Gulf Oil Disaster: Root Cause Analysis

By William M. Duke

Disasters like the tragic fire of April 20, 2010 on board the Deep Horizon happen for a reason. The reasons are often unclear for months or years after the incident. Sometimes, the reasons never become clear. However, the sad and shocking reality is that disasters like this happen repeatedly for the same fundamental, or root cause, reasons. Whether it is an oil rig fire, a nuclear power plant accident, or a space shuttle disaster, root causes are common. They occur, not because people cause them or because things break down, but because organizations fail.

Humans naturally seek to blame someone. We want to know who is responsible. As of this writing, British Petroleum is locked in a desperate battle to stop the flow of oil from a broken pipe 5,000 feet below the surface of the Gulf while massive oil slicks invade the shores of Louisiana and threaten the entire Gulf Coast region. BP's efforts have appeared inept and have summoned stinging invective from virtually every organized voice affected by the disaster. But, who gets the blame? Should it be BP's CEO because the buck stops at the top? Or, was it one or both of the two senior-most managers on board the Deep Horizon at the time of the fire? One of those managers was from BP, the company leasing the Deep Horizon to Transocean. The other was a senior manager from Transocean, the company operating the derrick. Was it the Captain of the Deepwater Horizon, who at the time of the fire was attending a ceremony with the other two senior managers to celebrate 20 years of incident-free operations? Does it matter? Will blaming someone and punishing them stop disasters like this from happening in the future?

Humans have a deep need to seek retribution against those that harm us. This is not irrational. Nor is the desire to seek justice for those harmed by disasters. But, this need often preoccupies and distracts us from the more compelling need to understand why such things happen. We cannot prevent what we do not understand. We can address an individual committing the same mistake by taking away their ability to do it. We can address an organization from repeating mistakes by punishing it or imposing tighter controls and oversight. But, in doing so we are not addressing the most fundamental "Why," the true root causes of such disastrous events. We live in a complex world where small events can have colossal effects. We tend to think that in such a complex world there are an infinite, or nearly infinite, number of root causes. This is not true. Research over the past few decades demonstrates that root causes fall into a very few categories and that these root causes, unfortunately, recur frequently.

The Deepwater Horizon disaster frighteningly mirrors the Exxon Valdez spill of 1989. Certainly, the ship's Master, Joseph Hazelwood, bore an enormous share of the blame for the disaster and suffered public vilification for many years to follow. Hazelwood was clearly derelict in his duties having consumed alcohol and retired to his cabin to sleep it off prior to his ship colliding with a reef. But it was not Hazelwood that caused the collision. It was his poorly trained and exhausted crew who did not possess an operational sonar system to alert them of the danger that resulted in the collision. But does it end there? No, Exxon bore responsibility too in that it knew Hazelwood had an alcohol problem yet did nothing to remove him from his position.

Exxon cited human resource policies that guaranteed employees protection in their current positions in order to expose and address addictions rather than force them in to hiding. Although Exxon might be given high marks for its progressive employment policies, it failed to appropriately consider the risks of investing extraordinary authority and responsibility in someone so compromised.

It is easier to blame a person than an organization because a person can bear moral responsibility and be punished. They can be singled out. For professional misconduct, licenses may be revoked. For criminal activity, a person may be imprisoned or even executed. But organizations are not individuals in a real sense. Legally, a corporation is treated as an individual. But, beyond that, the analogy begins to fail. Organizations are run by the individuals that compose them. As individuals behave according to their personalities, organizations behave according to their cultures. Edgar Schein, one of the most respected scholars in the field of organizational culture declares that leader's must recognize the power of culture within their organizations and accept that positively affecting that culture is the ultimate challenge of leadership – and perhaps their most significant responsibility.

A police force does not fight criminals; it fights crime. If someone commits a crime, we do not blame the police. However, if crime rates increase over a period of time we do. That is because we do not expect police forces to eliminate crime. We expect them to maintain order. When great threats arise, we expect police forces to protect us from harm and offer aide. Preparedness is the role of the police and other emergency responders. That is their mindset. However, the mindset of most organizations, large and small, is not one of preparedness or crisis response. They are not prepared for contingencies. Their personalities, their cultures, focus too much on the individual and not enough on the organization itself. Turning the focus inward to specific root causes is the first step to developing a healthier culture. As when we assess ourselves we have to turn the eye inward, face our shortcomings and address them. That all begins by seeking root causes for failure.

