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SIL Analysis for Manufacturers of SIF Components

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Abstract:

Safety systems comprising of electric, electronic, and/or programmable components have been used in various industries over the years. A typical safety instrumented function (SIF) consists of a sensor to detect a process upset, a logic solver to compute the required action, and a final element to affect a change in the system to bring it back to safe state. IEC 61508, “Functional safety of electrical/electronic/programmable electronic safety related systems”, was first released in 1998 and provides a robust framework for the development and implementation of such functional safety systems.

Since the integrity of the overall safety instrumented system (SIS) is dependent on the integrity of the components that comprise it, manufacturers of these components have a critical role to play in the functional safety lifecycle of a SIF. Increased focus on safety and reliability has led a lot of end-users to request functional safety analyses, so many manufacturers of sensors, logic solvers, and final elements for safety systems are now being asked by their customers to provide components suitable for safety integrity level (SIL) systems, along with the necessary documentation to prove their components’ reliability. To meet the technical requirements set by their customers, many manufacturers choose to rely on third party functional safety experts to provide SIL analysis and certification services.

This presentation discusses the benefits and drawbacks of certifying components with respect to SIL, and also some common challenges that manufacturers face in meeting the requirements set by IEC 61508. The presentation also provides recommendations for manufacturers seeking to perform a SIL analysis and/or certification for their products. Finally, it presents the overall utility of a functional safety analysis, which goes beyond meeting SIL requirements. A robust SIL analysis can help manufacturers analyze their product design and manufacturing processes from a reliability perspective, help limit failures in the field, and facilitate better understanding of the overall safety system.