Safe machines protect people and the environment, but they also increase operating efficiency and thus the competitiveness of both machine manufacturers and users. In this process, the main focus is on functional safety. The control systems and protective devices must function correctly.

To ensure that machines and plants are as safe as possible, the European Machinery Directive requires a comprehensive analysis of their potential risks. Following this analysis, risks for all operating conditions of the machine must be sufficiently minimized by implementing structural, technical, and organizational measures. Today, the standard-compliant documentation of these technical and organizational measures in the safety certifications is essential. Machine manufacturers that have this documentation achieve CE conformity and greater legal security. The standards specifying the requirements of Machinery Directive 2006/42/EC regarding functional safety are standards EN ISO 13849-1, EN 13849-2, and EN 62061.

Software for standard-compliant machine evaluations

According to the Machinery Directive, risk assessment, engineering drawings, e-plans, and proof that measures for functional safety have been implemented are part of the necessary technical documentation. Using the Safety Evaluation Tool (SET) is an easy way to create safety certifications. The next step after risk assessment and planning the safety project is to specify the technical safety measures. A safety function is defined for every risk factor and assigned either to the Performance Level (PL) or the Safety Integrity Level (SIL). This function is then created with a sensor, logic, and an actuator. For this purpose, the manufacturer of a component supplies the necessary safety-related values, including the PFHD or B10 values. Using the SET, the machine manufacturer can implement the safety-related values in its applications.

Faster and more secure machine evaluation

Machines must meet very high safety standards, and in accordance with current standards, documenting mathematical evaluations is becoming increasingly important in the design of safer machines. The new import function for safety-related values as well as sample libraries in the Safety Evaluation Tool, make creating safety certifications significantly easier.
Advantages of the Safety Evaluation Tool

- Fast, automated import of safety-related values
- Easier, as there are no input errors: values were checked by the manufacturer
- Standardized file format: most equipment manufacturers will use XML
- EPLAN also supports the format for creating construction plans

ADVANTAGES OF THE SAFETY EVALUATION TOOL

in compliance with the standards. In this process, the SET sample library offers valuable support in creating the defined safety functions. The PL or SIL achieved is determined for every safety function and compared to the required PL or SIL from the risk assessment. The users then receive a standard-compliant report, which they can include in the documentation as proof.

Uniform XML data format

Previously, the safety-related values differed in format and scope, depending on the manufacturer or the calculation tool used. There was no uniform data exchange format. The German Engineering Federation (Verband Deutscher Maschinen- und Anlagenbau, VDMA) and several manufacturers have now agreed on an electronic exchange format and outlined it in the VDMA specification 66413 on functional safety – universal data format for safety-related values of components or parts of control systems (German title: “Funktionale Sicherheit – Universelle Datenbasis für sicherheitsbezogene Kennwerte von Komponenten oder Teilen von Steuerungen”). With the new data interface, the documentation process is simplified for users, and, especially in the case of products from different manufacturers, it is faster and more secure. As the first tool of this kind, the SET includes this data interface, thus offering the option to import safety-related values from other manufacturers in XML format according to the applicable specification. The data from the XML files are imported via the menu item “Databases for safety-related values”. This prevents errors due to manual input. It is also possible to download Siemens safety-related values in XML format from the SET website for other tools such as EPLAN Electric P8.

Safety-related values integrated into EPLAN

EPLAN also offers a standardized interface in the latest EPLAN Electric P8 software platform 2.3 to allow users to electronically import the safety-related values of automation components and use them in construction plans. This creates an even broader foundation for the VDMA exchange format. This is a benefit for users, because they no longer need to laboriously compile the safety-related values by hand. In addition, the safety-related values needed to assess the safety of a complete plant are already integrated into the EPLAN project – they are displayed directly on the components in the circuit diagram. Afterward they can be conveniently integrated into the plant documentation – for example, in a parts list. This supplements the machine documentation, which then contains more complete and clear information on the safety technology employed.

INFO AND CONTACT

siemens.com/safety-evaluation-tool
stefanie.wamerdam@siemens.com