PREVENTING
CATASTROPHE

Executive Summary

Prevention of catastrophe needs to involve every nook and cranny of the organization. This is work that cannot be outsourced to a Risk or Safety Department. It is work that must be carried on by people at all organizational levels and throughout the breadth of the organization, supported by Risk and Safety experts. The work of preventing catastrophe cannot be eliminated by any one-time fix such as the implementation of a Risk Management System or specialized task force.

Key Capabilities for Prevention

Twenty organizational capabilities are required to ensure catastrophe is kept at bay. Six of these capabilities are components of the Risk Management System (RMS) but the RMS is not even remotely adequate on its own. The RMS must be surrounded by a healthy risk culture, operational excellence and a skilled and knowledgeable regulator. The necessary capabilities identified in our research are outlined in the following sample Risk Scorecard.

If any one of these capabilities is weak, the pathway to catastrophe could open. One of our participants said, "Nature is very good at discovering the one fatal flaw in the organization."[1] It takes commitment throughout the organization to achieve a high level of performance on this set of elements. This effort is repaid through reduced catastrophe potential and increased organizational performance.

Risk Scorecard Sample Results

Legend: RMS · Risk Culture · Operations Excellence · Regulator
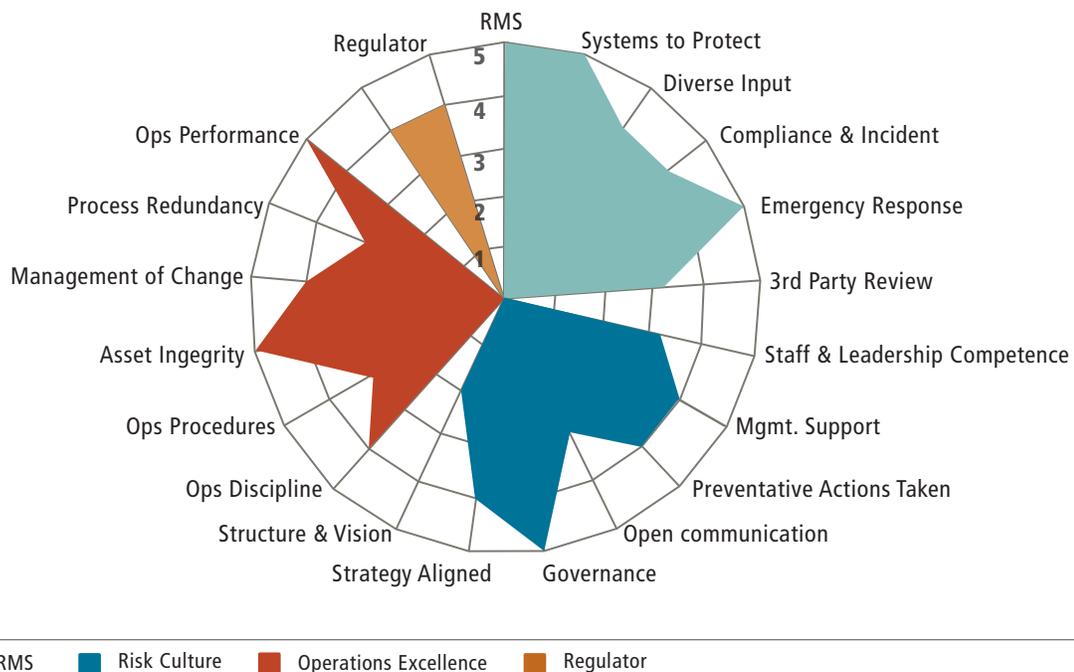
[1] All unattributed quotes in this report are direct quotations from the Expert Group participants.

Catastrophe Fundamentals

A **catastrophe** is a great and usually sudden disaster. Our research focused on preventing man-made catastrophes of two types: major industrial incidents causing great harm to workers, the environment and the general public; and information technology disasters causing serious strategic damage. Catastrophes are distinguished from other incidents by their scale and the difficulty of containing the consequences on the host corporation and the public. We excluded financial catastrophes from our project.

It is difficult to grasp the potential for catastrophe partly because so few of us have direct experience with it. These are low frequency events so it is hard to test theories about catastrophe through experience. And the long period between events causes some people, and some teams, to feel invincible. This can feed their risk appetite and set the stage for huge problems.

Three concepts are fundamental to understanding catastrophe and how to prevent it:

- Performance on personal safety is a poor predictor of catastrophe potential.

