



PROCESS SAFETY REPORT 2023

SPHERA INSIGHTS 8TH ANNUAL REPORT



A woman with brown hair, wearing clear safety glasses and a blue collared shirt, is looking intently at something off-camera in an industrial or laboratory setting. The background is blurred, showing various pieces of equipment and structures.

Table of Contents

| | |
|--|----|
| Executive Summary | 3 |
| About the Process Safety Report 2023 | 4 |
| Key Findings | 7 |
| Overview of Process Safety Management | 9 |
| Understanding Safety-Critical Maintenance | 12 |
| The Pivotal Role of People | 15 |
| The Value of Digital Solutions | 20 |
| Moving from Compliant PSM to Proactive PSM | 23 |
| The Role of ESG | 25 |
| Conclusion | 27 |

Executive Summary

Every year since the original survey in 2016, approximately two-thirds of respondents have pointed to gaps between their organizations' safety goals and realities. Despite new technologies, solutions and efficiencies, respondents report that in a typical month, one-third of scheduled safety-critical maintenance is not achieved.

Compared to our 2022 survey results, budget and resources have dropped in significance as limiting factors. So why are so many organizations not able to fully achieve their safety goals? In this report, we investigate the possible reasons for this.

We observe that **technology is increasingly valued** by companies to help them reduce vulnerability to high-potential near-misses and major hazard events. Half of those surveyed say their organizations have already invested in visualization tools to manage the health of individual safety barriers/safeguards.

Yet professionals in process safety management (PSM) are keenly aware of the **pivotal role of people** in implementing safety policy and technology. Problems can result when there are not enough people or there are new hires who lack experience. Whether the issue is related to organizational culture, management support, frontline behavior or training and competency, human factors strongly impact the effectiveness of process safety management.

Although respondents see some differences at the individual, company and country levels, they increasingly believe that **regulatory compliance** and safety (governance) reporting requirements have helped companies reduce their vulnerability to high-potential incidents. Nearly half of survey participants think that companies seem to be moving from compliance-driven process safety management toward proactive management.

Similarly, the majority of respondents believe that process safety management fits into their companies' **environmental, social and governance (ESG) programs**. At least 60% tie it to governance and environmental aspects, with 40% relating it to social aspects. Many respondents also think that environmental impact is important from the corporate perspective.

60%

tie process safety management to the environmental component of ESG.

40%

tie process safety management to the social component of ESG.

Nearly half of survey participants think that companies seem to be moving from compliance-driven process safety management toward proactive management.

ABOUT THE PROCESS SAFETY REPORT

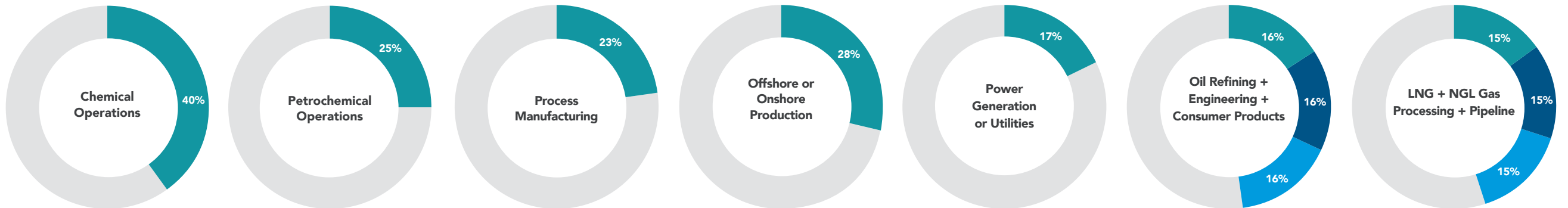
About the Process Safety Report

Now in its eighth year, the Sphera Process Safety Survey annually takes a snapshot of the state of process safety and operational risk management. We gather insights and opinions from process safety professionals in some of the most dangerous industries, including petrochemical operations, metals, mining and power utilities. Our survey investigates the most pressing process safety challenges and promising trends across the globe.

In the Process Safety Report 2023, we intend to uncover the relationships between policy and reality; technology and its adoption; and regulation and compliance, among others. Through our survey, we can better understand the current state of process safety management and its interaction with operational risk management.

