

QHSE: solving the “produce safely” conundrum

QHSE might sound bureaucratic, but it is as fundamental to operating successfully as maintenance is to production. Safety should be an innate part of the production process – not thought of as a separate procedure. The statement “produce safely” is itself a sign of an immature organisation: why mention “safely”, when it should be inherent in “produce”? Yet safety and production objectives often come into conflict. It requires strong leadership, a rigorous safety ethic and mature judgment to sacrifice production in the interests of safety. Avoiding an accident because of a good decision should be seen as heroic. Unfortunately, however, management will generally never know whether someone has been heroic or paranoid, because when an accident is avoided, nothing happens to prove the individual who took the decision right or wrong.

QHSE performance has two direct drivers: behaviour and asset configuration. QHSE programmes have traditionally focused on assets – the configuration of facilities and equipment. However, based on a variety of cases, Schlumberger has found that around 75% of incidents are caused by human error and 25% of incidents are caused by problems with equipment or infrastructure¹. The emphasis should, therefore, logically shift to human behaviour.

Yet assessing the causes of human error is not straightforward. As the International Association of Oil and Gas Producers puts it: “Although human error has been recognised as part of the risk contribution, the root causes associated with particular types of human error have been difficult to address².”

People tend to believe that what happens to others will never happen to them. As a consequence – and even though following a safety guideline might save their life – line staff tend not to embrace QHSE principles as profoundly as they should. Indeed, while asset configuration has improved over the years, in part thanks to QHSE measures and learning – in, for example, valve design and maintenance – safety regulations are often ignored.

Whether an accident is caused by behaviour, asset configuration or a combination of the two, problems can generally be traced

back to failures in the management system. QHSE will never be seen as a priority in an organisation unless the leadership speaks and acts as if it were. A QHSE mentality is difficult to engender, because people assume they will not have accidents and because positive results – incident avoidance or time or lives saved – is unquantifiable and intangible. Management has to make QHSE a matter of pride and basic discipline for employees.

Management must put in place measures that avoid unsafe working conditions and reactive mechanisms to ensure that when an incident does occur, it is quickly and efficiently corrected and that it does not recur.

However, management’s most important role is to translate complex safety models into a language that is relevant to line staff and to integrate these principles seamlessly into day-to-day operations.

New safety initiatives are typically implemented following serious accidents. But this is far from ideal: in these circumstances, QHSE staff are under pressure to provide a rapid response; they are more likely to treat the symptoms of a problem and less likely to trace it back to its root cause. This type of approach is likely to be viewed with suspicion by the workforce, because

¹ Research from RECIO data (Pemex QHSE data)

² OGP white paper on HSE best practices (OGP Human Factors working group)

it will be seen as reactive and not as a considered intervention into the QHSE system designed to prevent further incidents.

Despite an industry-wide focus on continuous improvement, safety is still an immense problem, for even the most sophisticated of organisations. Like technology, it evolves over time, in step with changes in the organisation itself. There is also an intangible dimension to the best safety practices: learning and measurement are inhibited by the fact that the greatest knowledge should be gleaned from incidents that didn't happen.

When incidents do occur, they have a significant financial impact. The pipeline leak at BP's Prudhoe Bay field provoked a 26-day system shut-down. Exxon Valdez cost \$2 billion in remediation and \$5 billion in liabilities. TexPet in Ecuador cost \$300 million in remediation and it is thought that costs from an international lawsuit could amount to as much as \$6.5 billion. In addition, these costs do not begin to measure the impact of these events on reputation, facilities and people. Lives can be lost, either during simple operations or during major accidents, such as the explosion and fire at BP's Texas City refinery in 2005.

