# Connecting the dots

**ENTRUST Solutions Group's safety management systems reduce risk before an incident occurs, says Jim Francis, Vice President – SMS Consulting, ENTRUST Solutions Group, USA.**

Learning to identify, analyse, and mitigate potential hazards in the workplace drives us to take a deeper look into our safety management systems (SMS). ENTRUST Solutions Group (EN), a leading national engineering, consulting, and compliance services firm, has experts experienced in the development, implementation, and improvement of a SMS.

A SMS is a comprehensive, systematic and deliberate approach to managing the safety of the workforce, assets, and the public. It is focused on proactively identifying and reducing risk. Employees and stakeholders are empowered to raise concerns and act to mitigate risks, while continuously improving processes, procedures, performance, and culture.

EN has resources in place to help clients address specific challenges and areas of risk that surface when exercising the SMS. EN's data solutions, integrity management, and engineering and design teams can guide businesses in addressing risks in their workplace and support solutions to mitigate risk.

In 2015, The American Petroleum Institute (API) provided the framework for SMS in the 'Recommended Practice 1173'. The team at EN uses key elements from API RP 1173 and other SMS and quality management system (QMS) standards to work together to drive engagement and accountability in the workplace.

"When you think of the changes to the natural gas and liquids pipeline industry over the last 20 years, we've already developed programmes that have improved safety and compliance," said Jim Francis, EN's Vice President of SMS consulting.

"Numerous regulations and the evolution of technology add a complexity and increased demand to continue to drive SMS to be better," he added.

Building a SMS requires continuous focus over a long period of time. "Implementing SMS is a marathon, not a sprint," said Francis, "and it takes dedication, persistence, and fortitude to be engrained in your culture and business operations." Often, a measurable reduction of risk requires multiple cycles of analysis before it is known if the mitigations are effective. A SMS adds a layer of control to an evolving environment. EN ensures that SMS is inclusive of all programmes in the workplace by complementing and creating an opportunity to improve safety processes.

## Risk management

"Risk management is at the heart of a SMS," said Francis. "It establishes the need for education, drives goal setting and creates the basis for continuous improvement."

Along with all of the factors in a SMS, risk management must be routine and intentional. This allows all of the compliance requirements and activities to be measured, establishes the criteria for the management system, and, because of audits, measures whether the work is completed as required. Addressing and analysing risks are to be completed throughout the year and on purpose. Risk management first starts with a defined set of procedures that describes how the processes will be executed. The procedures break down each process into different components: risk collection, decision-making, risk assessment, and mitigation planning.

According to Francis, the owner of the risk management process should meet at least annually with stakeholders to have a facilitated discussion about the operational risks relevant to their group.

"The fourth quarter of the year is a great time to reflect on the performance and experiences of the previous months. By discussing new or changing risks, you can develop a plan for the upcoming year," Francis said.


**Figure 1. Risk management is the engine that drives the SMS process.**

Once a plan has been made for the year, including goals and objectives, the team can start conducting deep-dive risk assessments on individual risks. These are facilitated sessions that thoroughly review a risk, the associated operational controls, and create a defined improvement plan as an outcome. A risk management process must be flexible to allow for urgent and emerging issues. Most risks are identified during the facilitated and routine execution of the SMS. Evaluating the effectiveness of controls allows for additional or changing risks that may occur.

At its best, Francis shared, a SMS reduces risk before an incident occurs. By creating structure and establishing intentional engagement activities, risk discussion ensures that the voices of all stakeholder groups are incorporated into a risk management programme. The outcome of the process creates clear operational focus for the upcoming year, setting safety improvement priorities for the enterprise.

The SMS risk management process bridges the gap between detailed asset-based integrity processes and the high-level enterprise risk management process. Identifying risks for SMS allows an examination of all aspects within a company. The mitigation of these risks provides a closer look at the controls that are in place and to determine if it is effective at preventing risks from occurring.

## Operational controls

In SMS, operational controls are designed to minimise the likelihood of a hazard leading to a safety incident. These controls also help minimise the consequence when an incident occurs.

Francis shared, "The further you go up on the hierarchy of controls, the solution is more effective at preventing the risk from occurring. Higher level controls should be outcomes of the engineering processes and integrity management programmes."