Organizational Failures

After a few years, scholars will have dissected every available detail of the Deepwater Horizon disaster and final judgment will have been passed. There will likely be more government regulation and untold economic and environmental effects. In one way or another, attitudes about offshore and deep water drilling will change too.

From the information that has arisen so far, certain root causes are already floating to the top of the oily waters. As indicated in the opening, poor leadership, evidenced by a lack of clear decision-making authority on board the Deepwater Horizon, appears to have affected the ability of rapid, critical decisions to be made. Whether this was due to the shortcomings of any one of the two senior managers present or the captain himself is unclear. It also appears that the standard operating procedures may have set up a confusing structure of cooperative decision-making authority. If so, those senior personnel present may have been placed in a paralyzing position. If, in crisis situations, one person is not in charge, then no one is in charge.

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One of the most telling anecdotes of the disaster, if true, is that of the 23-year-old woman responsible for aspects of Deepwater Horizon's navigation who, in response to the massive fire, broadcast "Mayday, Mayday" on the vessel's radio. The vessel's captain reprimanded her by exclaiming "I didn't give you authority to do that." Her response was an apologetic "I'm sorry." To reprimand a subordinate for taking positive action in a crisis situation rather than standing by helplessly awaiting orders that were unlikely to come from a potentially paralyzed decision-making structure, is a mark of extraordinarily poor leadership.

Beyond the leadership root cause failures, there is the apparent root cause of the real disaster, the inability to stop the oil leak for more than a month. This is a failure in contingency planning. Perhaps the most frustrating and utterly dumbfounding issue is that something so well-recognized and prepared for as an oil rig explosion at sea could so easily lead to an oil leak of such massive proportions with no means of stopping it. Simply hoping that something bad will not happen is an open invitation to catastrophe.

Finally, what lesson did BP, or for that matter the U.S. government, fail to learn from previous oil spill disasters like that of the Valdez? Surprisingly, although Exxon bore responsibility for the Alaskan spill, it was BP that managed the clean-up. What lessons did they learn that they failed to implement in order to deal with the Deepwater Horizon contingency?

One of the most infamous and spectacular disasters in modern history was the explosion of the Space Shuttle Challenger. The cause of the explosion that killed 7 astronauts, including a school teacher, was the failure of an "O" ring in the solid rocket boosters that powered the shuttle into orbit. The root causes, however, were not material failures, but failures to effectively communicate the dangers to decision makers and a failure of decision makers to listen. The Challenger exploded because decision makers were too constrained by a single pattern of thought that provided no room for discussion or dissension. It suffered from *Groupthink*. Coined by Yale Psychologist Irving Janis, *Groupthink* is a mode of thinking within groups or teams in which the need for unanimity overrides their motivation to realistically appraise alternative courses of action. Groupthink is characteristic of teams with little diversity and an inability to effectively collaborate to reach decisions and develop plans.

Similarly, communication root cause failures are shared with the Eastern Airlines Flight 401 disaster of 1972 in which a passenger airliner crashed into the Florida Everglades killing 101 passengers. That crash was caused by an accidentally disengaged fight control that went unnoticed by the crew as they ceased monitoring the aircraft in order to shift their attention to resolve a landing gear problem. In spite of the crew's lack of situational awareness, the aircraft's descent was noticed by an air traffic controller that never clearly and openly communicated the issue to the flight crew. Flight 401 crashed because of a few minor, correctable errors in organizational behavior.

It is often small, seemingly insignificant issues that, when combined with others cascade into catastrophes. Such was the story of the Three Mile Island nuclear power plant meltdown in March of 1979. A series of mechanical failures, each insignificant on its own, combined to create a coolant leak. Although the accident was brought under control, the root causes were

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related to the design of the plant, in so far as its user interface controls were concerned, and other human factors to include inadequate training. Training is an essential component to mastering any complex system. Poor communications also marked the incident in that confusing and ambiguous statements by leadership demonstrated poor crisis response abilities. Had the accident been more severe, poor communication and contingency planning could have turned a crisis into a catastrophe.