Companies tend to fail to understand the value of tracking and managing minor incidents and their systemic relationship to larger ones. Incidents tend to be seen as problems in themselves, as opposed to symptoms of a wider flaw and are dealt with in an isolated way, each driving an independent and, at best, partial solution. Large numbers of partial solutions end up absorbing resources, distracting staff, sometimes cancelling each other out and rarely resolving the underlying problem. The unintended consequences of poorly designed responses to flaws in the safety

system, whether they are dealing with the symptoms of the problem or supposed root causes, often exacerbate the original problem³.

Change #1: The proactive use of tools to produce step changes in performance

Audits are a useful device for incident prevention. By their nature, they are forward-looking and tend to be focused either on behaviour or on assets. However, they must be seen by the line organisation in a positive light – as an opportunity for self-improvement and learning. Collaboration between line personnel and safety staff in the company's headquarters encourages line staff to become actively involved in executing QHSE principles and improving the QHSE culture. This, in turn, will ensure both increased awareness of safety issues among the general working population and more successful implementation of preventative measures.

Cross-audits between assets also promote peer-to-peer evaluation, self-evaluation and the sharing of best practices. In addition, the more sophisticated the organisation, the more audits will focus on behaviour, rather than asset improvement.

Formal investigations, given their visibility and the pressure for change that they generate, create a platform for radical change in a system that has been trying to im-

prove with minor, symptomatic or organic changes.

By contrast, simply reacting to problems as they occur is unlikely to bring about a useful change in safety culture. The key is to avoid the kind of political and social pressure that often exists to come up with a speedy solution that may not be most effective over the long term.

Learning and significant improvement in safety performance can be achieved, over time, by plotting trends across behavioural and asset audits and investigations (both forward and backward looking) and by pooling the findings of different parts of the workforce.

In one company, SBC used *Systems Thinking*, a problem-solving tool, to plot out these patterns. The diagrams that were generated using this approach were useful both in promoting an understanding within the company of the issues it was facing and in gauging the effectiveness of specific interventions.

For example, the drilling management department discovered that it was caught in a vicious circle in which – both by design and out of habit – it was taking on risk from other parts of the organisation, without measuring or anticipating the impact that this could have. Now this pattern has been identified and its consequences measured, the company is aware of its own behav-

³ "Consider the strong emphasis on redundancy as a safety and reliability measure in many systems. Some degree of redundancy is useful in increasing reliability, and possibly safety. But more redundancy is not necessarily better, and may be worse. While redundancy may increase reliability, it does not necessarily increase and may decrease safety. First, a reliance on redundancy may lead to decreased emphasis on other safety engineering techniques. If system designers believe that redundancy will limit the effect of design errors they may be less motivated to find and eliminate these errors. In practice, redundancy may 'cover up', or mute, design errors and prevent them from becoming visible until something catastrophic occurs. Second, increasing redundancy increases system complexity." Marais and Leveson: "Archetypes for Organisational Safety"

itorial pattern and is in a position to implement a robust risk-management system, allowing it to determine whether to take on a risk and, in cases where a risk is accepted, how to manage it.

Systems Thinking allows an organisation to identify an intervention that will solve the root problem as opposed to hundreds of interventions focused on symptoms. Once high-leverage safety initiatives (those that cure several problems at once by tackling root causes) begin to take effect, the number and seriousness of incidents should decrease. It is important, however, to continue performing audits, registering and responding to minor incidents or adjusting safety targets and indicators as appropriate.

In addition, organisations have the tendency to become complacent and forget that safety is an issue when safety indicators begin to improve. Ironically, research shows that although successful safety initiatives can initially make an organisation safer, high-impact incidents – those with particularly serious consequences for QHSE performance – begin to recur as the level of complacency increases⁴.

Minor incidents and behaviour must be systematically monitored to ensure that the organisation retains the capacity to anticipate and forecast more serious incidents.

Change #2: Balancing responsibility for QHSE between line and headquarters

To engender an effective QHSE culture, SBC found that it is important to clarify the balance of responsibility between line staff and headquarters.

Line personnel can delegate or outsource specific tasks to a QHSE support group (either local or corporate), but must always retain control over and responsibility for the outcomes of QHSE procedures.

