Measuring the Reliability of Safety Controls, Alarms, and Interlocks

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The risk analysis assumes a level of risk reduction provided by each of the safeguards, including safety controls, alarms, and interlocks (SCAI). After installation, SCAI equipment must be proven to meet the assumptions through examination of maintenance records. As SCAI equipment ages, failures can begin to occur more frequently where few have occurred before. Some equipment may need replacement just to sustain the risk reduction. An instrument reliability program is necessary to:

- Provide feedback to validate risk analysis assumptions
- Identify and eliminate systematic failures
- Provide prior use information for determining fit for purpose
- Support selection of SCAI equipment
- Ensure that poor performing equipment is identified and actions are taken to correct deficiencies

In order for the risk analysis to not be overly optimistic or pessimistic, the data assumptions need to agree with the actual capability of the installed systems. This paper covers the essential elements of an instrument reliability program that can be applied to both process control and SCAI equipment. It will discuss the critical activities needed to identify and track failures, so negative trends in performance can be responded to prior to a loss event occurrence. A successful instrument reliability program has a culture of continuous improvement that emphasizes the importance of taking proactive measures to reduce dangerous and spurious failures.

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