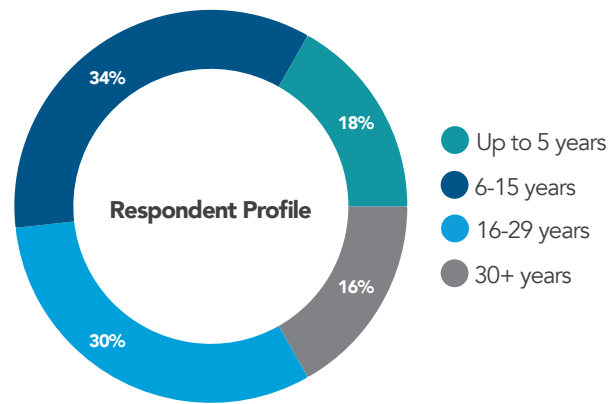
Sphera's Process Safety Report 2023 is based on survey responses from 239 process safety and operational risk management professionals in a wide range of industries across the world. Our report has provided trends, patterns and insights in process safety and operational risk management annually since 2016.

Industry segments represented by respondents



Respondent Profile

Just over one-third of our survey participants have between 6-15 years of process safety and operational risk management experience. Another 30% have worked for 16-29 years in these areas. At the low and high ends of the scale, 18% have up to five years and 16% look back on more than 30 years of experience.



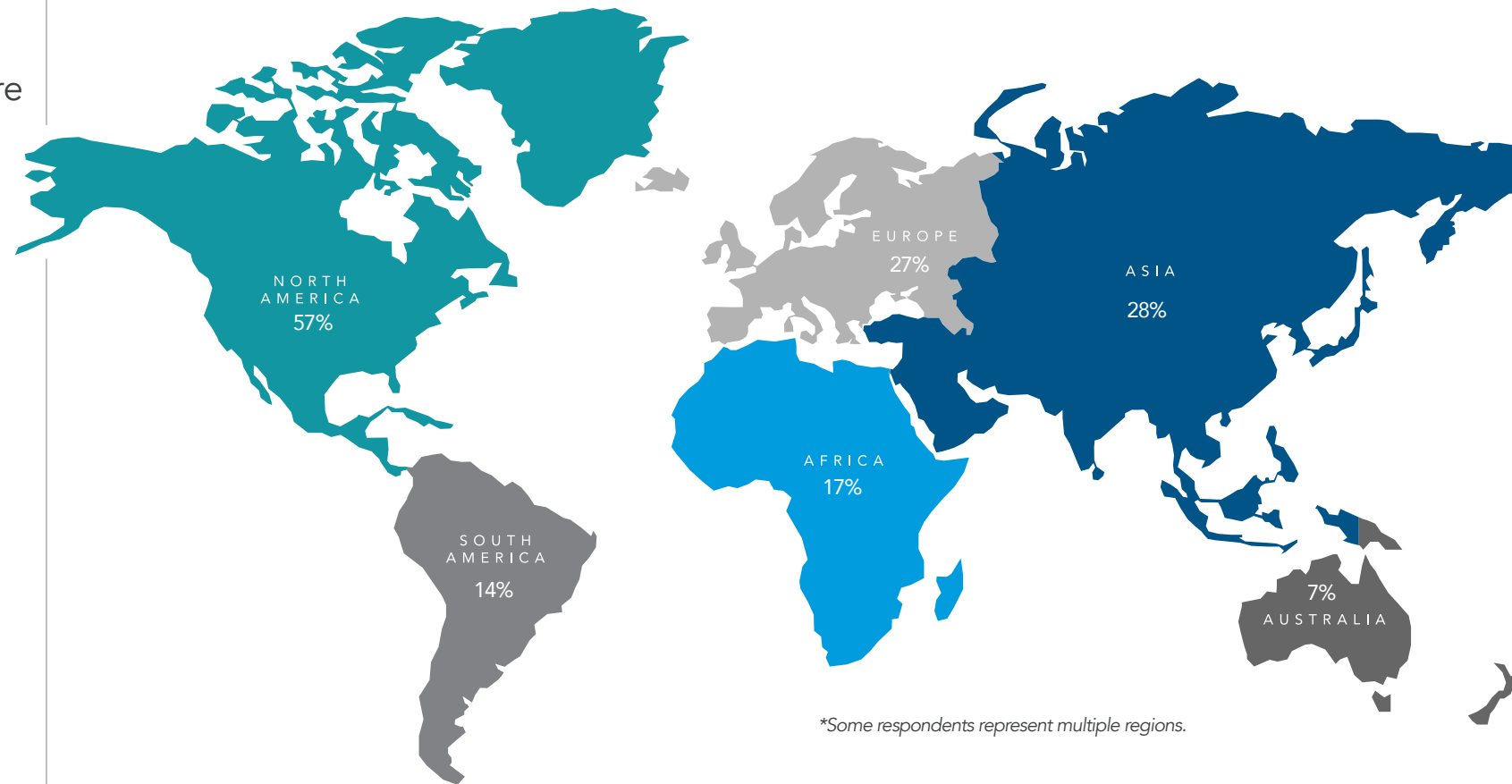
239

Total responses

46%

> 15 years of experience

Regions Covered by Survey Respondents



**Some respondents represent multiple regions.*

KEY FINDINGS



Key Findings

1

COMPANIES ARE (STILL) NOT MEETING THEIR PROCESS SAFETY GOALS. ONE-THIRD OF SAFETY-CRITICAL MAINTENANCE IS NOT ACHIEVED.

