

Safety Lead Competency Centre

ABB T151 Common Cause Failure and Safe Failures Training Course

The goal of this course is to understand the principles of Common Cause Failures, Safe Failures and related topics, their theory, quantification methods and applications.

Course attendance is open to all interested parties.

Learning objectives

Upon completion of this course, the participants will be able to:

- Explain the relevance of Common Cause Failure and Safe Failures in safety systems
- Understand the characteristics of different safety system operation modes
- Understand the phenomena of common cause failures, its mechanisms and defenses
- Quantify common cause failure rates in safety systems
- Understand what are safe failures and their consequences in safety systems
- Quantify safe failure rates
- Explain the conflict between safety integrity and safe failures performance

Main Topics

- Basic system reliability concepts
- Failure modes
- Safety systems operation modes
- Common Cause Failure concepts and applications
- Quantification of CCF by β -factor and PDS methods
- Estimation of the β -factor by the method of IEC 61508-6
- Safe failures concepts and applications
- Types of redundancy in safety systems
- The conflict between PFD and STR in safety systems
- Types of redundancy
- Management of PFD vs STR through MooN voting

Participant profile

This training is targeted to control and systems engineers, instrumentation and application engineers, especially to those involved in executing safety system application projects.



Agenda

Day 1	Day 2
Introduction <ul style="list-style-type: none"> - Basic concepts - Failure rate - Reliability measures - System reliability - Failure modes - Operation modes 	Safe failures quantification <ul style="list-style-type: none"> - Safe failures quantification - Spurious trip rate <ul style="list-style-type: none"> - Equations - Fault trees
Common Cause Failure <ul style="list-style-type: none"> - Concept of Common Cause Failure - CCF analysis - Sources of coupling Defensive measures against CCF - Common cause failure modeling & quantification <ul style="list-style-type: none"> - Beta factor method - PDS Method - IEC 61508-6 Method - Reliability block diagrams and fault trees - Simplified equations 	Redundancy <ul style="list-style-type: none"> - Types of redundancy - Diverse redundancy - Static & dynamic redundancy - Parallel and voting redundancy - Conflict PFD vs STR - Software redundancy - Measures against CCF in the 800xA HI system
Safe failures quantification <ul style="list-style-type: none"> - Concept of safe failures - Impact on safety - Spurious activations - Causes of safe failures 	

How to order

Please contact any of the ABB colleagues listed below for either attendance at any Open course being planned in your region or if you would like to run a training course specific to your organisation.

On completion of discussions, a fixed price training proposal will be issued to you for your approval to proceed and the training delivered in your choice of course language

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