Once this principle has been clearly established, support personnel at a company's headquarters – if they are not responsible for safety and have no direct control over safety results – will tend to question what their role should be. The more intangible their role becomes – and, given the difficulty in quantifying the impact of safety initiatives, by its nature an intangible subject – the more headquarters-based staff are likely to feel the need to prove their worth. As a result, they tend to attempt to take responsibility for QHSE issues, diminishing direct line control.

Articulating clear QHSE support roles is challenging. People in headquarters tend to see their role as either supervisory or providing standards. Line staff tend to expect QHSE staff to help them directly with safety problems. But it is vitally important to define the respective roles clearly.

Headquarters should provide support for QHSE in several areas:

It should define standards, guidelines and basic procedures, taking company and government or global policies into account, as well as line input. Once these guidelines are adapted to line needs and clearly communicated or implemented, they must be monitored, maintained and updated.

A QHSE group has to strike the correct balance between trust and moral authority by playing an advisory, expert role. In addition, achieving these aims is difficult for a group that generally lacks the authority to implement standards and is not incentivised to ensure compliance. It also, therefore, needs direct connections with line staff and top management, and the authority to insist on compliance if necessary.

Moreover, at a company-wide level, the QHSE support group must be able to adapt QHSE regulations to special situations – when, for example, a standard procedure or policy is limiting line objectives without significantly reducing QHSE risk.

QHSE headquarters should monitor minor incidents and establish patterns of behaviour that can be plotted and used to forecast and solve problems. Line staff are too close to operations and do not have the vantage point or the time to identify these critical patterns. Headquarters must also create a system in which data can flow freely from the line and be captured, analysed and converted into procedural improvements on a continuous basis. In this way, long-term analysis, systemic root-cause analysis and overall QHSE strategy can be set by headquarters.

⁴Consider the case of ultra-safe systems. Common sense tells us that in order to increase safety, errors, incidents and breakdowns must be reduced or eliminated. This is true for systems where the rate of incidents and accidents is high. In the case of ultra-safe systems, continued elimination of errors, incidents, and breakdowns may paradoxically decrease safety" Amalberti, R, "The Paradoxes of Almost Totally Safe Transportation Systems," Safety Science

Implementation of safety interventions needs to be more subtle than writing a ticket for execution – merely listing a series of remedial measures. Line staff must be responsible for implementing guidelines or proposed solutions and should be able to show how they decided on a particular course of action, prove that it was implemented and indicate whether the intervention worked.

Finally, QHSE headquarters should employ experts capable of performing the activities described above who provide expert advice to the line when the line requires support. These experts must ensure that they provide advice and perform specialised tasks without taking responsibility for the final safety objectives.

Summary

QHSE is an inherent component of day-to-day operations. Improving QHSE performance is challenging and many organisations fall into the same pitfalls, treating incidents as isolated occurrences, paying attention to QHSE only when incidents occur and then becoming complacent or losing the balance between safety and production objectives.

Companies will always struggle with these issues, which are continuously evolving. We have come a long way from the 1960-70s' models of arming people with personal-protection equipment, but safety remains an elusive target.

SBC has found that a key to improving safety performance centres on establishing tools to improve the monitoring of safety

performance and making the continuous detection of trends, patterns and solutions more sophisticated.

The QHSE headquarters group is essential in managing these activities. Its role should involve establishing standards and procedures; monitoring trends, patterns and company-wide behaviour; adjusting standards in accordance with company needs and behaviour and providing expert support to the line, without taking responsibility for the safety objective itself or the execution of safety procedures.

Playing this role successfully depends on guidelines, improvements and feedback with data flowing freely between headquarters and the line. If this flow is interrupted – because information was not understood, feedback not interpreted properly or elements within the organisation were absent or blocked the information – the corporate support role becomes hard to play and, more importantly, QHSE is compromised.