Roughly **65%** of respondents see a gap between safety goals and realities. Despite better technology and more resources, survey participants report that one-third of scheduled safety-critical maintenance is not achieved in a typical month. In this process safety report, we reflect on possible underlying causes.

2

TECHNOLOGY ENABLES EFFECTIVE PROCESS SAFETY AND OPERATIONAL RISK MANAGEMENT.

A clear **100%** of respondents agree that technology currently enables effective process safety management or will enable it in the future. Eighty percent agree that technology helps reduce vulnerability to hazard events, and over **80%** believe that access to digitized, real-time process safety risk indicators improves risk awareness and safety.

3

HUMAN FACTORS, INCLUDING LOSS OF EXPERIENCE AND FRONTLINE BEHAVIOR, INCREASE RISK AND IMPACT SAFETY PERFORMANCE.

Losing experienced personnel increases risk, according to **52%** of respondents, and **46%** cite conflicts between policy and frontline worker performance. Similarly, **63%** report that human factors negatively impact safety performance.

4

RESPONDENTS SAY THEIR COMPANIES ARE MOVING FROM PSM MERELY FOR COMPLIANCE TO PROACTIVE PSM.

Forty-one percent believe their organizations go beyond practicing PSM only in order to achieve compliance. Yet only **13%** take full advantage of the range of tools for compliance and predictive decision-making. This indicates too much reliance on people being able to connect the dots on their own.

5

PROCESS SAFETY MANAGEMENT REMAINS HIGHLY SIGNIFICANT FOR ESG PROGRAMS.

Process safety management fits into ESG programs according to **86%** of respondents. This corresponds closely to our 2022 findings. Similarly, **71%** express concerns about environmental impact from incidents, but **71%** now worry about the loss of production capabilities, far more than in 2022.

OVERVIEW OF PROCESS SAFETY MANAGEMENT

Overview of Process Safety Management

According to the International Association of Oil & Gas Producers (IOGP), process safety management is a “disciplined framework for managing the integrity of operating systems and processes that handle hazardous substances.”

Hazardous chemicals, flammable liquids and gases require proper handling, use and storage. Equipment must be meticulously serviced. Risk management and safety-critical maintenance lay the foundation for ensuring safety and preventing large-scale disasters. In addition, individuals who operate machinery and perform dangerous processes must be rigorously trained and aware of the hazards present.

At the top of our minds was the overarching question of whether companies and individuals are actually **achieving their process safety goals**.

Risk and Reality

In short, 65% of respondents recognize a gap between their company’s process safety goals and the reality. Although this number has dropped from 69% in 2022, it remains alarming that process safety goals are so routinely, even chronically, missed. We investigate possible causes when we take a closer look at safety-critical maintenance.

How does this gap come about? Respondents point to a number of challenges in delivering effective process safety management.

What are the main challenges in delivering effective process safety management?

| | 2023 |
|---|------------|
| Training and competency | 46% |
| Management involvement | 38% |
| Engaging the front line to improve awareness | 32% |
| Lack of resources | 28% |
| Aging facilities | 27% |
| Cross-functional support | 25% |
| Cost management | 23% |
| Data and process challenges | 15% |
| Major accident hazard (MAH) awareness | 15% |
| Actionable insights (visibility of operational risk) | 15% |
| Aging workforce | 6% |



- people
- processes
- resources

Topping the list are human and organizational factors. **Training and competency** is named by 46% as a challenge to delivering effective process safety management. Next, 38% cite **management involvement**. Also, for 32%, **engaging the front line** to improve awareness is an issue.

To initiate more effective process safety management, leadership is in the best position to drive digital transformation. They should be first to demonstrate how such digital tools will bring tangible value across the enterprise.

Lack of resources was a new response option in the 2023 survey. Here, 28% indicate that they need more resources. This includes time; money; personnel; or technical, administrative or process-related support systems. Another 23% believe that **cost management** is a challenge to effective process safety.

