ABB Ability™ SafetyInsight™

Enhance process safety management by digitalizing the process safety lifecycle

Companies in high-hazard industries must ensure safe and efficient operations to protect employees, local communities, the environment and financial performance.

Achieving this is essential for companies to maintain their license to operate; however, this comes at a cost.

Digitalization provides the opportunity to improve how companies can manage process safety effectively and optimize the cost of safety.

Process facilities are facing elevated challenges for process safety incidents

Aging infrastructure and workforce, rapidly evolving technology and sustained low oil prices have led to an increase in major incidents

Between 2018 and 2019, more safety incidents appeared in the top 20 largest losses list than any other two-year period in 30 years. Property damage losses during this period totaled **US $4.5 billion.***

Managing risks, managing costs
Delivering effective process safety management is critical for any company operating in the hazardous process sector. However, companies must strike the right balance to ensure process safety risks are appropriately managed in conjunction with other business priorities.

High-hazard process industries face a number of unique challenges:

Enhance Safety

Minimize safety risks and incidents by providing a safe working environment while optimizing costs

Minimize Environmental Impact

Reduce the number of (and severity of) incidents that have a negative impact on the environment

Protect Reputation

Maintain brand value among customers, regulators, employees and society

Drive Overall Equipment Effectiveness

Maximize productivity while optimizing total maintenance cost

Management of Change

Ensure the risks associated with changes to organization, operational and technical barriers are effectively managed

Maintain Compliance

Meet increasingly stringent local, regional and international process safety management regulations (e.g. COMAH, Seveso III, OSHA1910, IEC61511 Ed2.0 and IEC62682)

* From Marsh report "The 100 Largest Losses in the Hydrocarbon Industry"

Introducing ABB Ability™ SafetyInsight™

Because the future of process safety management is digital

Process safety management begins with three key questions:

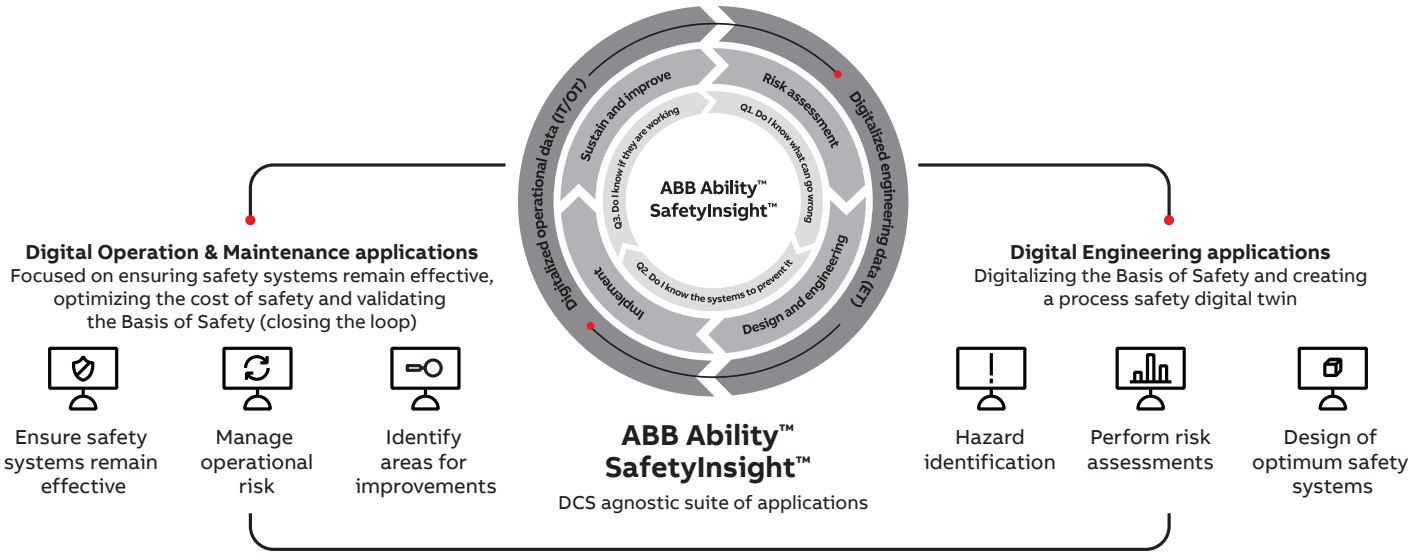
1. **Do I know what can go wrong?**
2. **Do I know the systems to prevent it?**
3. **Do I know if they are working?**

Digitalization provides answers to these questions and enables management of process safety risks throughout the lifecycle.

ABB Ability™ SafetyInsight™ is a digital approach to process safety management for high-hazard process industries. It digitalizes early Engineering Technology (ET) data to create the process safety digital twin, to which actual plant operations can be compared.

Operation and Maintenance data from IT and OT systems is captured through agnostic connectivity. The ET data then gives the necessary context to the IT/OT data, utilizing the process safety digital twin, providing the right information, to the right person, at the right time, to make the right, informed decision.

