

SOLUTION NOTE

Safety Instrumented Systems - Health Monitoring



The Safety Instrumented Systems-Health Monitoring™ solution optimizes the maintenance and testing of process safety instrumentation, resulting in improved availability and reduced process interruptions.

Building upon many years of experience with safety instrumented systems (SIS), Honeywell and process industry experts have joined together to develop the Safety Instrumented Systems-Health Monitoring (SIS-HM) solution to effectively manage safety instrumented systems.

The unique SIS-Health Monitoring solution is a set of tools and services that enable industry practitioners to measure the status and health of their safety instruments, analyze their reliability and safety integrity, optimize test intervals, and reduce spurious process trips. In addition, the SIS-Health Monitoring solution enables the detection of unexpected trends, the maintenance of test frequencies, and the benchmarking of SIS device quality and reliability. In summary, SIS-HM helps manage safety instrumented systems to reduce unnecessary over-engineering and minimize unnecessary spurious trips.

Experience has continuously shown that a poorly maintained safety instrumented system, or a system with insufficient safety integrity, can be costly. Minimizing spurious trips can significantly increase process availability. In addition, a savings of as much as 20-30% of the installation and operating costs for a typical safety instrumented system can be realized with the work practice improvements enabled by Honeywell's SIS-Health Monitoring.

By optimizing SIS lifecycle performance, process safety and availability, Honeywell improves your peace of mind:

- **Reduce process interrupts and production upsets to increase process uptime**
- **Maximize effective and efficient utilization of safety assets while improving SIS integrity and availability**
- **Decrease testing and maintenance**
- **Provide seamless integration into work process**
- **Empower operators with actionable reliability and safety knowledge**
- **Rely on conventional as well as state-of-the-art safety instrumentation**

A Modular Approach to Monitoring SIS-Health

The SIS-Health Monitoring solution consists of a modular toolset easily customized to the plant's specific requirements, the specific plant conditions and process demands. The toolset is intuitive and is designed to integrate seamlessly into existing work processes. The toolset was co-developed with industry professionals in the maintenance, instrumentation, and test engineering fields – the net result is a set of tools specifically designed to meet the needs of safety professionals.

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The toolset consists of five modules, each capable of operating stand-alone or together as a set of integrated modules. The toolset includes the SIS-HM local reliability database, the global reliability database, the PFD-SIL analysis toolset, automatic interface modules with field equipment and the hazard and risk assessment or SIL classification utility. The toolset is generic and can be universally used for any type or brand of conventional or state-of-the-art safety instrumentation – making benchmarking available regardless of what hardware may be used.

The SIS-Health Monitoring Modules

The **SIS-HM Local Reliability Database** can store and handle all inventory information regarding the site's safety instrumentation efficiently, flexibly, and in a structured manner. In addition, health and failure events, like tests, trips, demands, can be inputted and managed. Based upon the failure behavior of the site's instrumentation, reliability and safety performance characteristics are determined, such as bad actors, trends, demand rates, and application-specific, time-dependent failure rates, for the site's safety instrumentation.

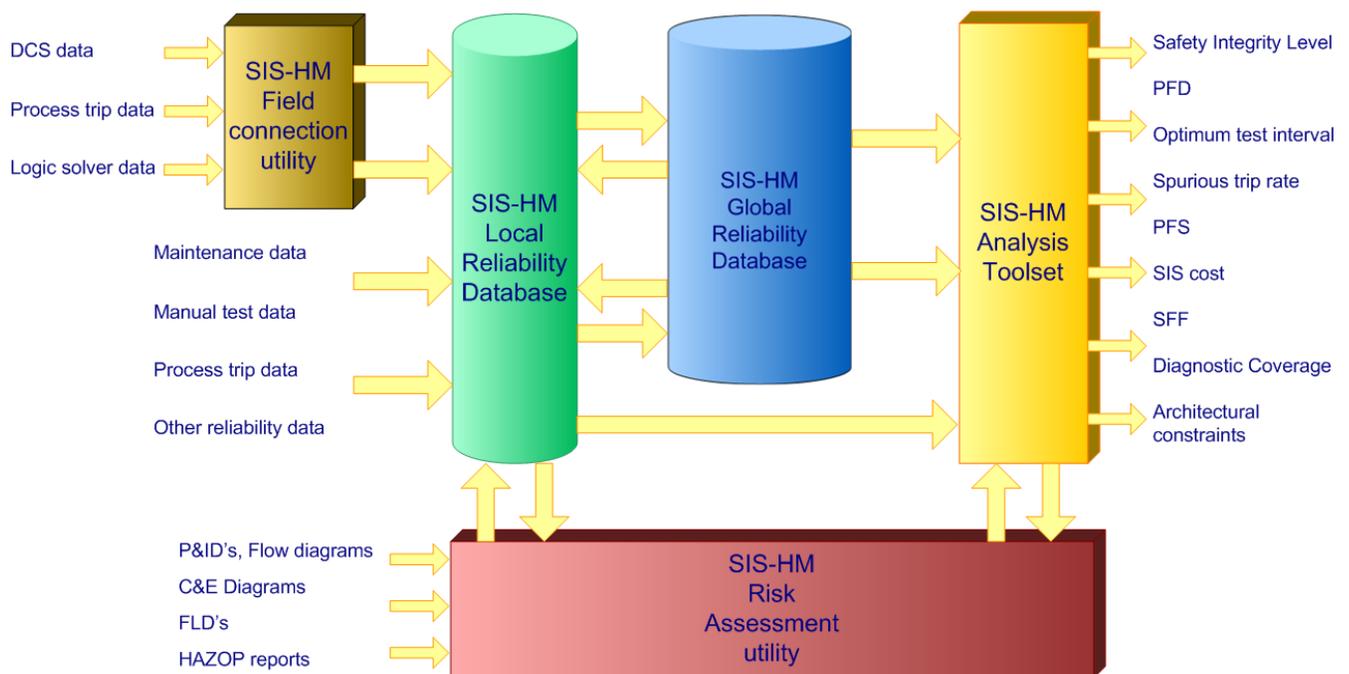
The **SIS-HM Global Reliability Database** lets a company use this global database in addition to the local databases on several sites. This company-wide database provides the facility to store, handle, and process data from multiple local databases. This enables expanded data collection, data sharing, and improved data processing to facilitate benchmarking between sites and between manufacturers.

