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Process safety

Why 'safety cultures' don't work



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Oil and gas companies will never be “high-reliability organizations” if they rely on campaigns to change hearts and minds on the operational front line. Instead, argues renowned author Andrew Hopkins*, they must identify the obvious precursors to catastrophe and get serious about eliminating them – led firmly from the top.

As human beings, we crave what the social psychologist Leon Festinger called “internal consistency”. We need the information and ideas we have about things to match up with the reality we perceive. When new information or ideas come along that do not match that reality, we experience a kind of mental stress that Festinger called “cognitive dissonance”. And when that happens we try and do whatever we can to make the dissonance, like the caterwauling of a beginner violinist, go away, either by updating our perception of reality or, for many the easier course, by denying or ignoring the new ideas or information.

The concept of cognitive dissonance is very pertinent to process safety in the offshore oil and gas sector because it helps explain why all the talk nowadays about companies instilling a “safety culture” is misguided. It’s misguided because too often it means an attempt to change the way people at the front line are thinking and feeling about safety. “If only everybody thought differently,” the presumption goes, “all these accidents wouldn’t happen.”

This kind of approach starts at the wrong end of the problem. A company can expend huge amounts of resource trying to change the way operatives, foremen and supervisory staff think and feel about safety. The results will be partial at the very best. A far more effective rubric than “safety culture” is something more basic. I would express it as, “the way we do things around here”. This focuses on what people do, not on what they think, and what people do is something company leadership can indeed control, while what people think is neither here nor there.

A clear example of how “the way we do things around here” can work is seatbelt legislation. I remember very clearly a time when the small minority of people who used seatbelts would be thought of as fussy. Seatbelt avoiders may have been aware of the statistics that proved seatbelts save lives but, not having been injured in a car crash themselves, or knowing personally anyone who had, such evidence could be ignored to preserve a state of mind free of cognitive dissonance.

Then in many countries wearing seatbelts became the law. Since refusing to wear them brought unpleasant consequences, people started belting up. At first there was grumbling, then it became habitual. Now most people think and feel that it is correct and sensible to wear seatbelts. This is the dynamic of cognitive dissonance at work: faced with a new reality (wear seatbelts or get fined) people, eventually, updated their perception of it (‘seatbelts are a good idea’).

This dynamic has been shown to work in industry, even in oil and gas. In the last 30 years the focus on personal safety has produced a marked change. In some operational environments, such as drilling, it used to be a badge of honour to have lost a finger. Now, thanks to a persistent, top-down, “this is the way we do things around here” insistence on certain behaviours, that is not the case.

Four years on from Macondo, however, evidence for a similar groundshift in the realm of major incidents is very hard to find.

Left to their own devices

The drilling industry is highly focused on speed – drilling as many feet per day as possible – while hydrocarbon production is focused on maximizing output. Bonuses, supervisory responses, quarterly and yearly results all bring enormous pressure to bear on reinforcing and intensifying those focal points.

Meanwhile, left to their own devices, people will set out for themselves “the way we do things around here”, and it will be based on experience, which is the most powerful learning mechanism nature supplies. Because major accidents are extremely rare, they figure, statistically speaking, in almost nobody’s experience. So in order to produce the results required from on high, people take shortcuts and even deviate from best practice when the chances of penalties seem remote. For instance they may rely on just one well barrier when theoretically two or three are required because, in their experience, that has always worked before.

For the offshore oil and gas sector, “the way we do things around here” has not even begun to grapple with the prevention of major accidents. That is just a fact, no matter what companies say.

There has been much talk recently about “high-reliability organizations” (HROs) with the airline industry an oft-cited example. It’s true that HROs represent an ideal, but it’s equally true that some organisations and sectors are much, much closer to this ideal than others.

One sector I’ve studied closely is air traffic control. A bread-and-butter requirement of this industry is to maximize the number of take-offs and landings that occur at a busy airport. But overriding that is the absolute, inviolable necessity to prevent a mid-air collision which, from the air traffic controller’s point of view, is the worst conceivable outcome.

It’s also extremely rare for two large aircraft to collide. The last such event occurred in 2002 when a Bashkirian Airlines jet carrying 60 passengers and nine crew collided with a DHL aircraft over Überlingen, Germany. The error, attributed to Swiss air traffic control, led to the deaths of all 71 people on board the two planes. As if it were not tragic enough, the incident had a shocking coda when, in 2004, a man – a husband and father to some of the victims – murdered, out of revenge, an air traffic controller on duty at the time of the accident. Such events may be extremely rare, rarer by far than catastrophic events in the oil and gas sector, but still the air traffic control industry is totally focused on them. How might that “total focus” be measured? The following is one instance. A key indicator of how safe the airways are is whether aircraft remain separated from each other by the requisite distance, let us say, two miles. Using that figure, if two or more aircraft come within one and a half miles of each other, that’s called a “breakdown of separation” and, although the planes are still a long way away from each other, it’s considered a serious failure of process and a precursor event to a major accident.

It’s accurate to say that the air traffic control sector is obsessed with breakdowns of separation. It is the single most important indicator within the air traffic control fraternity. Each incident is recorded, charted and studied very carefully. Movements up or down in the rate of their occurrence are analysed closely.

This is a clear example of the way a high-reliability organization operates. It works out what the most catastrophic event is likely to be, regardless of how rare such events are in recent experience, and devises good indicators of how well the prevention of that catastrophe is being managed. It is a way of thinking that is highly unusual in the oil and gas industry.

