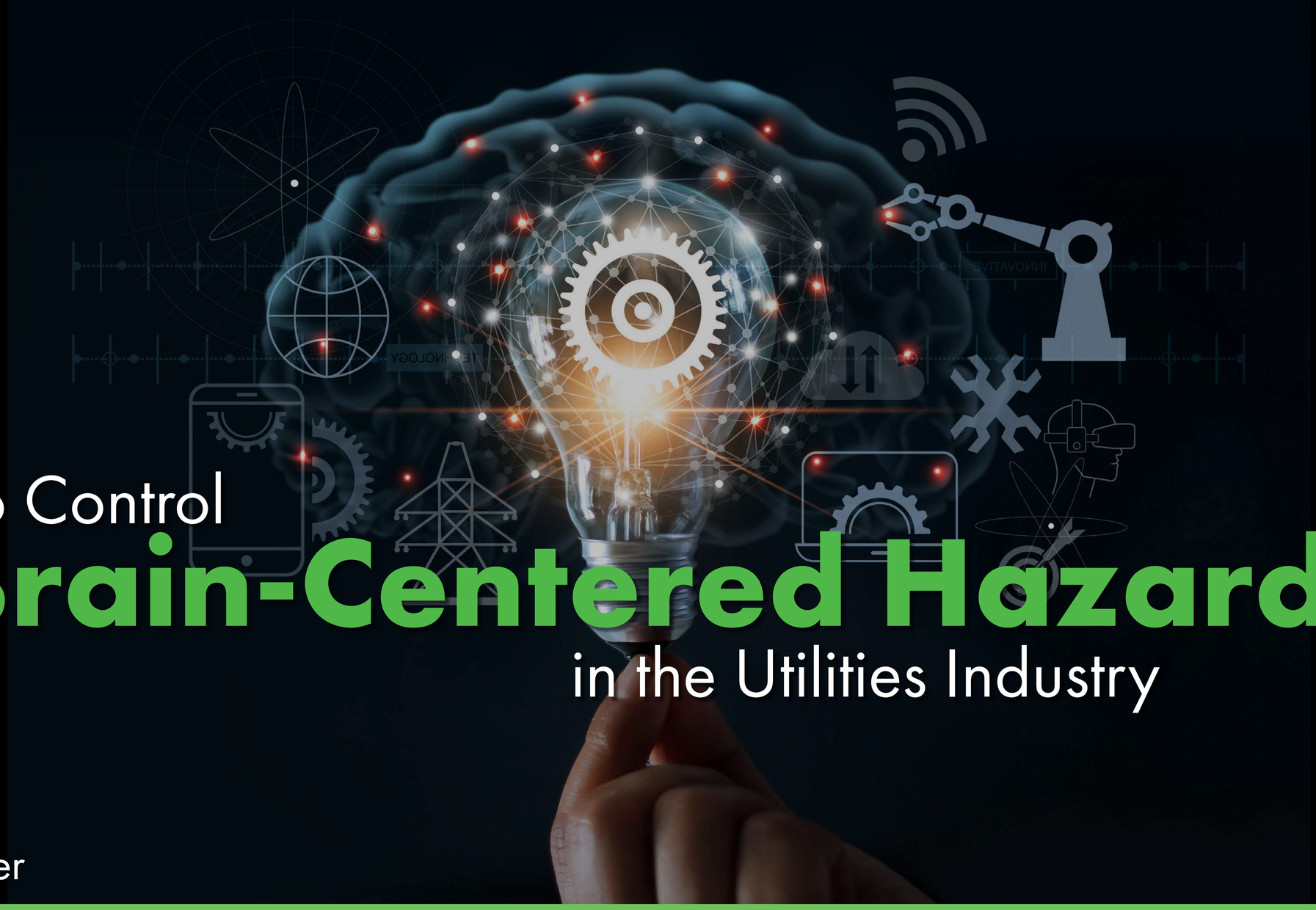

How to Control Brain-Centered Hazards™ in the Utilities Industry

White Paper

Serious injuries and fatalities (SIFs) can happen to even the most experienced workers who have demonstrated safe performance of the same routine task in a similar environment. Why? The answer to that question points directly to how the brain works. In order to prevent critical errors in these situations, we need to understand how the brain functions and how even small changes in the work environment can lead to performance error that results in serious injury.

When we believe that something is easy, there is a tendency to operate out of habit and do things the same way they have always been done, regardless of how safe that way was or the situational exposures.

Consider this example of welding a bonding nut to a static arm for an overhead ground wire.

It was an easy task for an experienced employee and would not take all that long. It required working at over 100 feet in the air. While the workers were up in the bucket, there was a strong breeze and a spark from the welding process ignited a fire in the upper hydraulic controls of the bucket. Workers were faced with fighting the fire without the right tools and had only one choice: to lower the bucket. When the workers attempted to lower themselves from that height, the controls did not function. There was an attempt to use the lower bucket controls, which also did not function correctly. The workers had to be rescued using another truck but sadly only after serious injuries had occurred.

This task was routine. It was a job that had been done without incident numerous times by these same workers. The resulting confidence led them to falling into the trap of thinking, "This is easy." When we believe that something is easy, there is a tendency to operate out of habit and do things the same way they have always been done, regardless of how safe that way was or the situational exposures. As a result, the workers operate in fast brain, that is, not consciously thinking through what could cause harm.

This was compounded by the fact that the workers were working under deadline pressures in order to move to another project quickly. Feeling higher levels of stress and urgency also promotes increased fast-brain functioning. Additionally, there was no visual recognition of the exposure. When in fast brain, there is a much greater chance of missing important information that could help identify critical exposures and there is increased potential for errors that can lead to incidents.