Users from local and global facilities can obtain data needed for purchasing and for best-practice decision-making. It also provides company-wide reliability data on instrumentation.

The **SIS-HM Analysis Toolset** enables valid and traceable analysis, validation, and optimization of the reliability and SIL behaviour of a Safety Instrumented Function (SIF) for complex configurations with dependent SIFs. Maintenance and test policies can be optimized, for example, by extending the test intervals and reducing spurious trips, saving time and costs. Data used for the analysis can be retrieved from the local database, the global database, or through user entry based on third-party sources.

The **SIS-HM Field Connection** utility facilitates connecting multiple data collectors and generators to the local database through automatic interface modules, like intelligent instrumentation (e.g. smart transmitters, such as HART, partial valve stroke testing solutions), CMMS, or asset management tools. Using real-time field data for on-line actual data collection realises improved data gathering and entry, utilization of previously unused data sources and on-line data collectors.

The **SIS-HM Risk Assessment** utility provides risk assessment, based on probability and consequence analysis, to obtain a SIS and SIF specification and Safety Integrity Level classification.



Safety Instrumented Systems-Health Monitoring: “The Complete Picture”

An Urgent Need for SIS-Health Monitoring

During the last decades, the process industries have made tremendous investments to protect people, the environment and their process equipment. In many cases this has required implementing systems for safeguarding and protecting life, process, and equipment. These systems require careful maintenance and testing to ensure the expected level of safety is realized and maintained, while at the same time preventing over-engineering that might lead to spurious process trips.

Managing SIS health yields tremendous business results.

Current studies show illustrative results:

- 60-75% of SIFs are over-engineered
- 5 – 10 % of SIFs are under-engineered
- Site savings can total more than \$1M per year by properly engineering SIFs

Poor testing is blamed as a primary cause for spurious trips. This unscheduled downtime can result in:

- In North America, loss is estimated at \$20 billion, or almost 5% of total production/year
- Largest single factor eroding plant performance

Lost performance can result in:

- 3-15% lost to asset unavailability and incidents
- 20% of incidents are caused by maintenance and testing errors
- 15% of SIS expenses consider maintenance

Similarly, in an effort to eliminate the hazards and risks in a typical plant, the safeguarding system may be over-designed with unneeded redundancy, excessive maintenance and testing frequencies and unnecessary process shutdowns.

Proper design begins with proper measurement. Dedicated reliability assessment, optimal testing, and design optimization can only be achieved by adequately

measuring the actual reliability performance and health status of the safeguarding equipment. A major weakness of today's industrial safety and reliability assessments is that no representative or accurate failure rate data is available. As a result, engineering must rely on fixed values obtained from relatively conservative and often misapplied handbooks. Unfortunately, this leads to work practices that are often over-designed and too frequent.

In order to optimize the design and operation of safety instrumented systems, the process industry has an urgent need: adequate application-specific health monitoring facility with the capability to measure the actual SIS health status and reliability. With this, maintenance and testing staff can avoid unnecessary time spent in the field and in the hazardous areas, operational and maintenance costs, are reduced with less time being spent on maintenance of these systems, and spurious process trips can be minimized. In addition, with tools specifically focused on the safety instrumented system and measuring its health status and reliability, trends in quality like aging or wear out problems, can be easily exposed and managed quickly.

Since the publication of international standards like IEC 61508 and IEC 61511 on SIS functional safety, many companies are forced to classify their risks and validate their safety equipment. Many tools and methodologies are available for the industry to perform risk assessments and reliability validations. Unfortunately, these existing tools do not have the capability to automatically measure the actual performance of the SIS and subsequently optimize test frequencies and system designs.

Unique Honeywell SIS Asset Effectiveness Principles

Open-with Freedom of Choice

Supports multiple protocols, multiple suppliers.

Software- enabled

Does not force the end-user to buy new hardware to obtain the value of monitoring the SIS health.

Process-centric

Focussed on the safety instrumented function and its effect on the process – not only focussed on the individual devices.

Partner with Honeywell

Honeywell Process Solutions has a long and reliable reputation delivering plant and process automation, control and safeguarding. The Honeywell product portfolio, including FSC™ and Safety Manager™, collects and integrates information across the entire manufacturing facility, getting the right information to the right people when needed, improving decision making and production uptime.

In order to realize maximum production in combination with optimal safety of people and environment protection,

Honeywell places priority on helping customers not only to implement automation and safeguarding systems, but also offers services and expertise to assess hazards and risks, define safety requirements and deliver tools to measure, analyze and optimize these systems. As a result, Honeywell is a qualified and dedicated partner for sound safety solutions in all phases of the lifecycle – from the definition and conceptual design phase, throughout implementation, and during plant operation and automation.

For More Information

Learn more about Honeywell's Safety Instrumented Systems-Health Monitoring and its benefits.

Visit our website, www.honeywell.com/ps, or contact your Honeywell account manager.

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