We're trying to get organizations to develop adequate process safety indicators, but we haven't got very far. Take drilling: if the hazard of greatest concern is the blowout, then one obvious precursor event is the well kick, when the drillers temporarily lose control of the well. The drilling industry should measure and monitor well kicks closely, and not only kicks but the time it takes to recognize them. At Macondo, the drillers experienced a kick a month earlier and it had taken them 30 minutes or so to recognize it, which is far too long.

Another indicator could be cementing failures. It has been estimated that approximately half the blowouts in the Gulf of Mexico are preceded by cementing failures so, again, these should be treated as precursors to catastrophe and studied carefully. But treating kicks and cementing failures as seriously as air traffic controllers treat breakdowns of separation will strike many as something like overkill.

There are other indicators that could be studied as precursors to catastrophe, such as the ratio of planned maintenance activity to unplanned or breakdown maintenance activity, or the number of authorizations granted to override or decommission safety systems for seemingly justifiable operational reasons.

All of these are indications of increased risk. How sensitive an organization is to risk can be measured by how seriously it takes this increase. If you are going to take these things seriously then you count them, and you make sure the numbers you are getting are accurate. It is that simple. Identifying, counting and managing these indicators is the urgent need.

What can managers do?

The trouble, or, put more optimistically, the challenge, is that the further upstream in the causal process you set the precursor event, the more tenuous is its connection with the catastrophe you are trying to prevent, and the tougher it is to get people to take it seriously. The good news, however, is that companies can make people take things seriously. Operational discipline is very familiar territory for business leaders. Changing the way people think is nigh impossible, but setting up organizational structures that monitor compliance with procedure, even if that procedure is seen as redundant or unnecessary, is doable.

To some extent this involves a shift in focus away from production and toward the management of effective procedure. This shift will be difficult for the oil and gas sector, but it is what high-reliability organizations and sectors do. If a CEO is really concerned he or she will set up a structure that gives prominence to this heightened sensitivity to risk. There will be strong, functional lines focused on process safety that report right to the top of the organization – to him or her, in fact.

Prior to Macondo, BP's process safety structure was decentralized. The safety experts had very little power. They lacked strong reporting lines to the centre and answered to commercial managers who tended to put production ahead of engineering excellence. After Macondo, BP reversed this. Now, what I call the "voices of safety" are powerful and heard loud and clear in the boardroom.

Instilling operational discipline will make more sense to corporate leaders, and will be more effective than trying to instil a safety culture, but it is still a prickly nettle to grasp. Identifying the upstream risk indicators, counting them, measuring them and monitoring the response to them takes vast resource in terms of money, time, and talent.

Other things like incentives need to be rethought. Performance agreements and bonuses now reinforce the priorities of speed and production. They've been made to reinforce personal safety in recent years. They need now to be rethought again to incentivize the avoidance of catastrophe.

There is a cultural aspect to the effort, as well. The oil and gas sector should be telling the stories, over and over again, of the iconic accidents relevant to the industry. Story-telling is a powerful way of educating and reinforcing attitudes.

In air traffic control, the iconic story is still Überlingen. Recently I was doing some work with air traffic controllers in Melbourne and an event occurred that was recognized as a remote precursor to an accident. Immediately, managers mobilized and the name on everybody's minds – and I know because it was on people's lips, as well – was “Überlingen”.

Those people were super-sensitive to any hint of similarities in circumstance to that tragedy. It was unforgettable anyway, but its “inforgettability” had also been intentionally harnessed, to useful effect, in a way that the oil and gas industry's unforgettable accidents such as Piper Alpha and Macondo, generally, have not.

As a rule I avoid naming companies, because there are pockets of best-practice in any company, and also because companies go through cycles and are often very good in the years following an accident. But on the story-telling front, Shell is doing something very impressive. They have identified a set of process safety basic requirements and they have linked each of these with a major accident. One concerns the safe siting of portable occupied buildings, which is one of the critical lessons coming out of the Texas City refinery fire of 2005 in which 15 workers were killed. Another stipulates emergency shutdown valves on platform risers, which stop the flow of hydrocarbons to an offshore platform coming from other sources. The reference here is Piper Alpha, where the fire was fed for hours by fuel piped in from another platform.

Stories are so powerful because they convert raw data into pictures and feelings, which our brains are hard-wired to receive.

Offshore regulators have a crucial role to play because when they say what “the way things are done around here” must look like, the industry has to listen. To get the companies to focus on major hazard risk you need to get the regulators to focus on major hazard risk. In some countries they have already pushed behaviour in certain directions, by requiring gas releases to be recorded and reported, for instance. That is a step in the right direction, but a gas release is still too close to a catastrophic event. The further upstream in the causal process you set the precursor event, the better.

Many regulatory regimes, however, particularly that of the US, are not functioning as they ought to. Regulators need to be highly skilled and resourced and must be able to match the best

minds in industry in order to have competent discussions about the risk-management strategies of the corporations. In the US they're not doing that yet. The best practice recognized worldwide is the safety case regime, in use in UK and Norway.

To conclude, I'll say that culture change, if it is to mean anything at all, emanates from the top. The leadership of a company must put in place systems to ensure it is getting the behaviour it wants. It is not cheap, nor is it easy, but it works. The fashion for "safety culture", insofar as it relies on a campaign for hearts and minds, is at best wishful thinking and at worst a thinly disguised version of the blame-the-worker strategy which we've been combatting for years. It is up to the organization to step in and find ways of short-circuiting the collective drift toward experience-based standards of behaviour, which do not take into account extremely rare events. It's time to take control of the way we do things around here.

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