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Safety of machinery - Safeguarding authorization system - Basic requirement

机械安全 安全防护授权系统 基本要求

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Safety of machinery - Safeguarding authorization system - Basic requirement

1 Scope

This document specifies the basic requirements for the design, verification and validation, as well as information for use of safeguarding authorization systems (SAS).

This document applies to the design and application of safeguarding authorization systems.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 15706-2012 Safety of machinery - General principles for design - Risk assessment and risk reduction

GB/T 16655-2008 Safety of machinery - Integrated manufacturing systems - Basic requirements

GB/T 16855.1 Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design

GB/T 16855.2 Safety of machinery - Safety-related parts of control systems - Part 2: Validation

GB/T 42598 Safety of machinery - Instruction handbook - General drafting principles

3 Terms, definitions, and abbreviations

3.1 Terms and definitions

For the purpose of this document, the terms and definitions defined in GB/T 15706-2012, GB/T 16655-2008, and the following apply.

3.1.1

safeguarding authorization system; SAS

SRP/CS: Safety related parts of control systems

4 SAS configuration

4.1 General

4.1.1 A SAS consists of an identification element, a SAS human-machine interface, and a controller, as shown in Figure 1.

4.1.2 After the identification element identifies a personnel, the controller completes authentication and allows the personnel to perform operations within his/her authorized scope on the SAS human-machine interface. The SAS implementation plan is shown in Figure 2.

4.2 Identification element

4.2.1 The identification element consists of a personnel identity and an identification device.

4.2.2 The personnel identity may be a biometric identifier (e.g., iris, fingerprint, etc.) and/or an identifier assigned to it (e.g., RFID tags, ID cards, encryption keys, etc.).

4.2.3 The identification device is used to read the personnel identity and transmit the data to the controller.

4.3 Controller

The controller receives the personnel identity data and compares it with the information in the credential database to complete the authentication. The controller receives the

personnel request information and makes an authorization decision based on the information in the credential database.

4.4 SAS human-machine interface

The SAS human-machine interface is used to initiate task requests and display information using visual and/or auditory signals. The SAS human-machine interface may be a keyboard, touch screen, etc.

4.5 Interface between SAS and SRP/CS

The interface between SAS and SRP/CS enables data transmission between SAS and SRP/CS.

5 SAS design

5.1 General requirements

5.1.1 The SAS shall be used in conjunction with safeguards and shall not replace the safeguards.

5.1.2 The integrator shall review the risk assessment documentation for the machine/IMS and consider the task zones and corresponding control spans.

5.1.3 The SAS shall be capable of controlling all modes required to perform tasks in hazard zones, such as adjustment, setting, teaching, and troubleshooting. The functionality of the SAS shall be based on the modes described in 5.1.3, 8.2.2, and 8.4 of GB/T 16655-2008 and 6.2.11.9 of GB/T 15706-2012.

5.1.4 The SAS is an additional layer, of which the function is to provide input to the safety logic system of the SRP/CS and activate the appropriate control or operating mode for the task being performed based on authorization (see Figure A.1 in Annex A). When performing safety functions, the performance level of the SAS shall meet the requirements of GB/T 16855.1.

5.1.5 The SAS may be part of the SRP/CS or a standalone system. An overview of the SAS is shown in Figure 2 or Annex A.

5.1.6 The SAS shall provide the following functions:

a) identify personnel;

b) provide personnel with information and permitted tasks;

c) inform personnel of their authorized tasks;

d) activate the operation or control mode corresponding to the selected task;

5.2.1.2 Personnel identity

It shall select the appropriate personnel identity based on the specific application. For example, fingerprints shall be avoided when gloves are required, and iris scans shall be avoided when a protective mask is required. Biometric identification should be used for personnel identity.

5.2.1.3 Identification device

The identification device shall be able to identify the personnel identity being used and transmit the data to the controller. Identification devices shall be positioned to facilitate personnel task execution and adhere to ergonomic principles.

5.2.2 Controller

5.2.2.1 The controller shall be able to complete authentication based on information from the credential database. Authentication shall be used to record personnel entry and exit from control zones.

5.2.2.2 The controller shall be able to receive task requests from personnel through the SAS human-machine interface and make authorization decisions, enabling personnel to perform safety-related operations, such as mode selection (see Figure A.1).

5.2.3 SAS human-machine interface

The SAS human-machine interface shall exchange information with the controller and indicate authorization results using visual and/or audible signals. The SAS human-machine interface should display the following information:

a) personnel information;

b) tasks that personnel are permitted to perform;

c) selected tasks;

d) control zones that personnel can access, entry paths to the control zones, and, if necessary, exit paths;

e) authorization results for safety-related operation requests;

f) current status of the IMS.

5.2.4 Interface between SAS and SRP/CS

Safety functions that can be activated/deactivated by the SAS should include, but are not limited to:

a) mode selection;

b) restart;

c) reset;

d) release of guard locking devices that lock guards in the closed position (see GB/T 18831).

5.3 Credential database

5.3.1 The credential database (see Figure 2) shall be established or updated in advance based on task requirements and permissions, and provide input information to the controller.

5.3.2 Information output from the credential database should include:

a) tasks that personnel are permitted to perform;

b) modes in which personnel are permitted to operate;

c) combinations of personnel and tasks that are associated with each mode.

5.3.3 The credential database can be part of the SAS, a remote network resource, or a combination of both.

5.3.4 The credential database shall take measures to ensure data security in the credential database.

5.4 Verification and validation

The SAS integrator shall verify according to GB/T 16855.1 and confirm according to GB/T 16855.2 that the SAS meets the requirements of safety functions.

6 Information for use

The information for use shall meet the requirements of GB/T 42598.

The information for use shall include necessary information on authorization procedures.

The information for use shall highlight the risks associated with managing personnel identities (such as ID cards, RFID tags, and encryption keys) and the risks of providing backup copies of personnel identities.

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