Operational controls can be found in two forms: preventive and responsive. A preventive control is intended to keep a hazard from causing an incident to occur, such as locating a service line to prevent excavation damage. A responsive control is intended to minimise the consequence if the incident does occur, such as having an excess flow valve installed on the service line, which shuts off the gas before something more catastrophic can occur.

Understanding the relationship between operational controls can be challenging due to industry regulations. SMS is at its best when a company is facilitating intentional and routine risk assessments. This can include reviewing operational controls and its effectiveness before an incident occurs.

Francis said, "EN thinks well beyond the compliance requirements when assessing our operational controls. Controls should be specific and evidence should be available to prove compliance."

Using statistical analysis and sampling tools, EN provides clients with confidence in the results of the process control checks. By leveraging tools such as a bow-tie analysis or process hazard analysis, companies can visually see the relationships. These analyses involve facilitating small teams in identifying and documenting which operational control is intended to prevent or minimise a hazard.

Francis said, "Creating a visual map to see the relationship between the hazards, controls, risks, and outcomes is an important outcome in a risk assessment. This approach is very effective when implementing new regulations. Evaluating your controls through a risk assessment allows you to see the gaps as you plan for implementing new requirements, particularly thinking beyond just updating your compliance procedures."

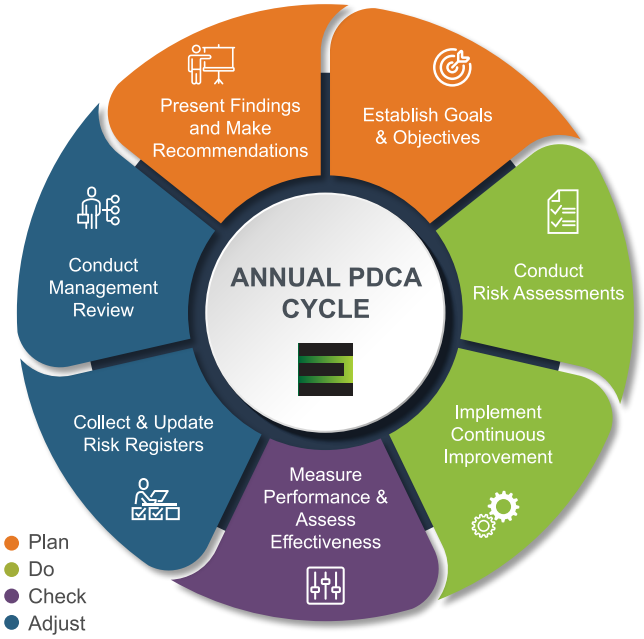


**Figure 2. Annual cycle of an SMS should drive decision-making, prioritisation, resource planning, and review in a routine and intentional way.**

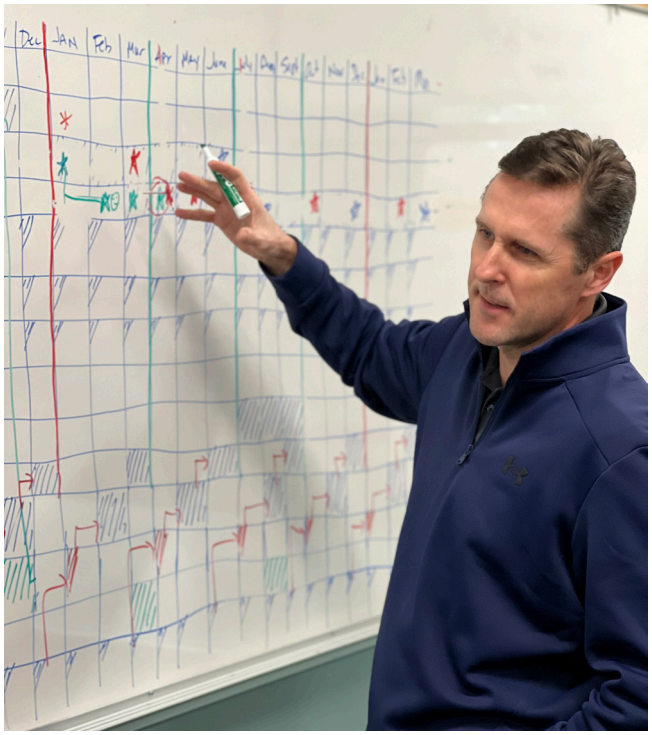

**Figure 3. Author, Jim Francis, facilitating a workshop on safety management systems.**

Documented controls are a foundation to compliance and continuous improvement. Without structure or procedures in place, it is difficult to identify the effectiveness of a risk assessment.