ABB SafetyInsight's unique approach of combining IT/OT/ET data enables the engineering data to be available in the operational phase, so that actual operating data can be captured and compared to engineering assumptions (closing the loop). Timely adjustments can then be made to improve safety, increase productivity and reduce maintenance costs.



Process safety management. Transformed.
The digital approach to managing operational risk and achieving safe and sustainable operations

Engineering Applications

- Efficient, intuitive recording and change management of hazard identification, risk assessments and optimum development of SIF[1] designs
- Providing a digital record of the basis of safety (the process safety digital twin) and the answers to the first two key process safety questions

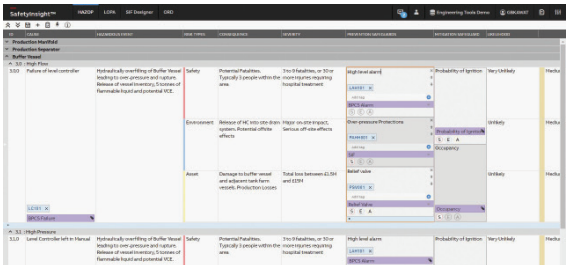
HAZOP[2] and LOPA[3] Modules (Risk Assessment)

Minimize engineering effort when transitioning between lifecycle phases (Hazard Identification - HAZID and HAZOP, LOPA, SRS, SIF Design).

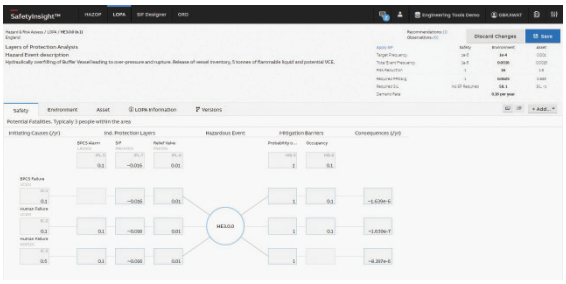
Provide Major Accident Hazard (MAH) lifecycle management with an MoC[4] audit trail and action tracking that allows for each MAH to be managed throughout the safety lifecycle.

Provide a digital record that enables this valuable data to be made available to the operation and maintenance teams for decision support.

Ensure compliance with IEC 61508 (Ed. 2.0) and IEC 61511 (Ed. 2.0) for the hazard and risk assessment phases.



HAZOP: Supports various Hazard Identification processes such as HAZID, HAZOP and Process Hazard Reviews (PHR)



Simplified bow-tie views enables full engagement of the LOPA study teams

SIF Designer Module

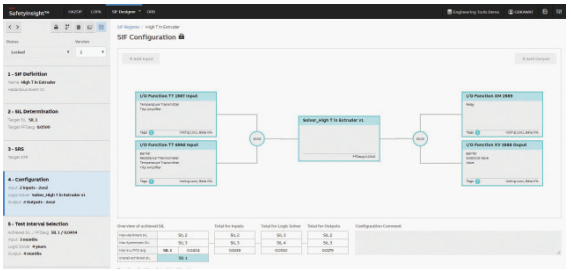
Develop safe and optimum SIF designs

Reduce operational risk by helping avoid the development of under-engineered SIFs, which result in higher operational risk.

Minimize engineering effort with an efficient, intuitive and structured approach to documenting each SIF.

Increase efficiency by leveraging a digital platform that provides connectivity and reduces effort required to gather actual SIF performance data.

Manage SIF lifecycle with an audit trail that allows for SIFs to be managed throughout safety lifecycle.



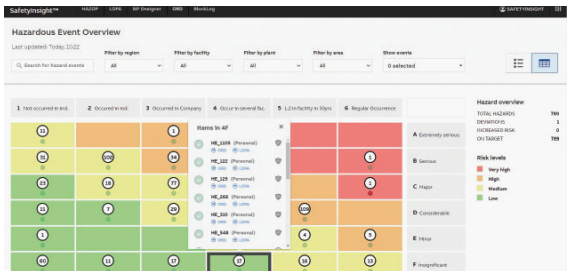
Develop safe and optimum SIF designs

[1] Safety Instrumented Functions
[2] Hazard and Operability
[3] Layer of Protection Analysis
[4] Management of Change

Operation and Maintenance Applications

Optimizing maintenance and minimizing production downtime, help validate the basis of safety (close the loop) and answer the third key process safety question.

Operational Risk Dashboard: Avoid operating at increased risk of major process safety incidents or unplanned shutdowns. The dashboard aids decision support for Operational and Maintenance teams by presenting relevant data from the engineering applications in simple risk matrix and bow-tie diagram views. Option to add “real-time” IT/OT data to create a dynamic risk matrix showing the accumulative effect of multiple degraded barriers/ protection layers.



Sustain safe and reliable operations

Bypass Management: Supports the management of bypasses and other barriers/protection layers which are to be taken out of service, by automatically generating current and historical bypass events. Includes bypass approval, permitted durations, and associated risk levels.

