T81 - Streamline the Safety System Development Process
Agenda

- Typical Machine Safety Development Process
- Standards Based Process
- Tools to help you through the Safety Lifecycle
- Other Tools
Typical Safety System Development

Machine Review and Hazard ID

Product Selection

Safety System Design

Safety System Installation

Start Production

“Wow, that looks dangerous!”

“I better install a (guard / light curtain / interlock) to keep people safe!”

“Looks good, let’s roll!”
Difficulties with the Typical Approach:

- Greater than 60% of injuries occur outside normal production activities

- Selecting a safeguard that makes it difficult for an operator to perform their job will have one of two outcomes:
  - Productivity will suffer
  - Safeguards will be bypassed

- The typical approach often misses the human interaction with the machine
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Machine Safety Lifecycle

STEP 1
RISK OR HAZARD ASSESSMENT

STEP 2
SAFETY SYSTEM FUNCTIONAL REQUIREMENTS

STEP 3
SAFETY SYSTEM DESIGN & VERIFICATION

STEP 4
SAFETY SYSTEM INSTALLATION & VALIDATION

STEP 5
MAINTAIN & IMPROVE SAFETY SYSTEM
Agenda

Typical Machine Safety Development Process

Standards Based Process

Tools to help you through the Safety Lifecycle

Other Tools
Machine Safety Lifecycle

**STEP 1:** Risk or Hazard Assessment

**STEP 2:** Safety System Functional Requirements

**STEP 3:** Safety System Design & Verification

**STEP 4:** Safety System Installation & Validation

**STEP 5:** Maintain & Improve Safety System

Safety Life Cycle
Safety Lifecycle Toolkit

Getting Started with Safety Lifecycle Toolkit
This wizard will guide you through all of the steps required to design a complete safety system.

Launch RASWin
Begin the safety lifecycle by performing a Risk Assessment and creating a Functional Specification and Verification and Validation Plan in RASWin. Export to Safety Automation Builder for design and product selection.

Launch Safety Automation Builder
Once the Risk Assessment is complete, the safety design can be completed in Safety Automation Builder. Safety Automation Builder can also export back to RASWin or to SISTEMA for Performance Level Calculation.

Launch SISTEMA
To view performance level calculations.

Launch ProposalWorks
Create a Bill of Material (BOM) by importing the Safety Automation Builder project file.

Launch Connected Components Accelerator Toolkit
Use Connected Components Accelerator Toolkit to design a machine including safety components. In the next release, CCAT will be able to export to Safety Automation Builder to complete design.
Machine Functional Safety Concept

Perform Risk Assessment
Identify Safety Functions

Design & Choose Input / Logic / Output for Safety Function

Validation Checklist
Assessment Documentation

RASWIN

Verify Circuit Meets Standard

Safety Automation Builder

Create and Price BOM

Proposal Works

RASWIN

SISTEMA

RASWIN

Risk Assessment Software
RASWin

Safety Automation Builder

Proposal Works

SISTEMA

STEP 1
RISK OR HAZARD ASSESSMENT

STEP 2
SAFETY SYSTEM FUNCTIONAL REQUIREMENTS

STEP 4
SAFETY SYSTEM INSTALLATION & VALIDATION
RASWin

Assessment - Characteristics of the Machine
RASWin

Task / Hazard Identification, Risk Estimation
RASWin

Recommended Safeguards, PLr, Safety Function Identification
Specifying Safety Function - RASWin

- Triggering Event
- Safe State
- Circuit Performance
- Reaction
- Reset Conditions
RASWin

Export to Safety Automation Builder
Safety Automation Builder
Import of RASWin Information
Safety Automation Builder

Libraries and Reuse
SISTEMA
Export from Safety Automation Builder
Proposal Works

Bill of Material based on Safety Automation Builder
RASWin

Import from Safety Automation Builder for Validation
### RASWin

**Validation Checklist and Report**
Safety Functions Library

Safety Functions

The "building block" approach to a pre-engineered safety solution - learn detailed information that outlines the functionality, performance and components that are required.
Safety Functions Library

Generalized Functional Specification - Interlock

Triggering Event

Safe State

Reaction

Safety Functional Requirements
Opening of a guard door will stop and prevent hazardous motion by removal of power to the motor. Upon closing of the door, hazardous motion and power to the motor will not resume until a secondary action (reset button depressed and released) occurs. Pressing the E-Stop button will stop and prevent hazardous motion by removal of power to the motor. The motor coasts to a stop: a Stop Category 0. Upon releasing the E-Stop, hazardous motion and power to the motor will not resume until a secondary action (reset button depressed and released) occurs. Faults at the door interlock switch, wiring terminals or safety controller will be detected before the next safety demand. The safety functions in this example are capable of connecting and interrupting power to motors rated up to 9A, 600VAC.

Both these safety functions will meet the requirements (PLr) Performance Level “e”, for Category 4 (PLe, Cat 4), per ISO 13849-1, and SIL3 per IEC 62061, and control reliable operation per ANSI B11.19.17.

Diagnostic Tests

Circuit Performance

Reset Conditions
Safety Functions Library
Accelerator Toolkits

Safety Accelerator Toolkit

Quick Start
System Layout and Wiring Diagrams
Guard Ig and SmartGuard Modules
Safety Device-Routines
Guard Ig and SmartGuard Faceplate Files
Guard Logic Tools
Pt. Safety Catalog
Safety Application Examples
Support Information
Terms and Conditions

Connected Components Accelerator Toolkit (CCAT)

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Safety Accelerator Toolkit
Connected Components Accelerator
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Is safety only a cost, or can a safety project show a return?

Total First Year Benefits: 299300

Return on Investment: 3.9907
Download pre-engineered safety functions for machinery.

Download here.

http://machinesafetysolutions.com
Come to the Safety booth to see a live demo of these tools!
Thank You!