- Prevention of major accidents depends on defence-in-depth: a series of barriers to keep hazards under control. Catastrophe happens when all these barriers fail simultaneously, or in rapid succession.

- In retrospect, after catastrophe hits, it is always evident that warning signs were not treated seriously, and that preventive action could have arrested the problem with very little cost.

Barriers to Preventive Action

Preventive action is routinely acknowledged to be cheaper and easier to implement than action after a problem occurs. This is true in widely varying fields such as product quality, surgery, highway safety and financial control. When considering catastrophic problems, the gap between the cost and benefit of prevention is astronomical – it is always massively better to prevent a catastrophe than it is to deal with and control its consequences.

In spite of the advantages of preventive actions they are sometimes blocked. The three most important barriers to preventive action are:

- Failure to perceive risk

- Leadership failure

- Production pressure

The **failure to perceive risk** is the most important of these barriers. In the apparent absence of risk, preventive action makes no sense. The pathway to catastrophe will be gapingly wide if key risks are not acknowledged and acted upon.

Leadership failure, particularly from senior leaders, is another critical barrier. The *tone from the top* is set by the actions and decisions of senior leaders. This tone builds the foundation of the risk culture.

Production pressure is the third most powerful barrier to preventive action. The pressure for cost reduction, profit, speed, quality and other aspects of production can be very positive, but only when balanced with pressures for protection against risk.

Healthy Risk Culture or Culture of Risk?

A healthy risk culture supports people who manage risks well and strive for excellence, innovation and high levels of performance. In a culture of risk people are encouraged to take chances.

Developing a healthy risk culture is a challenging business. It requires leaders at all levels in the organization acting in an aligned way, each doing their part building and maintaining the health of the risk culture. The risk culture is built over time with an accumulation of what leaders do during their *moments of truth.*

The risk culture is important because the trigger event leading to a catastrophe can be any one of thousands of decisions taken every day close to or very far away from head office. The risk culture sets the template for these decisions, establishing the tolerance for risk and the requirements for protection. No one can possibly supervise or monitor the choices taken on any day in a complex organization but the culture guides these choices, for better or for worse. The right culture will keep the organization out of massive trouble.

Building a healthy risk culture is simple conceptually but challenging in practice. It is simple to say that the key requirement is having senior leaders walking the talk consistently. But this takes discipline and strength of character when the leaders are placed, as they always are, in a world of competing priorities, demands for improved performance and vast quantities of uncertain information.

Assessing the Health of the Risk Culture

We identified six foundational components of an organization's risk culture. Leadership behaviour in each of these areas determines the risk culture that is acted out in the organization.

Each of these elements is difficult to define and measure but you can be sure they are assessed every day by people in field offices, control rooms, maintenance shops and engineering shops. It is their assessment of the risk culture that establishes the templates for local decisions. These decisions establish whether the pathway to catastrophe is open or closed.

The foundational components of the risk culture are:

- Sincere management support

- Preventive actions taken when appropriate

- Open communication about risk

- Governance

- Organizational strategy and systems aligned with risk management

- Organization structure and vision

Performance in each of these areas has to be strong and consistent so that its effect is felt in all areas of the organization. Building a healthy risk culture is similar to building trust – both take a long time to establish and just one serious mistake to damage beyond repair.

Beware Subcultures

Even the healthiest risk culture can contain pockets of danger. These can be departments, district offices, business lines or other special divisions that are somehow immune from central influence. The technology, environmental conditions, market conditions or other factors may well demand a different approach to risk from the rest of the organization. But be careful that this does not mask a weakened risk culture.

The danger lurking within a strong subculture can be especially difficult to grasp when the subculture produces great financial results. This may cause a very strong organizational reluctance to disturb the goose laying all those golden

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eggs. The assessment will be further hampered if senior management does not have a gut-level understanding of the business model or technology used by the subculture, as they won't understand the risks either.

Subcultures may be a sign of a healthy risk culture if they are formed for the right reasons and their unique rules truly contain their unique risks. Subcultures do have the potential for hiding nasty surprises so they need to be monitored with care.

The Objectives of a Healthy Risk Culture

When a risk culture is healthy it produces three important results for the organization:

- Minimized risk blindness

- Reduced deafness to signals of danger

- Proper balance between production pressure and protection

As mentioned, the failure to perceive risk is the most powerful barrier to preventive action. As a consequence, reducing risk blindness is a primary objective of any healthy risk culture. In a healthy environment the RMS is used actively at all levels of the organization as a tool to help discover, discuss and manage risks rather than as a bureaucratic process. Risk awareness is also encouraged through storytelling, aligning management systems to support risk management, and training staff in operations and risk analysis.

