



Building a Better Interlock - BBB (Borrow)

Guidelines for Safe and Reliable Instrumented Protective Systems by CCPS

Reviewed by Nick Sands

In 1985 the American Institute of Chemical Engineers (AIChE) formed the Center for Chemical Process Safety (CCPS) in response to industry demand following the Bhopal incident. CCPS has developed guidelines in a wide range of process safety topics. One of the new CCPS books is *Guidelines for Safe and Reliable Instrumented Protective Systems* which covers the management of systems to protect business needs as well as safety systems. Dr. Angela Summers, the primary author, is CEO and founder of SIS-TECH Solutions, author of over 50 papers on safety instrumented systems, and a member of the SP84 and IEC61511 committees. Summers, a PE in Texas, has a Ph.D. in Chemical Engineering from the University of Alabama and received the 2005 Sperry Founders award from ISA for her work with safety instrumented systems.

The introductory chapters highlight the standards and practices for safety instrumented systems (SIS), including ISA 84 and previous books from CCPS. Emphasis is put on the management systems needed to maintain the reliability and integrity of the instrumented protective systems (IPS). An overview of the IPS lifecycle previews the contents of the remaining chapters.

A key early step in the lifecycle is the risk assessment. This is when hazards are identified along with the consequences, and the frequency of the initiating events. Layers of protection are assigned until the risk is mitigated to an acceptable level. Depending on the consequence and the risk, the protective functions are classified, which determines how they are managed throughout the lifecycle.

Once the protection requirements are determined, the process requirements, including operability and maintainability needs, and I&E requirements, including the instrumentation and controls, are determined and verified to provide the required protection. Safe states, actions, process safety times and reliability requirements are common design specifications. Good engineering practices, testing methods, and maintenance philosophies are inputs to design.

The engineering, installation, commissioning, and validation phase of the lifecycle usually requires the most time and people, and is usually the most time critical. Activities include the detail design of hardware and software, including the operator interface, as well as field installation and validation testing. A factory acceptance test (FAT), is highly recommended prior to a site acceptance test (SAT).

Once the IPS is put into operation, its performance is dependent on the management practices for controlling bypasses, investigating failures and demands, and managing changes. Maintenance and test procedures are a critical task. Finally, improvements should be made based on test and demand data.

Summers and the CCPS committee have tried to address a real need by extending the principles of safety system design to functions for reliability and business loss protection. The style, perhaps a result of committee writing, is general and repetitive. Still, *Guidelines for Safe and Reliable Instrumented Protective Systems* is well worth reading. At \$125, from Amazon.com, it may be a good book to borrow (BBB).