According to 27%, aging facilities present challenges for process safety. For example, in the U.S. alone, more than 50% of the assets in the hydrocarbon industry are already past their design life, according to a recent report by Marsh risk advisors.

Aging assets have higher levels of maintenance, and over time, equipment needs to be replaced. Potentially, years of backlog in maintenance tasks may have added up. Also, with various ownerships resulting from mergers and acquisitions, facilities may lack accurate and comprehensive documentation.

According to 25% of respondents, structural issues such as a lack of **cross-functional support** also seem to stand in the way. A digital solution allows functional expertise and information to be more easily shared and provides a repository for knowledge and data from multiple sources.

A Closer Look at Major Accident Hazard (MAH) Risk

AWARENESS, UNDERSTANDING, RECOGNITION

Major accident hazard (MAH) risk is a source of danger that can cause a major incident with fatalities or significant damage. Because understanding and controlling MAH risk is so critical to process safety, we provide a short summary of insights on this topic from various survey questions.

According to 66%, **reducing exposure to MAHs** is a top driver for improving process safety performance. In a related question, **awareness of MAHs** is cited by 15% as a main challenge to delivering

effective process safety management. However, when asked whether they are **fully aware of their assets' exposure** to an MAH, respondents have only **average confidence** that they are.

To reduce vulnerability to near-misses, accidents and major hazard events, organizations need a real-time view of safeguards and associated risks. Roughly 30% say that as a result of integrating sources of operational risk, **they have access to real-time data streams to predict MAH risk exposure**. Increasingly,

process safety professionals use real-time data streams to proactively track the status of safety critical elements and associated barriers.

Through digital technology solutions such as Sphera Digital Risk Pathways, threats and consequences that are identified in Hazard Identification and Risk Assessments (HIRAs) become readily available and can be visualized using bowties. Data-based processes help organizations optimize safety-critical maintenance and performance.

UNDERSTANDING SAFETY-CRITICAL MAINTENANCE

Understanding Safety-Critical Maintenance

Defined broadly, safety critical elements (SCEs) include structures, systems, equipment or component parts whose failure could cause or contribute substantially to a major accident. This also includes equipment intended to prevent or mitigate the effects of major accidents. Maintaining such elements is therefore paramount to operational and process safety.

The Chronic Process Safety Shortcoming

In 2023, respondents estimate that only 67% of safety-critical maintenance tasks are completed in a typical month - exactly the same percentage as in 2022. In fact, there has been little deviation in this figure over the past eight years. Similarly, while 63% believe it is practical to achieve 100% of scheduled safety-critical maintenance, 25% believe it's not practical. These percentages also vary little from 2022, when 62% expressed the opinion that all scheduled maintenance can be achieved and 28% said it cannot.

We investigate several possible hypotheses for the stubbornly chronic shortcoming:

- Organizations might be listing too many tasks as safety-critical. There may be a tendency to categorize every potential hazard as critical, to avoid potential legal repercussions. This could require a more rigorous prioritization of tasks that are production-relevant, yet not safety-critical.
- Opinions may differ as to what is critical. Asset-integrity functions prefer tasks to be categorized as critical, so their assets are prioritized. Operations prefer that critical tasks are kept to a

minimum to avoid having to release equipment when it is running.

- Systems have not been integrated. Information exists in silos, and many companies still rely on paper-based systems that are cumbersome, time-consuming and non-interactive. Organizations and individuals may not have a true picture of critical tasks and their completion.

Challenges to Completing Scheduled Tasks

When asked for the top three challenges to achieving 100% of safety-critical maintenance, 60% choose limited resources, down from 74% in 2022. The term "resources" could refer to budget, but also personnel or even supporting systems such as administration. Notably, the number of respondents who see "limited budget" as a challenge also declined; 34% identify this as an issue, down from 41% in 2022.

At the same time, 56% cite conflicting priorities as a key challenge. Another 24% think there is a limited understanding of priority, and 15% believe that the definition of critical is too conservative. This could indicate conflicting views on what is safety-critical versus what is critical for productivity.

1 IN 4

do not believe that all safety-critical tasks, including asset-integrity inspections, can be completed as scheduled.

What are the challenges to achieving 100% of safety-critical maintenance/asset integrity inspections?

| | 2022 | 2023 |
|---|------|------|
| Limited resources | 74% | 60% |
| Conflicting priorities | 65% | 56% |
| Inadequate planning | 43% | 45% |
| Limited budget | 41% | 34% |
| Difficulty accessing equipment | 24% | 27% |
| Limited understanding of priority | 37% | 24% |
| Too conservative definition of critical | * | 15% |

- people
- processes
- resources

*This answer was not an option in 2022.