"One of the more rewarding aspects of mapping your controls is that it often reveals to individuals who own parts of a process how what they do affects the work of others," Francis said.

Whether it be changes to controls, such as procedures and training, or changes that directly affect the pipeline system, there are decisions made every day that have an impact on the safety of a pipeline system and the stakeholders that operate it.

## Safety assurance

The EN team works together with clients to ensure the SMS is driving the level of performance expected by providing improved safety and a reduction of risk. Safety assurance makes sure that SMS is having a positive impact on a company's safety culture. Putting a structure in place is key to allowing the measurement of progress and effectiveness of a SMS against an established baseline.

Francis said, "It is important to not only show how you are complying with the SMS requirements, but also demonstrate that you are reducing risk."

Auditing is one of the most effective ways to measure risk. Internal audit processes create a continuous improvement plan and supports compliance with the requirements. Leveraging an external resource to perform these audits can provide added value to a company's SMS by recommending practices that an internal audit team may not be privy.

Francis said, "Going beyond compliance is important. It is good to get an outsider's perspective to assess the quality of the process."

Measuring the effectiveness of risk management is one of the primary goals of a SMS. A risk management programme should provide metrics that quantify the change in risk over time. These measurements reflect the quality of the process, stakeholder engagement, and leadership commitment to risk management.

Programme level metrics provide continuous measurements of high-risk processes, such as emergency response times or excavation damage rates. The performance of stakeholders can be measured by engagement metrics. These metrics illustrate participation in continuous improvement events or SMS leadership meetings.

Measuring risk at an individual level shows progress of the mitigation efforts over time and evaluates if the mitigations were effective. Particularly early in the implementation of an SMS when the risk register is more volatile and more stakeholders are getting engaged, improvement can be shown even if the aggregate risk score increases. "Your goal is to quickly be able to communicate to your leaders whether there are additional actions that need to be taken to address any emergent issues," Francis said.

Establishing key performance indicators (KPIs) is also a way to demonstrate how an SMS is reducing risk and improving safety. There are multiple elements to how KPIs are leveraged within a SMS.

SMS programme metrics illustrate progress. These results, which include implementation progress and audit results, are

typically reported on an annual basis. Risk management metrics demonstrate the change in risk from the baseline assessment and previous results. This includes changes in risks associated with specific areas where mitigation activities were completed.

Engagement metrics measure the level engagement in the SMS from various stakeholders, such as employees identifying risks or corrective actions. Pipeline safety programme metrics are continuous metrics associated with high-risk processes, including excavation damage rate, emergency response times, and integrity assessments. These programme-level metrics are actively tracked and monitored through the year as part of an SMS.

"At EN, we help our clients develop their SMS metrics and scorecards," Francis said. "We've worked with our clients to develop systems, metrics, dashboards, and reports that allow them to see the effectiveness of their SMS."

## Conclusion

Creating an infrastructure of support within your company allows teams to quickly gather the information needed to review the effectiveness of a SMS. Francis shared, "A SMS management review should be structured around the input requirements, making it easy to demonstrate compliance and provide a good visual of the programme's strengths."

Implementing a governance process that is executed throughout the year will allow management to perform on-going analysis. Management is also responsible for communicating plans and outcomes of the SMS to stakeholders. By doing so, stakeholders know that they have a voice in the SMS.

According to API RP 1173, leadership ensures that routine processes are in place to foster continuous improvement. Continuous improvement methods should be leveraged on a daily, weekly, monthly basis to drive change both intentionally and routinely. Engagement in continuous improvement creates active stakeholders who solve their own problems, which drives further engagement and influences a positive culture.

Francis explained when applying continuous improvement to risk mitigation activities, "You want the people who own and exercise the process to help improve it. When this occurs, you get the type of engagement that's needed to drive your company's safety culture." Ensuring that continuous improvement methods are fully implemented and effective is driven by accountability.

"By having effective, continuous improvement processes and expecting your teams to use them in their daily work activities, risk management becomes routine," Francis said.

Building a quality SMS adds a layer of control to an already complex environment. EN works together with clients to ensure the SMS process is efficient in its execution and continuous growth.

"EN helps clients develop procedures to all aspects of a SMS. We help connect the dots to all of your existing procedures, operational control documents, and elements of your management system," Francis said.