether the customized configuration does actually meet your own requirements.

805 The configurations which are accessed during startup of the IQ-Software are saved in the file `iq-layouts.ice`, which is located in the Workgroup directory.

¹⁶ See chapter 3.10 Expanded failure net (page 14)

Write access rights

If the user does not have write access rights in the Workgroup directory, then the ICE file present there can be copied to a different location. Afterwards a new registry key should be created with the path to the ICE file. The corresponding entry in the registry settings for the IQ-Software¹⁷ is: `InterfaceConfigurationFilename=<path>\iq-layouts.ice`

4.26 Comparison of file copies

Unlike normal text files, the FME files do not contain an ordered sequence of information, but instead are a collection of objects, dependencies and links. In addition, there is a large number of object attributes and administration data. Consequently, a comparison of FME files is anything but trivial!

The identities of objects form the basis for the information saved in the FME file. All new objects receive these numbers (ID numbers), which must only occur exactly once in every FME file.

All information which is copied into the FME file currently being edited (e. g. from a different FME file) is also given a new ID number.

Comparison of file copies

If a file is copied by means of the operating system, then the ID numbers in the files are identical for all objects which already exist.

This forms the basis for the comparison of file copies. This can be launched in the Consolidation Desktop (`CONSOLIDATION | CONSOLIDATION DESKTOP...`), which is also responsible for consolidating (`FILE | COMPARE FILE COPIES...`).

4.27 Valuation catalogs

The valuation catalogs are located in the area of the administration data of an FME file. The corresponding category in the Data Manager is used for displaying and editing.

When creating new FME files, the corporate standard which is saved in the template document (`Normal.FMT`) is integrated in the FME file. The supplied FMT file contains the valuation catalogs shown in Fig. 4.23.

Standard for FMEA

For every FMEA type which is used, one of the available catalogs can be defined as the default catalog (example: default catalog for design).

¹⁷ See chapter 3.1 Windows registry (page 8)

	Catalogue	!	#	Name	Description
+	Catalogue: AIAG 4th Edition (June 2008) - Design FMEA				
+	Catalogue: AIAG 4th Edition (June 2008) - Process FMEA				
+	Catalogue: AIAG 4th Edition (June 2008) - Product FMEA				
+	Catalogue: Design (34 items)				
+	Catalogue: Process (34 items)				
+	Catalogue: QS-9000 3rd edition (April 2001) - Design-FMEA				
+	Catalogue: QS-9000 3rd edition (April 2001) - Process-FMEA				
+	Catalogue: Standard				
+	Catalogue: VDA				
+	Catalogue: VDA 2. Edition (March 2007) - Process-FMEA [Default catalogue for process]				
+	Catalogue: VDA 2. Edition (March 2007) - Product-FMEA [Default catalogue for design]				

Figure 4.23: Valuation catalogs in *Normal.FMT* on delivery (overview)

If nothing is assigned for a particular FMEA type, then the catalog with the designation “Standard” (default) is used. If there is neither a dedicated assignment nor the standard (default) catalog, then the first entry in the alphabetized list is used.

File size

Each catalog requires a certain amount of memory space, as it contains explanatory text and this text is also translated into different languages. For this reason, all catalogs which are no longer required should be deleted.

Catalogs which are then still present should be copied into the template file (**Tools | Update Template...**).

AIAG 4th edition — VDA 2nd edition

The valuation catalogs found in the current standards of AIAG and VDA are now also available (see Fig. 4.23).

Filtering

In the toolbar of the Data Manager a filter icon can be seen, and there is a combination box in the toolbar called “Catalogs”. Both of these control options allow the visibility of catalogs to be restricted, i. e. only those which are currently relevant can be selected.

4.28 Reorganizing

When working with the IQ-Software, processing speed has a high priority. For this reason, after certain actions like deleting subtrees, the previously occupied space is not always used for new information.

Users enjoy the speed of working, even if the data are very bulky. However, it follows that the resulting size of the FME file is not ideal.