In situations such as this, and to decrease the impact of fast-brain functioning and increase visual recognition, we recommend the following:

- Provide prompts and nudges in work-related documents to check for specific exposures common to the work environment, such as weather conditions and checking for specific equipment condition
- Consistently discuss pre-job safety briefs for specific tasks, and highlight known changes that may add or change exposure
- Consistently complete and talk through pre-task planning and risk assessments
- Create messaging to front-line team members that communicates that safety is valued, regardless of deadlines, and take action to relieve pressure to complete jobs faster
- Use checklists to ensure that critical controls are in place for high-risk activities

Helpful and Hindering Aspects of the Fast Brain

Habits are created and strengthened by structures including the dorsolateral striatum working with the basil ganglia (Crego, et al., 2020; Rosenbloom, et al., 2012). Our habits are driven from our nonconscious fast brain. The fast brain allows us to move fast and get things done quickly without conscious thought. Driving on a highway often occurs via our fast brain. While the fast brain is helpful to move us through mundane tasks that are low-risk, like brushing our teeth or chatting with a store clerk, industrial environments elicit challenges in which working the same task the same way can result in less-than-right-first-time performance, resulting in someone getting hurt. People do not choose which part of the brain, slow or fast, to process information. Our brains choose for us, and our default mode is fast brain first, whenever possible to conserve brain power.

Our example illustrates a prime opportunity for the fast brain to initially guide the work. The worker carried out the task habitually, with limited conscious processing of updated information where a change in the environment went undetected.

In other words, the fast brain prevented the worker from being aware of the change in the environment and responding effectively. This resulted in serious injury.

How Visual Recognition Plays a Role

One other key factor that led to error in this incident has to do with visual recognition.

We see with our brain. Our brain tells our eyes to search for information in order to process and activate behavior that best suits the situation. When our brain does not identify something that is significantly new or different, it seeks to apply similar behavior to a familiar situation. We tend to notice more information in the center of our visual field and close to us. We also are more prone to miss information in our visual field that our brain does not intentionally seek out. When operating in fast brain, this further compounds the limitations already inherent in our visual system.

> One part of our brain that supports information processing is the frontal lobe of the cerebrum. This handles our decision-making and conscious, analytical thinking. We call this the "slow brain," as it involves slower, deliberative thought and takes more time and energy to activate behavior. This is our conscious thought and what makes the human brain especially remarkable.

Controlling Brain-Centered Hazards

Fast-brain functioning and visual recognition are two examples of what we refer to as brain-centered hazards. These are hazards related to our neurological makeup and, if left uncontrolled, increase our likelihood to make errors, including critical ones that lead to injury, equipment damage, and losses to reputation and the company brand.

Brain-centered hazards impact everyone, including experienced workers. It is important to understand how these two hazards function and then design work environments and activities in a way that accounts for and controls for them.

The People Are Great; the Way We Work May Need Updating

Many organizations seek to find fault with a team or person involved in an incident. In those cases, corrective actions, (retraining, disciplinary action, or even job reassignment) can serve as a Band-Aid for systemic issues that could result in serious injury, unless effective layers of protection are incorporated.

Identifying where, within the work process and workplace, team members are more likely to be vulnerable to the impact of brain-centered hazards is a good first step to protecting people. Historical incident analysis will also provide valuable insight into where these internal brain hazards have gone unaddressed.

Examples of Enhanced Layers of Protection for Improved Human Performance Reliability:

Now that we understand Brain-Centered hazards and their role in controlling SIFp exposures, what can we do about it? Using the Layers of Defense model below, organizations can take actionable steps to reduce human mistakes and, as a result, minimize SIFp exposure.

Systems:

- Complete pre-task exposure assessments using a strategic method for identifying exposures.
- Create a process to discuss pre-task safety briefs for specific tasks.
- Rotate routes and tasks to prompt slow brain functioning.
- Provide visual cues that highlight changes in the work environment, focusing on areas that have remained static over time.

Capabilities:

- Train employees on how to recognize and control brain-centered hazards.
- Use a technique called “commentary drive” to speak through proximal exposures during routine activities.
- Train employees on SIF hazard recognition with a special emphasis on recognizing changes in the levels of exposure.

Education:

- Integrate event learning methods to identify underlying factors that can result in human error
- Integrate human performance reliability training events for all employees.

Alignment:

- Build human performance reliability techniques in all local governance processes, focusing on reducing human error in SIFp exposures.
- Build human error into incident investigation protocols so that human reliability becomes part of your organization's methods.

The way our brains are wired plays a crucial role in decision-making that have safety implications. Understanding brain-centered hazards is imperative for any organization that wants to reduce the potential of human error.

And minimizing human error is paramount for any organization that wants to reduce SIFs.

Sources:

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SEVEN BRAIN-CENTERED HAZARDS™

Conclusion

The way our brains are wired plays a key role in work- related decisions that have significant implications when it comes to safety, especially in the dynamic, high-risk work carried performed in the utilities industry. Understanding brain-centered hazards is imperative for any organization committed to reducing the potential for critical errors related to safe operation and keeping customers cared at all times. Setting up teams for success requires the understanding and integration of key human-performance concepts to ensure sustainable performance. And it is paramount for utilities organizations as they work to eliminate SIFs, demonstrating their commitment to keeping their workers safe.

Interested in learning more about how brain-centered hazards are impacting your organization? Connect with us

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