Perceiving the risk is not enough. A healthy risk culture contains open, two-way communication about risk. This is supported by following up on danger signals – otherwise the organization appears deaf and the intensity of the signals diminish. It is not always popular to raise inconvenient concerns but a healthy risk culture makes sure it is safe for people to speak up.

A healthy risk culture balances two forces: pressure for production and protection against risk. Over-emphasis on either can freeze the organization. But when pressures for production and protection are in balance these forces are not in conflict. Preventive action reduces error, rework, disruption, injury and other factors that mess up schedules and budgets. And the safe way is often more certain, simple and easy to implement than the high risk road.

The Performance Bar is High

The best competitive advantage comes out of building a strong culture. Build it the wrong way and the culture can produce hubris (excessive pride, arrogance) and an enormous appetite for risk. Build it the right way and you will have solid results and good reason to sleep comfortably at night.

A healthy risk culture is demanding. As one of our Expert Group said, it needs "Board and senior Executive team 'walking the talk' about RMS all the time even if it costs more, reduces earnings, disappoints shareholders or analysts or results in dismissal of a senior executive. RMS can't be seen as being implemented only when it doesn't hurt." Once you get to this lofty peak, you then have to sustain the risk culture's health in an atmosphere of competitive pressure, investor impatience and technological change.

Role of the Regulator

Our Expert Group had a cautious appreciation of the regulator's role in prevention of catastrophe. They are very clear that a knowledgeable and skillful regulator can be a great help but they are cautious that the regulator can overplay its hand and in doing so could increase the risk.

There was very solid agreement on the general role of the regulator in prevention. By far the most important aspect of this work is in setting standards of performance together with industry stakeholders. This is followed at some distance by compliance action, work to raise the bar of industry standards, and investigation of serious incidents.

The prime responsibility for preventing catastrophe lies within the operating organization. The caution about the regulator's role comes in considering how prescriptive and interventionist the regulator should be. A skillful regulator will adjust its level of intervention to the maturity of the industry and the health of any individual company's risk culture. Erring in either direction could increase risk.

Keys to Preventing Catastrophe

Prevention of catastrophe is a test of an organization's character. Every organization says roughly the same things about the importance of safe operations. The test lies in what people do when production pressure, financial challenges, resource constraints and other issues push their hardest. Leaders have to demonstrate that they mean what they say about the priority of protective measures.

And leaders have to be relentless so their message is heard from a great distance. The real character of the organization is revealed by how risks are managed far from head office by front-line supervisors, district engineers, procurement specialists and others.

It is not about avoiding risk or compromising organizational performance. Preventing catastrophe requires staff and leadership competence, open communication, aligned strategy and operational discipline – these and the other key capabilities build broad organizational strengths. Healthy risk cultures can be enormously productive and highly innovative.

■ RESEARCH OUTLINE

This research explores the ideas and experience of a remarkable group of operations and executive leaders who have succeeded in preventing catastrophe during their careers. The members of this Expert Group work in industry segments that have the potential of catastrophic incidents: offshore drilling, high-speed rail, oil and gas production, engineering, procurement and construction management (EPCM), nuclear plant operation, pipelines, refining, industrial construction, electrical distribution, and information technology (IT). We also included the perspectives of regulators of these industries and process safety professionals.

The Expert Group represents a diversity of organizational levels and backgrounds. Every member has been (and may still be) a technical expert in their field; some are now in management, senior executive or board roles. A few are in academic or consultancy positions. None are currently in front-line operations jobs. Expert Group members reside in Canada, U.S., U.K. and Europe, with the bulk of participants from Western Canada.

Our purpose was to assemble the practical wisdom of the Expert Group members on this complex subject. We used a research tool called the Delphi Method, built on three rounds of iterative questionnaires. At the end of each round we produced an interim report and a more refined set of questions for the subsequent round. We all learned from the shared perspectives at each stage.

In April 2014 we published the final report of our research on preventing catastrophe in organizations. Fall Line Systems deeply appreciates the time and commitment of the Expert Group members. We had a 97 percent completion rate in our questionnaires and a great deal of challenging discussion in response to each interim report. The good ideas here come from people who have done the work to prevent catastrophe in their organizations. We thank them for this as well.

The final Research Report and the three interim reports are published and available at http://www.fall-line.ca/preventing-catastrophe