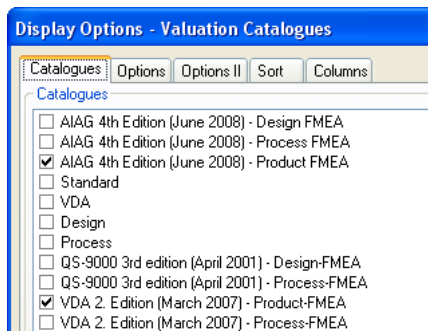


Figure 4.24: *Display options (filter) for selecting visible valuation catalogues in the Data Manager*

860 The Reorganize function (**FILE | REORGANIZE DOCUMENT...**) is provided in order to get rid of information which is no longer visible (and also no longer usable). After reorganization the file size is minimized. If you have worked with the file for a long time without reorganizing, then the FME file will usually become significantly smaller as a result of the reorganization.

865 **Automated reorganization**

If you wish to automate the reorganization then the option **REORGANIZE DOCUMENT ON PROGRAM EXIT** should be activated in the workstation settings. The FME file is then reorganized every time it is closed, although this does mean that it takes longer to save the file.

870 If a user of the IQ-Software requires assistance from APIS Support, then in some cases the information which is no longer visible — but definitely still present and also readable with the corresponding analysis tools — can be very valuable in terms of providing successful support. In these cases you should refrain from automated reorganization from the outset.

875 So far we have talked about getting rid of data which are no longer useable and which may be contained in FME files for unavoidable technical reasons. However, there are other types of information which can be removed through reorganizing (see Fig. 4.25). At present, this is:

- *Zero occurrences*
- 880 • *Version-controlled structures and FMEA forms*

Zero occurrences

If the last occurrence of a typified object is deleted, then an entry is left in the type catalog so that it can be reused again if required. Consequently, there are then entries without occurrences, so-called “zero occurrences”.

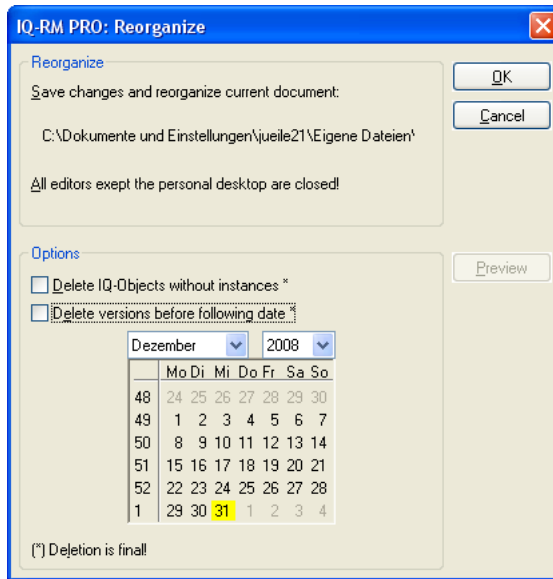


Figure 4.25: *Reorganizing*

885 It is also possible to fill the catalog with a default, so that a large number of zero occurrences exists at the start of the project work. These catalog entries help the user to use standard names.

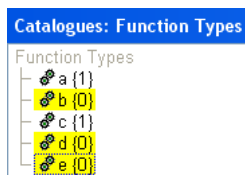


Figure 4.26: *Type catalog – functions with zero occurrences*

When creating an FMEA it is often the case that objects are collected during the course of discussions and then deleted again after all. This temporary information also remains in the database in the form of zero occurrences.

Deleting zero occurrences

As zero occurrences are not used in the project, they can be deleted without any impact on the project, e. g. by running the command **EDIT | DELETE ALL TYPES WITHOUT OCCURRENCES** in the **DATA MANAGER** section **TERMINOLOGY AND TRANSLATION**.

895 With the integration of the reorganization function (see Fig. 4.25) there is a further option for deleting IQ objects which are no longer required.

Deleting structure versions and form versions

In the project management or FMEA forms management there is an option to version-control large parts of a project (structures and/or FMEA forms). The aim of version-control is to be able to access earlier versions of a structure or FMEA form even after work has progressed.