Unclear priorities create significant obstacles to completing safety-critical tasks.

Inadequate planning, named by 45%, can hinder completion of scheduled maintenance. Twenty-seven percent say difficulty accessing equipment is a challenge. For example, there are cases in which workers cannot shut down or isolate equipment for preventive checks while the plant is running because this conflicts with productivity goals. When they are able to shut down, there are so many overdue maintenance and inspection tasks on the list that they can't finish all of them.

Drivers for Better Process Safety

So, which drivers improve process safety performance? Reducing MAH risk exposure is named by 66% of survey participants. For 57%, operational excellence (process improvement) is a key factor.

Forty-eight percent believe regulatory compliance drives improvement. We discuss compliance in a later section of this report. Similarly, 20% think that ESG obligations positively influence safety. This, too, will be discussed later. For 29%, business continuity is significant, while 28% choose reducing asset downtime, and 22% select corporate priorities. Interestingly, just 10% believe that financial incentives increase safety performance.

Using software solutions for process safety management and operational risk management enables companies to digitally transform and integrate strategies, processes and tools. Digital tools provide plant leaders with intelligence to navigate operational risks, maintain governance and controls and drive continuous performance improvements.



THE PIVOTAL ROLE OF PEOPLE

The Pivotal Role of People

Many factors increase risk, such as a lack of risk visibility or improperly performed activities. What stands out is that many respondents believe that human factors pose a greater problem than processes or costs.

| What factors cause risk to increase on your plant/asset? | 2022 | 2023 |
|---|------------|------------|
| Loss of experienced personnel | 62% | 52% |
| Conflict(s) between procedures/policy and frontline working practices | 49% | 46% |
| Incomplete, missing or inaccurate SOPs | * | 40% |
| Lessons learned that aren't effectively shared | 42% | 40% |
| Visibility of operational risk within aging facilities | 33% | 35% |
| Deterioration in the health or effectiveness of designed process safety barriers | 39% | 30% |
| Cost pressure | 37% | 28% |

- people
- processes
- resources

*This answer was not an option in 2022.

Factors Behind an Increase in Risk

THE TOP FOUR PROCESS SAFETY CONCERNS ARISE FROM HUMAN FACTORS

| 1

LOSS OF EXPERIENCED PERSONNEL concerns 52%. Companies are losing experience and knowledge of how to run and maintain plants. The backfill of inexperienced new workers is filtering through to the management level and can influence safety leadership. Businesses will need to capture, save and share knowledge through databases and digital processes.

| 2

CONFLICTS BETWEEN POLICY AND FRONTLINE PRACTICES worry 46%. This suggests that where process safety policies have been defined and developed, people are not following the rules. Process safety software solutions can connect workers, provide real-time feedback and improve operational decision-making.

| 3

INCOMPLETE, MISSING OR INACCURATE SOPS concern 40%. Standard operating procedures standardize processes and provide virtual “guardrails” to ensure tasks are performed in the correct order and in the correct way.

| 4

LESSONS LEARNED THAT AREN'T EFFECTIVELY SHARED is flagged by 40%. Proper routines, near-miss incidents or warnings may not be recorded in paper-based systems or passed along from person to person. With a digital repository, lessons learned have a greater chance of being shared. The longer businesses wait to make use of databases, the greater the challenge becomes, because the experienced people are leaving.

| 5

VISIBILITY OF OPERATIONAL RISK WITHIN AGING FACILITIES is a process-related risk noted by 35% of respondents. One remedy is creating virtual representation, a digital twin, of aging facilities. Supported by real-life data, such visualization enables more transparent and safer operations.

| 6

DETERIORATION OF SAFETY BARRIERS concerns 30%, down from 39% in 2022. While this may seem surprising given the finding around the completion of safety-critical maintenance, it could indicate greater confidence in the effectiveness of digital technology. With more visibility into the deterioration of barriers, process safety managers can take proactive measures.

| 7

COST PRESSURE is named by 28%, the lowest percentage, down from 37% last year. This illustrates our impression that financial factors are less of an issue.

Identifying the Main Players in Process Safety Management

While job titles vary widely among corporations, in our survey we offer a range of functional areas so respondents can indicate who typically and primarily carries out process safety responsibilities.

Forty-three percent believe process safety professionals are **driving process safety management**. Senior leadership is next, noted by 28%, up slightly from 2022.

