Future-Proofing Process Hazard Analysis

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There are risks in every organization, some large and some small. For decades, most Process Safety Management-based companies have focused on lagging indicators to assess risks. But as the old cliché says, "You don't know what you don't know." And having too many tools that cause hazardous scenarios to be generated in a formulaic, cookie-cutter manner can result in resources being focused in the wrong areas.

Aligning policies, procedures and objectives while at the same time supporting continuous improvement initiatives is a challenging endeavor. However, industry is moving toward improved approaches guided by metrics and detailed analysis of systems to identify which are most in need of improvement.

What We've Learned About Process Safety Over the Years

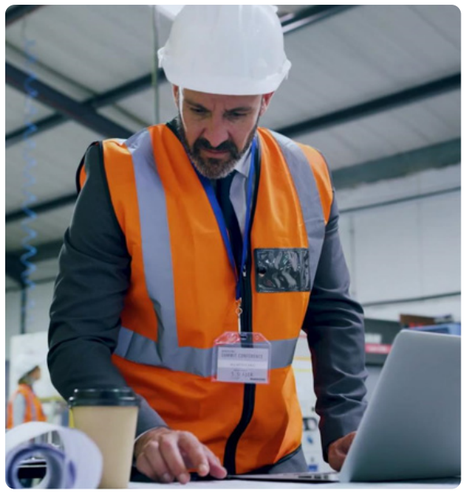
The progression of Process Safety progression—the evaluation of keeping people and processes safe—has been going on for about 40 years.

In the '80s, industry began monitoring, developing and adhering to what it believed were best practices for safe operation of its facilities. There were standards related to process design and a few tools available to help with the identification and management of risks.

In the '90s, regulations began to appear in many regions around the world. In the United States, the Occupational Safety and Health Administration PSM regulation and the Environmental Protection Agency's Clean Air Act came into force. In Europe, Seveso regulations were brought into effect, and in the United Kingdom the Control of Major Accident Hazards (COMAH) and Control of Substances Hazardous to Health (COSHH) were introduced. Things started to shift from just doing what everybody thought was best to people starting to follow a common set of guidelines to help identify and manage safety hazards in a more consistent and defined manner.

In the 2000s, risk assessments emerged to support PSM. Industry had a better understanding of regulations, it had new tools to assist as well as best practices and research from industry associations and academia. Industry's approach evolved from simple compliance to leveraging PSM efforts to meet safety and business objectives. The concept of performance metrics became more prominent. People were getting a handle on their risk identification and their hazard management activities. They began conducting more thorough hazard and operability (HAZOP), layers of protection (LOPA) and what-if studies. Broader management systems were available, and experts began to deploy systems designed to collect data and metrics for performance visibility and improved decision-making.

Understanding Today's Performance



This gets us to where we are today. The journey has taken us from the initial points where everybody was simply trying to comply with regulations and do what they needed to do to avoid getting into any trouble to becoming performance-driven organizations.

All organizations, no matter how large or small, have a vested interest in understanding safety performance. Operators need supporting information and benefit from both an audit and assessment process. The audit informs the organization as to if it is consistently following key processes. The assessment informs of the quality of the actions performed at each step of the process, and it identifies whether there is room to do things in a more effective manner.

With audit- and assessment-related metrics available to understand performance and improved decision-making, big data is a cautionary tale in the process safety discipline. While the wealth of data coming from incident and near-miss reports in PSM systems can help inform processes, organizations are dependent on people to provide critical information based on their expertise. This is the conundrum industry finds itself today. People need guidance to deliver consistent, quality, experienced process safety insight to support risk identification and management.

1. Consistency Is Key

While consistency improves the ability to compare data and benchmark performance, the burden of consistency is placed squarely on the people required to audit and assess risk by sharing their expertise and operational knowledge. This is a big challenge.

It is possible to have two identical plants located in two completely different parts of the world with two regulatory regimes, operational skill sets and operational realities running differently but producing the same results.

Furthermore, support operations can vary widely. An example is the comparison between pneumatic, hydraulic and electronic controls across the organization. There will be a material difference in operating philosophies that are manual in nature or automated approaches where systems control processes.
Finally, if one facility is looking at injuries, fatalities and environmental issues and another is focused on cost considerations, they are not assessing for the same types of problems.

To ensure that critical, performance-related information does not go missing or become unusable, the organization must incorporate measures to support consistency. Of course, organizations must be careful not to implement hard and fast rules that compromise the ability for critical information to get placed into the system. Consistency is required is to support the categorization and classification of preventive and mitigating measures and risk ranking. For example, there should be some consistent understanding of what a "Level 2" risk means across the organization. Having a common, well-understood measurement approach, even if it's used differently in different places, helps map things out for simpler analysis down the road. This helps companies plan resource management, identify risks and understand safety system performance.

2. Quality Storytelling Is More Important

As organizations build management systems of the future—regardless of what standard or regulation they follow—they must deliver audits and assessments in a structured, ordered manner. This does not mean that organizations must do everything the same way; global assets can maintain their best practice to support regional regulations as long as they are sharing information in the same order and understanding the insights in the same way. This level of quality improves risk awareness and the ability to identify process gaps.

3. Tacit, Operational Knowledge Is the Icing on the Cake

Having a great process for identifying hazards doesn't always go hand in hand with capturing what personnel have experienced in the years they have spent operating and maintaining facilities. Without this valuable input, there could be a consistent process and a qualitative way to capture information, but the quality of data within the management system might not be the best.

In many cases, subtle differences in the types of controls can result in differences in big consequences. Having tools to help experts share root causes or possible consequences are only helpful if they are built with flexibility.

Process Safety Analysis of the Future

Companies need consistent, quality data driven by experienced people to understand and manage risk and improve overall safety performance and Operational Excellence. Companies need to help their employees understand situations, even out-of-the-ordinary ones, by compiling the information that comes from the experience of the employees. Storing that information in an electronic library on a single platform can help organizations build databases of information that can be shared across the organization.

With all of this information at employees' fingertips, PSM organizations of the future can start to move from lagging metrics to leading indicators with predictive measures to show where the problems in the organization could be rather than focusing on events or near-misses that already took place. Soon enough, organizations will be leveraging heat maps from Integrated Risk Management 4.0 software solutions to help make the right decisions when it matters most.

While it's impossible to prevent an incident or near-miss that previously occurred, IRM 4.0 technology is stepping up to help companies predict where risks could occur and prescribe safety measures to ensure the safety of people, assets and processes to enable continuous improvement in the organization's PSM.

John Crosman has been a process safety consultant with Sphera for more than a dozen years, and has led the team of process safety consultants for about 10 years. An accomplished facilitator, Crosman has led PHA teams to complete many large-scale risk assessments covering hundreds of P&IDs across many key industries, and in most parts of the world. His experience also covers the broader risk management framework with understanding of such important activities as incident management, management of change and tracking of risk assessment actions.

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