One of the most interesting aspects that these and countless other disasters demonstrate is that in the complex modern world, large failures often arise from minor, almost imperceptible ones; and that these small failures may be nearly impossible to detect or prevent. We must accept that failures will occur and that they may not be preventable. To believe anything different is foolish. Our challenge is not to prevent failures, but to develop capable and responsive organizations that respond to failures skillfully and prevent them from precipitating into larger failures or catastrophes.

A number of scholars and researchers have closely studied why some complex organizations in high-risk environments have operated with very few accidents over many years. These organizations have been labeled High-Reliability Organizations (HRO's). University of Michigan professors Karl Weick and Kathleen Sutcliffe argue that high-risk operations like those onboard U.S. Navy aircraft carriers display these characteristics. For example, aircraft carrier flight operations demonstrate slightly less than 3 fatalities per 100,000 flight hours in spite of operating in an extremely hostile, complex, and constantly-changing environment where the average age of the workforce is only 21 years. Overall, Weick and Sutcliffe have coined the term "mindfulness" to describe 5 characteristics of most HRO's. Mindfulness in organizations tracks small changes, resists oversimplification, remains sensitive to operations, maintains capabilities for resilience, and takes advantage of shifting locations of expertise.

Organizations that possess the characteristics of mindfulness are able to address root causes and continually improve their ability to minimize failure, and when failure does occur, mitigate its effects and learn from it in order to prevent recurring failures. If anything is clear at this point in the Deepwater Horizon disaster, it is that if inevitable failures did occur, that mindfulness was not in play throughout the course of events at least in so far as the response to the oil spill and the inability to effectively respond.

The question remains, however, how does an organization actually develop these characteristics when mindfulness is, at heart, a cultural phenomenon? Organizational culture is very difficult to change. Weick and Sutcliffe offer some sage advice. They assert that, in order to change your culture, you should act your way into what you want to become. But, if it's about acting, where's the script?

A Script for High Reliability Organizations

A good planning process is the first script to follow in becoming a mindful, high-reliability organization. Good planning is flexible and adaptable, qualities that most organizations fail to

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master. Instead, most organizations view planning as a static practice – you make a plan and then you execute it exactly as you planned it. This is a very myopic view of planning, one that can only succeed when you have two things; 1) a perfect plan; and 2) a static environment. Neither exists in the real world. At best, we work with good plans that must adapt continuously to changes in the real world. Good plans are iterative. That is, they go through a series of changes before and during their execution. Furthermore, there are simple and clear processes by which organizations may plan the right way.

Another script to help act your way into becoming an HRO, is through proper team collaboration. Collaboration, should be a function of planning. Plans, however simple, should not be made in isolation and handed down to a team or individual to execute. Centralized planning is the first step to failure. Instead, planning should occur in diverse teams. When Weick and Sutcliffe note that HROs are sensitive to operations and take advantage of shifting locations of expertise, they mean that decisions and plans are made and executed at the operational level where detailed, relevant knowledge and expertise is found. Planning and decision making is performed by experts. But, by expert, they mean those that possess the most relevant and up-to-date information. That information is often possessed by those at the front-line of the organization where the real work is being done. Any collaborative planning process should include these experts. Like planning, good collaboration follows a disciplined process that is easy to learn and facilitate.

As we have seen in the several disasters outlined above, one of the principle root causes has been a failure to create or implement proper contingency plans. Contingency planning should be a part of the overall planning process. To disassociate potential contingencies from the context of day-to-day activities is dangerous. Active contingency plans serve to remind organizations that routine activities should never become routine. HRO's are perpetually mindful of what could go wrong and what they should do in the event that something does go wrong. Nothing is ever routine in a mindful organization. In high-risk environments, threats and risks assessments are inextricable parts of the planning process.

Once we act out the processes of good planning and collaboration we take a big step in setting organizations up to execute more effectively. Effective outcomes often are not just the responsibility of individual organizations but represent the collaborative efforts of multiple organizations or teams. As we have seen in the Deepwater Horizon case, we even have teams intermixed with other teams. One of the apparent issues surrounds the fact that both BP and Transocean are cooperating in a high-risk environment. But, are they collaborating? Already, we have reports surfacing that there was confusion over who had the authority to make decisions as the fire was developing. In a proper collaborative planning process there is a requirement to create that accountability and clear up potentially deadly confusion and delay.