Active risk management falls to frontline operations and maintenance, say 43% of respondents. This is slightly ahead of department heads, cited by 40%. Surprisingly, this is higher than safety professionals, chosen by 35%.

A positive trend is seen in risk awareness, with 53% believing that regional heads are aware of risk, up 15% from our 2022 finding. Planners and schedulers received the same percentage this year as last year. Yet at the same time, 33% feel that planners and schedulers **lack an understanding of risk**, up from 29% in 2022. This is unsettling, as it may point to strategic and operational gaps.

Compared to our 2022 survey, more respondents believe that senior leadership lack an understanding of risk, rising from 10% to 12%. One theory is that when data gets to the senior level, it has been sanitized down to a single number, with very little supporting information shared.

| | Drive process safety management | Actively manage risk | Are aware of risk | Lack understanding of risk |
|------------------------------------|---------------------------------|----------------------|-------------------|----------------------------|
| Senior leadership | ↑ 28% | ↓ 15% | 44% | ↑ 12% |
| Functional/departmental heads | ↓ 13% | 40% | ↑ 40% | ↓ 7% |
| Regional heads | 14% | ↓ 21% | ↑ 53% | ↓ 11% |
| Asset heads | ↑ 13% | ↓ 29% | ↑ 48% | ↓ 9% |
| Frontline operations & maintenance | ↓ 4% | ↓ 43% | ↑ 42% | ↑ 10% |
| Safety professionals | ↓ 43% | 35% | ↑ 18% | ↓ 4% |
| Planners & schedulers | 4% | ↓ 16% | 48% | ↑ 33% |

- ↓ down from 2022
- ↑ up from 2022
- same as 2022

Across virtually all roles, awareness of risk has risen. Regional and asset heads saw double-digit risk-awareness gains. However, the percentages for people who actively manage risk have mostly dropped.

Factors That Negatively Affect Process Safety

Respondents seem to feel that conduct related to process safety—whether by leaders, supervisors or colleagues—can lay the foundation for successful process safety management or undermine even mature strategies. This is a fundamental issue, with a need for leaders to ask uncomfortable questions to get to the underlying issues when the conduct creates problems. They will then have to provide visible support to make a change.

According to 63% of respondents, human factors have a negative impact on the company’s process safety performance. Organizational culture has a negative effect, note 52%. Staffing issues are seen by 38% to impact process safety. For 23%, senior leadership has a negative effect.

This shows that the cultural dimension and leadership from the top are critical for effective process safety performance. Leaders need to challenge the status quo and encourage a transformational attitude throughout the company. This requires top-down and engaged leadership, but more importantly, it must deliver bottom-up value.

Managers need to understand what their people on the ground do and how they should be doing it. Methods or systems don’t transform organizations, people do. Getting things wrong on the people side creates silos and leads to unwanted behaviors. Examples include senior management who impatiently ask for the ROI; middle managers who resist new ways of doing things while waiting to clarify their roles, responsibilities or career options; and frontline operators who ignore adoption until they see whether new systems make their lives easier.

Getting alignment of people from top to bottom and bottom to top is critical. Technology-supported business processes must be accompanied by visibility and transparency. When people are enabled with tools to change the operating culture, they also must understand that this gives them the means to do things in a better way. People need to hear, see, touch and benefit from this firsthand.

Negative impacts on process safety

| | 2023 |
|-------------------------------|------------|
| Human factors | 63% |
| Organizational culture | 52% |
| Staffing issues | 38% |
| Budgeting | 32% |
| Maintenance | 28% |
| Operations | 25% |
| Senior leadership | 23% |
| Reliability | 23% |
| Planning | 22% |
| Internal procedures | 19% |

- people
- processes
- resources

3 of the top 5 factors that negatively impact process safety performance are attributed to people and behaviors in the company.

THE VALUE OF DIGITAL SOLUTIONS



The Value of Digital Solutions

In 2023, all survey respondents believe that digitalization can enable effective process safety and operational risk management: 65% believe it helps now and 35% think it will help in the future.

Hazardous industries could be at a tipping point from a technological perspective. Particularly where the technology is good, organizations are receptive. External factors such as compliance, ESG, economic conditions, political drivers and supply chain impacts also drive acceptance.

Eighty-three percent believe that digitized, real-time process safety risk indicators could improve risk awareness and safety. Some feel that companies are concerned about the amount of work needed to ensure that their data is correct or to condition (optimize) it for use. In short, technology and data need defined processes and accountabilities and must be accompanied by regular reviews.

