



Moving the Needle in Safety Performance – It’s All in Your Brain

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The oil and gas industry involves some of the most dynamic, complex and high hazard working environments in the world. When workers and equipment interface, exposures run high. Yet, the industry is also on the leading edge of safety practices, systems and processes when it comes to reduction of injuries and events.

But leading the way came at a significant cost. The best practices leading the industry in reducing injuries and environmental impact were sparked by the 1988 Piper Alpha incident that took 167 lives. Significant lessons were learned and the industry developed greater knowledge of how culture, leadership, and behavior all impact safety performance.

Since that turning point, operators, contractors and service providers have placed greater emphasis on initiatives to develop culture and leaders. There also has been a greater implementation of near-miss and behavior-based programs focusing on observation and feedback. There have been more resources invested to eliminate and reduce exposure that leaves people vulnerable to workplace incidents. All of these efforts have helped reduce undesired safety events.

But is that enough? Even with all the great strides made across the industry, there continues to be imperfections in HSE

performance that harm good people who completed similar tasks without injury time and time again.

Injuries don’t just affect poor performers and those with limited experience. With the recent downturn in the industry operators and contractors are “doing more with less.” High performers – typically the workers with more experience – currently represent the largest portion of the current workforce. So why is it that incidents are still occurring? Many argue zero is not achievable because people aren’t perfect. They say some people are just prone to make errors because the fallibility of being human is that we make mistakes.

Well, those who make these arguments just might be on to something.

Instead of trying to “fix” a person, organizations must change how they design work and work-related activities that fit that person.

It's Not the Worker's Fault

When incidents occur, the common reaction is to blame the worker. The complaint is that the worker didn't know enough, didn't have the capabilities, or simply just didn't care. This can be a dangerous road to go down as it can damage culture and, more importantly, it does not get at the root of the human error that contributed to the incident.

Blaming the worker leads to "easy fixes" like re-training or disciplinary action. While these corrective actions may be necessary in some cases, most incidents involved good, knowledgeable and capable workers. Therefore, fixing the person is just not an acceptable solution.

Why? Because we are all wired in a similar way that sets us up to be imperfect and make errors. Remember, it is not enough to understand that "to err is human." The key is what Oscar Wilde once said is true for our industry: "It is not the prisoners who need reformation, it is the prisons."

Indeed of trying to "fix" a person, organizations must change how they design work and work-related activities that fit that person. Consistently accomplishing job tasks accurately, completely, and efficiently based upon agreed procedures and standards of excellence, is best done through applying knowledge of how we are wired. We need to create a human-work interface that maximizes the potential for right first-time performance.

To do that requires an understanding of how the brain works and how visualization plays a role in the decisions we make.

How the Human Brain Operates

The human brain is actually several brains housed in one.

Two key components of the brain include the cerebrum and the paleo-mammalian cortex. The cerebrum, or "slow brain," is the part of the brain that consciously processes information. It analyzes, problem solves and makes decisions.

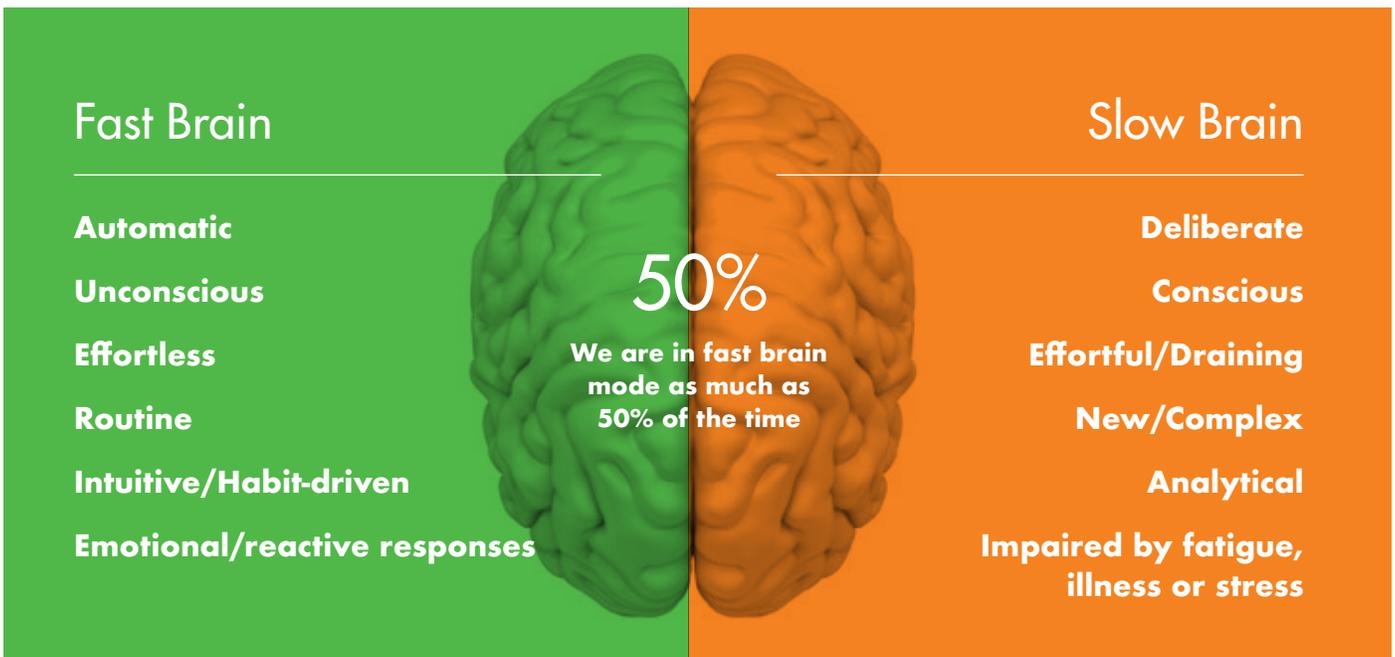
The paleo-mammalian cortex, or "fast-brain," is also a part of the brain that processes information, but it does so at greater speed and moves us into action based upon reaction and habit without consciously thinking through the situation and information available to us.

