Combining field failure data with new instrument design margins to predict failure rates for SIS Verification

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Abstract

Performance based functional safety standards like IEC 61511 offer many advantages including the opportunity to optimize and upgrade Safety Instrumented System (SIS) designs. But performance calculation depends upon realistic failure data for instruments used. A predictive analysis technique called Failure Modes Effects and Diagnostic Analysis (FMEDA) has been developed along with a component failure rate database that can predict failure rates of instruments based on their design strength and the expected stress environment. This method has been calibrated with billions of unit operating hours of field failure data over the last 15 years.