Process safety and operational risk management professionals indicate that they integrate sources of operational risk in different ways. This year's respondents report the use of real-time data streams to:

- Track the status of safety critical elements (SCEs): 64%
- Record SCE deviations: 44%
- Display barrier impairments: 41%
- Predict MAH risk exposure: 30%
- Calculate cumulative risk: 28%
- Provide a dynamic process safety management risk register: 26%

There could even be a generational aspect to the growing support for digitalization. But not because older workers reject digital technology; most of them regularly use smartphones and other devices. Rather, in some critical industries, the lack of digitalization could turn away younger workers who expect data to be connected and to use mobile apps for real-time insights, which help them make data-driven decisions. Paper forms in triplicate is outside of their norm.

Solutions That Support Process Safety Goals

Organizations use various types of digital solutions to support process safety goals. The distribution is not homogenous. Some software systems are geared toward measuring performance, while others focus on improving efficiency, for example.

Interestingly, the use of digital technology has remained relatively stable since our 2022 survey. Planning, budgeting and implementation seem to moderate the pace of digitalization in process safety. We can only hope that planned implementations are achieved sooner rather than later. As seen, it is not for lack of technology enthusiasm among our survey participants.



NEARLY **2/3**

believe digitalization already improves process safety. More than one-third believe digital technology will help in the future.

A further dimension involves system design. There seems to be a need to improve the quality of the systems that people design and use in their plants. Survey participants indicate that cross-functional, silo-driven issues remain. For gains in safety as well as productivity, digital systems must connect data and information across all functions and levels, so everybody understands how things interact. Of course, good systems must also be implemented well.

Improving Process Safety with Digital Tools

When asked whether their organization has invested in solutions to visualize and proactively manage the health of individual safety barriers/safeguards, 50% of respondents said yes—up from 44% in 2022.

The process safety gains that are possible through digitalization cannot be emphasized enough. Digital tools enable a change from reactive to proactive process safety management. Whether risk assessments, permitting, control of work or simultaneous operations (SiMOP), digital tools make sure all the correct steps are conducted in the right order.

Digital lists of pre-defined hazards, location-based hazards and controls are easy to access and search. With digital handoffs for permit ownership, nothing gets misplaced or lost. The integration of permits and controls standardizes the correct procedures and thus advances safety.

As shown, 100% of survey participants believe digital technology enables effective process safety and operational risk management or can potentially support these in the future.

Number of respondents who say that their organization uses or plans to use the following types of software solutions to support safe operations:



8 in 10 Environment, health and safety (EHS) software.



6 in 10 Master data management (MDM); asset performance management; secure cloud computing; mobile workforce applications; predictive analytics.



5 in 10 3D asset modeling; industrial internet of things technology (IIOT).



4 in 10 Deviation/safeguard visualization systems; industrial wearable technology; machine learning.



3 in 10 Digital twins.



MOVING FROM COMPLIANT PSM TO PROACTIVE PSM

Moving from Compliant PSM to Proactive PSM

In heavily regulated industries, noncompliance can put organizations and their leaders at significant risk. Managing process safety systems becomes an even bigger obligation. In addition to maintaining a safe facility, companies must comply with government regulations and reporting requirements.

Survey participants increasingly believe that industry regulations and safety reporting requirements have helped companies reduce their vulnerability to high-potential incidents.

However, respondents are almost equally divided on the relationship between regulations and process safety. While 44% believe organizations manage process safety as a compliance obligation, 41% think organizations proactively manage process safety.

Traditionally, compliance and regulations have been seen as something to underpin the business process. Leaders now want to improve because they see the business benefits. Every year, the number of respondents who consider their company in the more technology-mature categories—"Optimized" and "Leader"—is growing, from 43% in 2022 to 48% in 2023. The percentages who categorize their organizations as merely "Compliant" or "Efficient" are shrinking, from 67% in 2022 to 52% in 2023.

Nonetheless, process safety is still largely influenced by the need to comply with regulations. It is unclear whether maturity has increased that much "on the ground."

While many respondents believe their companies are moving from reactive to proactive process safety, the slow adoption of unifying technology and integrated digital systems is of concern. One explanation for the slow uptake could be that getting attention and approvals from more stakeholders is tougher and takes more time. As one industry expert commented, "There is still too much reliance on people being able to connect the dots in their head for far too much information, status of plant and ongoing activities."

With better reporting, near real-time data and probability modelling, process safety becomes more "real" across a company. Technology connects and shows people whether they are as safe as they think. Risk and safety become everybody's problem. Companies can take a giant leap forward through the implementation of integrated digital systems that provide the right people with the right information at the right time, empowering them to make better decisions.