Specific, accountable plans provide the script to act out another powerful means to achieving mindfulness – learning. Developing a culture of learning is absolutely critical to an HRO. It may even be the most important attribute. It is important because only learning organizations have the potential to display three of the five characteristics of HRO's – tracking small failures,

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resisting oversimplification, and maintaining capabilities for resilience. Learning is a prerequisite for any organization interested in process improvement. Of course, there are processes for learning, too.

Weick and Sutcliffe note the value of After Action Reviews (AAR's), post-mortems, or debriefs. Debriefs form the most fundamental and powerful learning process in any organization. The most widely-practiced and effective debriefing process is one that is a component of the *Flawless Execution Model* developed by James D. Murphy. Murphy's consulting firm Afterburner Inc. teaches companies all over the world how to conduct a proper debrief and that to fail to debrief is to miss the greatest learning opportunity available. Good debriefing, like good planning, follows a disciplined process. In that process there is no room for blaming individuals. Good debriefing acts out the candid process of questioning without attributing failure to individuals. Coupled with a planning process that not only provides the opportunity for everyone to offer their ideas, but actually requires it, a debriefing process that provides the opportunity for open criticism takes a giant leap toward creating an organizational culture of questioning. 'Experts' in an HRO must feel safe to question authority. To withhold important information because of a fear of questioning authority figures is not an attribute of HRO's.

Once that sense of safety is developed, candid discussion may begin in the debrief. There are two central activities within a good debriefing process. The first activity is to formalize specific actionable lessons learned. Lessons Learned must be written down. They must also be clear and expressed as specific actions to be taken. We have seen that communication is often a root cause of failure. The temptation, then, is to simply tell teams to 'communicate better.' Great, but how exactly is that to be done? That is the job of the lesson learned – to specifically explain to future teams and individuals how, under particular circumstances, to improve some activity. And, once that is done, there must be a means to transfer that lesson learned into a format that is readily available to anyone in the organization that might require it.

The second is to isolate both successes and failures and seek root causes for each. Because HRO's include diversity in its teams and those teams take part in the debriefing processes, many minds and perspectives are brought to bear when seeking out the root causes of failure. Because of that diversity and candid environment, teams can resist the temptation to oversimplify issues and miss the small issues that could indicate major failures or shifts in the operating environment. Furthermore, when debriefing takes hold as a common practice, those root causes can easily be tracked, analyzed and targeted as areas of improvement or response to change. The ability to identify leading indicators of change and acting upon that change is a powerful means of developing greater resilience in any organization. It all begins with empowering others to question.

If a culture of healthy questioning can be developed in a culture as hierarchically structured as a U.S. Navy aircraft carrier, then any organization can do it. But, for the process to work, leadership must take the first step. Poor leadership, has often been a root cause in disaster. Although leadership is a complex art requiring years of experience to master, there are simple practices that good leaders perform. To a large extent, the first step in developing leaders is a process of good planning and debriefing. In the disasters discussed, we demonstrated that

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communication is one of the common root causes. Communication is one of the most significant responsibilities of a leader. Communication begins at the top of the organization and cascades downward. It is most easily accomplished through a series of long and short range plans that includes the leader's intent rather than specific actions that must be taken. Intent corresponds to the notion that planning should be decentralized and performed by those who will execute the plan. Leaders at each level in the planning process should incorporate a simple briefing process to align each team toward overall organizational goals. Leaders may even utilize a literal script when briefing their teams - a script developed during the planning process.

Ultimately, leadership involves having the courage to tap the skills and knowledge of the organization as a whole. It means implementing common processes and modeling those processes while holding others accountable to do the same. Good leaders get all the actors reading the same script.

"To be mindful," say Weick and Sutcliffe, "is to resist the powerful temptation to blame individuals." To do that, leaders have to first to accept their share of responsibility for failure. Only when leaders demonstrate their ability to accept responsibility will others in the organization feel free to speak up, offer criticism, accept responsibility themselves, uncover root causes, and take action to improve. For High Reliability Organizations, then, blame shifts from individuals to the organization as a whole. Once root cause failures can be identified and tracked, then the organization can begin real improvement and prevent most disasters as well as properly react to those that do occur.

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