When it comes to most activities where safety is paramount, ideally, we want slow brain functioning, which is more analytical and gives us time to make safe decisions. After all, fast brain functioning can lead to human error because it relies more on habits — Which can be disastrous in a situation that requires stepping outside the lines to accomplish an unexpected task safely.

Fast brain functioning is most prominent involving repetitive tasks and among experienced workers who have fallen into the trap of doing things the way they have always been done.

Take the example of an incident that occurred during a milling operation on an offshore platform where a solids control (i.e., swarf) unit was integrated with the drilling fluids system for removing solids. During the operation, there is a possibility of solids plugging the hoses which could result in backing up

Fast Brain / Slow Brain



fluids and losing primary containment. In this instance, solids began to plug the hose to the unit. The solids control operator communicated to the drill floor to “cut the pumps” believing the driller would completely turn off the pumps.

Instead the driller reduced pumping rate resulting in back up of fluids and loss of primary containment. The drill crew typically used the term “cut” synonymously with “reduce” whereas the solids control operator believed “cut” meant to “shut off.”

In this situation, human error was a significant contributing factor to the undesired event. The human error related to the brain-centered hazard is known as fast brain functioning. Here, the driller’s actions aligned with how he and his crew always interpreted “cut the pumps.”

How to Prime Slow-Brain Functioning

The slow brain is not a light switch. People do not choose to turn it off and on. The brain finds opportune times to conserve energy and use the fast brain, which uses less energy than the slow brain. It does this during more routine tasks that have been done before. Driving is a great example of when the brain functions using the fast brain.

Work activities must be designed with this in mind. They need to prime people to consciously think through activities that, while quite similar, are often still different in a highly complex and dynamic work environment commonly found in the oil and gas industry.

Some tips for priming slow brain use include:

Create engagement in pre-work activities such as pre-job safety briefs. Dig deeper by using follow-up questions to promote specific responses such as:

- What is different this time doing a familiar job?
- What could go wrong (i.e., cause process or personal safety event)?
- How will the team prevent those potential undesired events?

Transform your worksite engagements by focusing on exposure to brain-centered hazards™ and asking questions to promote thinking among workers about how they are controlling specific exposures.

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Planning high-risk job tasks at more optimal times of the day where energy is higher.

Creating effective SOPs and risk assessments that identify exposure to brain-centered hazards and appropriate techniques for managing them.

Enhancing Visual Recognition

Workers are also wired in a way that misses information that is key to completing a job accurately and safely. We can miss information for a variety of reasons, but quite often we simply see what we expect. This is known as expectation bias. It is analogous to the reason why motorcycles are involved in so many accidents on highways – people simply do not see them because they are looking for other larger vehicles.

Take the example of an incident that occurred on the cargo deck of an offshore installation.

Typically, the deck is fill with large equipment and cargo containers sitting on a series of raised beams. Roustabouts maneuver containers into tight spaces around other containers that are easily visible. When walking in the area, as many roustabouts must do, the obvious exposure is other containers being backloaded and landed in the area as well as the exposure to the beams that could result in someone tripping. On this day, the deck was free from large containers. Roustabouts were laying out lifting gear across beams to backload for testing and re-certification onshore. As a crew member stepped over a deck beam, they stepped on a lifting sub that was in between the beams, rolling their ankle resulting in a fracture.

While other factors contributed to this incident, visual recognition brain-centered hazard is highly relevant. A general scan of the environment did not identify any additional exposures because those that typically exist in the area were not present. Thus, the brain did not identify anything else out of the ordinary that required further or different action that might have been taken had the exposure been identified.

In the complex, dynamic and high hazard environment seen in the upstream oil and gas industry, visual recognition is paramount to reducing exposures. Expecting workers to have good situational awareness is not enough as indicated by continuing incidents that are contributed to by poor visual recognition of exposures. In the complex landscape in which work is being done, it is extremely difficult for a worker to identify all exposures by just general scanning and with no strategy.

Some ways to enhance visual recognition include:

Implementing

Implementing a strategy that looks more broadly and deeply to identify “hard-to-see” exposure. Like a hunter, a worker can divide the field of vision into smaller chunks to search for exposures that are most likely to result in incident .

Using

Using brain-aligned checklists for critical exposures that will result in serious injuries and fatalities if not controlled well.

Designing

Designing work-related activities that includes a conversation surrounding what has changed or what is different.

Establishing

Establishing specific pause points to re-assess for worksite changes creating additional or different exposures.

Conclusion

Given the complex, dynamic nature of the work environment in the oil and gas industry, it is important to understand how we are wired as people. Simply hiring great people, re-training workers or disciplining workers will only continue to mask the underlying human performance issues and not truly reduce potential for human error to result in undesired events.

If the industry truly wants to transform the current safety performance, it is imperative to understand how we are wired, how our brains work, and how brain-centered hazards play a role in human error.

No one is immune to making errors. And yet any time there is human error in such a high hazard environment the costs can be quite significant. Priming slow-brain functioning and developing a more strategic approach to the visual recognition of exposures is paramount to increasing consistency in human performance.

As each control is imperfect, it is key to implement multiple layers of controls. Future articles will focus on additional brain-centered hazards affecting human performance in oil and gas.

Learn More

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