LEADER

"We use a range of tools (apps, analytics, IoT) for compliance and improved, predictive decision-making."

OPTIMIZED

"We are compliant and we integrate EHS using leading and lagging indicators to measure performance."

EFFICIENT

"We go beyond basic compliance, using technology to improve EHS."

COMPLIANT

"We do what is necessary to achieve compliance."

THE ROLE OF ESG



The Role of ESG

Process safety management remains significant and important to a company’s ESG performance, according to 86% of respondents. For 60%, it is connected to their company’s environmental performance; 63% see it as relevant for governance; and 40% link process safety management with their company’s social performance. These opinions correspond closely to last year’s results.

Considering environmental impacts in process safety and operational risk management evaluation is becoming more important, our respondents believe. While environmental impact has always been considered in risk assessments, with increasing focus from a broader set of stakeholders, its criticality is higher than ever.

In reality, it seems that some companies limit discussions on process hazard analysis (PHA) to impacts on safety and environment. Although the reliability, availability and maintainability (RAM) model uses people, asset, environment and reputation, until recently, the visibility of the impacts remained limited. Digital tools now improve visualization of the entire “picture.”

Managing the risk of environmental impact involves aspects such as ensuring no loss of containment, management of hazardous materials and eliminating potential negative impacts on employees, communities and customers.

For various reasons, the business and operational impacts are frequently removed from the discussion. Yet, 71% believe the most significant impact of a process safety incident scenario is “loss of production

capabilities,” up from 60% in 2022. This is equal to concern over environmental impact, also selected by 71%. This could indicate the types of organizations from which the respondents come or their locations. It could also point to the underlying need to associate process safety and operational risk with true business performance. Companies are very interested in having a real business case for process safety beyond commonly echoed benefits such as efficiency, time savings or better insurance rates.

Which possible business impacts from a potential incident are most concerning?

| | 2023 |
|---|------|
| Loss of production capabilities | 71% |
| Environmental impact | 71% |
| Impact on human habitation | 65% |
| Legal ramifications | 57% |
| Impact on existing process safety systems | 40% |
| Impact on staff training and competencies | 36% |

71% believe the most significant impacts of a process safety incident scenario are “loss of production capabilities” and “environmental impact.”

CONCLUSION



Conclusion

For nearly a decade, participants in our annual survey have reported that their companies struggle to complete safety-critical maintenance as scheduled. Conflicting priorities and an unclear definition of “critical” tell only part of the story.

Survey participants consider the departure of qualified personnel a key cause of risk increase. They also voice concern over how well the leadership, company culture and individuals adopt, support or promote safety procedures and policy. Indeed, human factors top the list of negative impacts on process safety.

All respondents believe that digital tools can or will help reduce risk and improve process safety. Most organizations already use various types of digital solutions to support their process safety goals. By implementing digital systems, companies can embed, standardize, enforce and institutionalize best practices. This can counterbalance and even eliminate frontline nonadherence to policy.

That said, silos continue to exist and data is not shared efficiently throughout many organizations. Getting the safety-productivity balance correct is key. This is why active change management on the ground needs to go hand in hand with the implementation of any digital system.

Digitalization magnifies the causes and effects of process safety management. Risk assessments can be based on real-time data rather than a risk study that sits on a shelf, and information becomes useable for more people across the organization. This becomes even more essential as experienced people leave the workforce, taking their knowledge with them.

A growing focus on ESG performance has elevated the role of effective process safety management and operational risk management. By investing in their process safety management, some companies are looking to improve ESG performance. Using digital tools that are

available, companies can achieve, communicate and report on process safety risk and performance and ESG risk management faster and easier than with paper-based systems.

Recent years have witnessed numerous, almost wholly unexpected events that have had environmental, social and governance impacts: unprecedented destruction from natural hazards, a global pandemic and geopolitical shake-ups.

The focus on ESG is driving businesses to consider the “once-in-a-thousand-years” threats, because the next severe event could be right around the corner.

The real world, where things go wrong and injuries happen, is where ESG also happens. Through technology, companies can integrate risk evaluation with other sources of information and connect all levels—enterprise, organizational and product—not just for sustainability reporting, but so that everybody understands how things interact. This serves to reduce or eliminate injury to people, harm to operations or assets and damage to the environment.

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About Sphera

Sphera creates a safer, more sustainable and productive world. We are the leading global provider of environmental, social and governance (ESG) performance and risk management software, data and consulting services focusing on Environment, Health, Safety & Sustainability (EHS&S), Operational Risk Management (ORM), Supply Chain Risk Management (SCRM) and Product Stewardship.