Control Systems
The Distinguishing Factors between Common Cause and Systematic Failures

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Abstract

Quantification of common cause is an integral part of the safety integrity level (SIL) Verification process for a safety instrumented function (SIF). There is a general recognition that its value can dominate the failure modes leading to it being the major contributor to overall probability of failure on demand (PFD) of a system. Many models have been developed in attempts to simplify and standardize this quantification. There is a perception that systematic failure has a somewhat limited impact on the overall integrity level. However, the author will demonstrate that this term can easily dominate the system failure rate and overall PFD. Exploring these two safety lifecycle issues in parallel, common cause and systematic failure, requires a precise distinction between the two. This paper explores the two concepts as they relate to the entire ANSI/ISA 84.00.01 safety lifecycle and to each other.