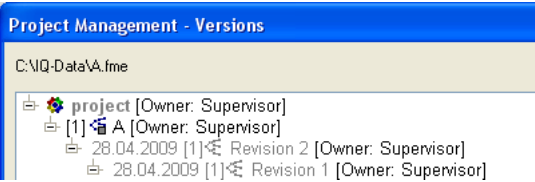


Figure 4.27: Project management – version-controlled structures

At the points in which version control is possible it is also possible to carry out the corresponding deletions.

With the integration into the reorganization function (see Fig. 4.25) there is another option for deleting version-controlled structures and FMEA forms generated before a cut-off date.

4.29 FMEA form with colors

Colors can be used to clearly highlight evaluations and the resulting RPN. If this form of identification is enabled via the display options, then the background color is assigned according to the pre-defined classes (TOOLS | PARAMETERS FOR COLOR CODING).

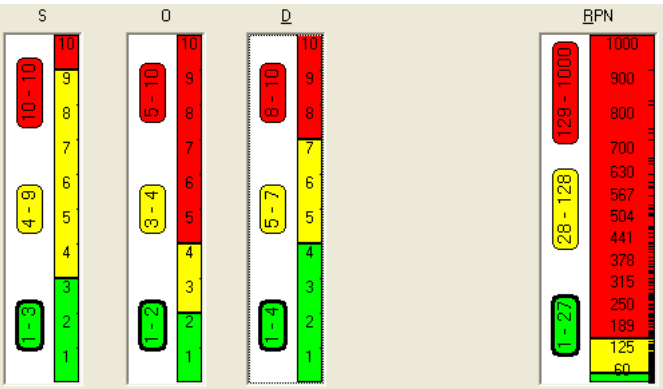


Figure 4.28: Dialog for adjusting the class limits for color coding (S, O, D and RPN)

FMEA Forms Editor VDA 96: Signal cable (complete) (CC 2042 - system [System])									
Effects	S	Failure Modes	Causes	C	Preventive Action	O	Detection Action	D	RPN
System Element: Signal cable (complete)									
Functions: transport signals from receiver to control unit without loss									
drive cannot be controlled at high speed	7	no signal when hot	does not protect the conductor from mechanical and chemical influences		Initial State: 17.01.2006 NONE	7	NONE	10	490
			no / no safe electrical connection between cable und plug		Initial State: 17.01.2006 NONE	5	NONE	10	350
			loss of signal level through the interface between cable and plug		Initial State: 17.01.2006 simulation under known application conditions	3	NONE	9	189
drive control is out of spec	9	signal does not represent the input values correctly	modulation of signal changes during transmission within the given application conditions		Initial State: 17.01.2006 NONE	7	NONE	10	630
					State: 17.01.2006 simulation of transmission (favored concept) under currently known	7		7	(441)

Figure 4.29: FMEA form with color coding for valuation numbers and RPN

4.30 FMEA form with traffic lights

In addition to the numerical values, traffic lights (red, amber, green) can also be displayed in the FMEA form, and this is also possible in conjunction with the background colors.

915 The parameters for color coding are used in this case as well (see Fig. 4.28).

4.31 User-defined views

User views show the contents of a structure in the form of a table (example: see Fig. 4.31). Here, the information is displayed starting from a focus column.

920 It is possible to select further objects and attributes so that they can be displayed in additional columns.

Every compilation of information, i.e. every generated User View, can be saved as a named layout (VIEW | FORMAT | LAYOUT | SAVE CURRENT VIEW...).¹⁸

4.32 Calendar file (ICS file)

925 In order to simplify the process of entering FMEA actions in an electronic calendar, the program uses a standard for exchanging calendar information, the iCalendar standard^{19 20}.

¹⁸ In earlier versions of the IQ-Software this option was restricted to the program flavors APIS IQ-FMEA PRO and APIS IQ-RM PRO.