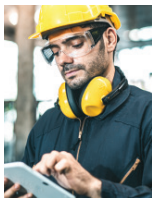
Automatic Shutdown Report: Enables a quicker start-up following an unplanned shutdown and helps to identify failures, by automatically generating a report at a shutdown level and/or for each SIF. The report identifies the trigger of the shutdown and if all actions were performed successfully.

Valve Verification: Supports deferral of maintenance associated with safety system valves, through the tracking and trending of all valve movements. Pre-alerts indicate when valves are starting to change behavior. Options include a Pressure Blowdown Report that provides the pressure blowdown profile for each blowdown valve, and a Valve Leakage Report which utilizes pressure and temperature measurements to advise if the valve leakage requirement is being met without needing to remove the valve.

SIF Performance: Enables actual performance data to be captured and compared to the design assumptions as required by IEC61511 Ed 2.0. Collects instrument reliability data per equipment group, identifying any bad actors and provides an updated PFDavg for each SIF. Also collects actual demand data for comparison to design, enabling improvements to be identified and made.

Many efficiency opportunities

ABB Ability™ SafetyInsight™ integrates individual modules to form a comprehensive, digital suite of applications. Find efficiencies by developing an optimum basis of safety, ensuring operational risks are managed, identifying opportunities for improvement and optimizing the overall cost of safety.



Bob, Site Safety Engineer

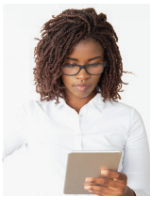
Reduce shutdown time and production losses

Before ABB

"During unplanned shutdowns, I must review large volumes of alarm and events lists to identify the cause. This is stressful because production is waiting for me to give the green light. And I may not identify if a failure occurred."

With ABB Ability™ SafetyInsight™

"I instantaneously review an Automatic Shutdown Report. It gives me the answers I need to make confident decisions quickly. And it provides me with the assurance that any faults will be identified."



Sue, VP of Enterprise Operations

Assess safety risks across one site or a fleet of facilities

Before ABB

"Weekly KPI reports from each site consistently tell me that all operations are operating safely, but I know from my team that we continue to have process safety near misses."

With ABB Ability™ SafetyInsight™

"I now have an Operational Risk Dashboard that gives me an enterprise view of process safety hazards, in near real time, enabling me to answer the three key process safety questions.

The dashboard shows the cumulative impact of operation and maintenance activities, in context, against each process safety hazard, represented on a dynamic risk matrix view."

Rashid, Site Maintenance Planner

Optimize maintenance, minimize production interruption and demonstrate compliance

Before ABB

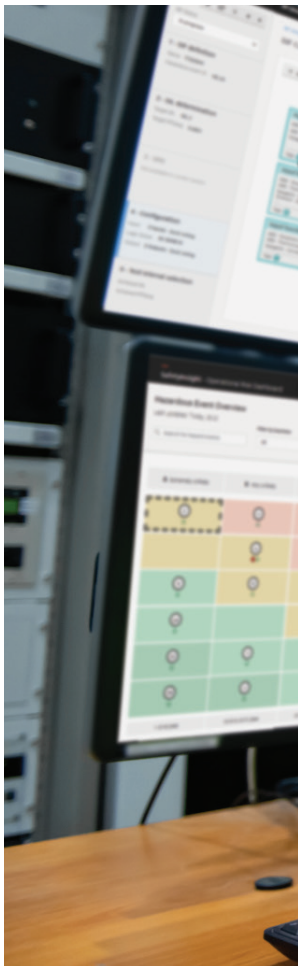
"My frequent proof tests interrupt production and disrupt the team. I lack the time to find, extract, and correlate maintenance data to justify reducing testing, or identify any bad actors."

With ABB Ability™ SafetyInsight™

"I automatically collate operational and maintenance data from all our safety systems, providing evidence to justify extending maintenance intervals while demonstrating compliance with safety standards.

I've reduced testing on safety system valves by **30%** and reduced annual tests **from 1,800 to 400 tests**, saving more than **$1 million**, while reducing production downtime."

Both Greenfield and Brownfield applications



Creates an editable, MoC-enabled, digital record of your company's basis of safety.

In greenfield projects, get the benefit of reduced engineering and improved quality when transitioning between lifecycle phases (HAZID, HAZOP, LOPA, SRS, SIF Design), as well as an improved project delivery to the end-user.

For brownfield projects, unlock the value of your under-utilized basis of safety documents (e.g. HAZOP and LOPA report), using low-cost migration tools that form the first easy step on your company's process safety digital journey.

Why ABB

Holistic support: ABB provides process safety services, SIL3-capable safety systems and digital safety applications to support the whole lifecycle

Deep energy expertise: Proven expertise with more than 30 years of experience in process safety

Flexible solution: ABB offers a scalable, holistic solution with multiple entry points for both greenfield and brownfield applications

Why ABB

Operational approach: Deep domain safety knowledge based on the operational heritage from ICI - the founder of the HAZOP methodology

Digitalize existing assessments: Tools and services to unlock the value of existing safety reports to aid decision support

Superior process safety experience: More TÜV-certified safety execution centers than any other supplier

ABB Energy Industries
Operating in more than 100 countries.

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