¹⁹ RFC 2445: Internet Calendaring and Scheduling Core Object Specification (iCalendar)

²⁰ <http://en.wikipedia.org/wiki/ICalendar>

FMEA Forms Editor VDA 96: Signal cable (complete) (CC 2042 - system [System])									
Effects	S	Failure Modes	Causes	C	Preventive Action	O	Detection Action	D	RPN R/
System Element: Signal cable (complete)									
Functions: transport signals from receiver to control unit without loss									
drive cannot be controlled at high speed		no signal when hot	does not protect the conductor from mechanical and chemical influences		Initial State: 17.01.2006 NONE		NONE		
			no / no safe electrical connection between cable und plug		Initial State: 17.01.2006 NONE		NONE		
			loss of signal level through the interface between cable and plug		Initial State: 17.01.2006 simulation under known application conditions		NONE		
drive control is out of spec		signal does not represent the input values correctly	modulation of signal changes during transmission within the given application conditions		Initial State: 17.01.2006 NONE		NONE		
					State: 17.01.2006 simulation of transmission (favored concept) under				

Figure 4.30: FMEA form with traffic lights instead of valuation numbers and RPN

System Element	Characteristics	
Name	Name	Specification
A		
B	m1	= 10 mm
	m2	= 11 mm
C	m3	= 13 mm
	m4	

Figure 4.31: User view – example: System element in focus column with product characteristics and their specification as additional information

ICS file

With the command **NOTIFY PEOPLE RESPONSIBLE (HTML)** ²¹ in the context menu, the IQ-Software generates an e-mail which, as well as the HTML attachment, also has an ICS file as an attached document.

The ICS file contains all relevant information for actions and deadlines and can be imported by standard applications like Mozilla Thunderbird, Lotus Notes, Apples iCal, Groupwise and Microsoft Outlook.

Note: In Microsoft Outlook only the first date is transferred to the calendar after double-clicking on the file attachment of an e-mail. However, if the ICS file is saved and then imported in Microsoft Outlook all of the dates are transferred.

²¹ This is possible in the FMEA form, but also in other editors.

```

BEGIN:VCALENDAR
PRODID:-//APIS//iCal Support//DE
VERSION:2.0
CALSCALE:GREGORIAN
METHOD:PUBLISH
BEGIN:VEVENT
DTSTAMP:20090101T121314Z
DTSTART;VALUE=DATE:20090701
SUMMARY:IQ6-Import: Preventive action 1
UID:93619673581756092
DESCRIPTION: ...
...

```

Figure 4.32: ICS file (excerpt)

4.33 XML validation

If the workstation setting `VALIDATE XML EXPORT FILE` is enabled, then an exported XML file is checked after the export for its validity in relation to a given DTD. The file `msrfmea_2_2_0.ml.dtd` is supplied with version 6 of the APIS IQ-Software.

In the past, this step needed to be performed separately using an external tool if there were any doubts over the validity of the XML file.

The program generates an error message if a fault occurs during validation or if the DTD is missing from the destination directory of the XML export file.

4.34 Registry settings

As was described in chapter 3.1, there are a large number of registry entries with which the behavior of the APIS IQ-Software is configured.

However, a range of settings cannot be made accessible via a user interface, i. e. the normal user interface of the APIS IQ-Software. There are different reasons for this. For example, one aim is to prevent inexperienced users from changing settings with knock-on effects that they might not fully understand.

In all cases, changes must only be made to the registry with the greatest care and diligence. The options covered in this chapter are provided with the proviso that, in the event of a problem, there is no right to have faults rectified, and that these options can be removed again by APIS at any time.

IQ Directories – workgroup directory

`WorkgroupDir=<Path to the workgroup directory> (character string)`

Example:

```

HKEY_CURRENT_USER\Software\APIS\IQ60\IQ-RM PRO\Directories
WorkgroupDir=
C:\Documents and Settings\user1\Own Files\IQ-Workgroup

```

IQ Settings – template file name

TemplateFilename=<Path to the workgroup directory> (character string)

Example:

965 HKEY_CURRENT_USER\Software\APIS\IQ60\IQ-RM PRO\Settings
TemplateFilename=
C:\Documents and Settings\user1\Own files\IQ-Data\normal.fmt

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