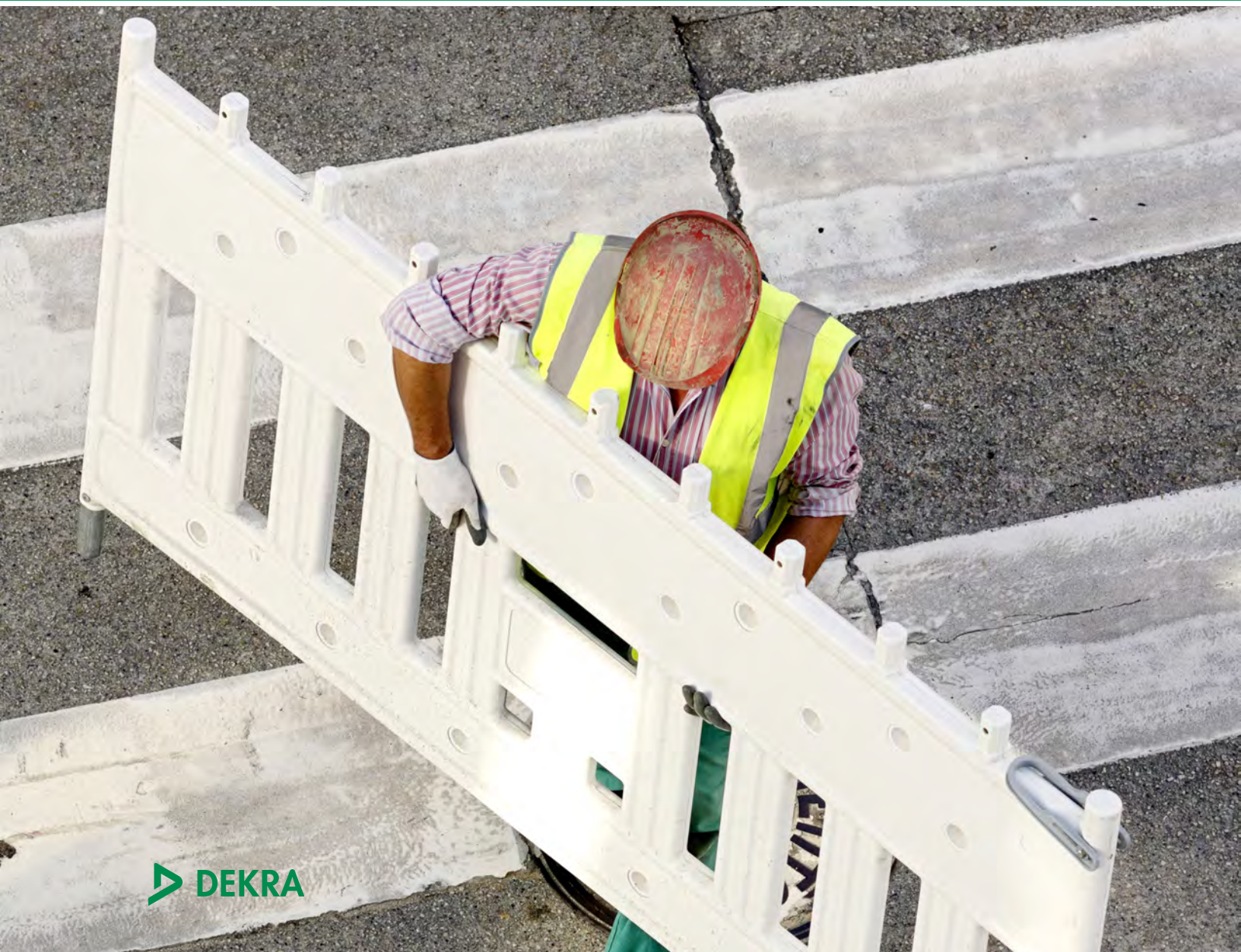




BRAIN-CENTERED PERFORMANCE:

Understanding How the Brain Works,
So We Can Work More Safely.



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THE HUMAN BRAIN.



The next frontier in
workplace safety.

Through improved education, technology, and data analysis, safety leaders have become increasingly adept at recognizing and controlling external hazards and exposures related to people, processes, and materials. What we are beginning to understand, however, is that these capacities are not sufficient for driving operational excellence or sustained reductions in significant injuries and fatalities. The missing key to unlocking sustained performance reliability and safety comes from within the human brain.

The overarching “human error” hazard can only be effectively controlled by aligning existing organizational culture, structures, and procedures with the functional realities and limitations of the human brain; that is, by making our organizational systems brain-aligned. The ground-breaking studies underpinning the Brain-Centric Reliability™ System have uncovered revolutionary insights into human performance, have forced a reexamination of how accidents and exposures originate, are classified and addressed, and have begun to fundamentally change the way we design, lead, and work.

FAST BRAIN. SLOW BRAIN.



Neuroscience brings new understanding.

At the center of recent neuroscience research has been a confirmation of two “factions” of the human brain that operate independently and at times cooperate to direct all human action. We call these two parts the **Fast Brain** and the **Slow Brain**.

The Fast Brain

is housed in the Limbic System of the brain, also known as the Paleo-Mammalian Complex.

The following types of actions are controlled by the Fast Brain:

- Pre-conscious
- Rote
- Reactive
- Habitual

The Slow Brain

is housed in the Pre-Frontal Cortex, the brain’s executive center.

The Slow Brain controls the following types of actions:

- Conscious
- Analytical
- Reasoned
- Reflective
- Intentional



“Analysis and decision-making take *energy*—and the brain leaps at the chance to conserve valuable energy by defaulting to reactive, reflexive actions based on habit.”





SO WHO'S RUNNING THE SHOW?

It may not be what you
think (or want).

As a leader, which type of organization
would you like to build;

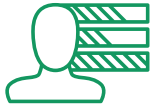
one based on

automatic, reactive, and
habitual actions
(as housed in the *Fast Brain*)

or one based on

conscious, analytical, and
well-reasoned actions
(as housed in the *Slow Brain*)?

Surprisingly, and unfortunately, research has shown that the Slow Brain is not the one in charge much of the time. In fact, an average of 45%-50% of all actions adults performed across a day, and particularly repetitive, routine ones, are controlled and executed in the Fast Brain without thinking or conscious decision-making. Analysis and decision-making take energy—and the brain leaps at the chance to conserve valuable energy by defaulting to reactive, reflexive actions based on habit. The Slow Brain actually has to be intentionally activated to spur conscious cognition—the brain state that enables analysis, accurate problem identification, reasoning, planning, and decision making.



ACTION WITHOUT CONSCIOUS COGNITION.

The hazards of operating in the Fast Brain.

Neuroscientists have confirmed that many of our actions come from the Fast Brain. What does this actually mean to us in terms of operational reliability and safety?

The Fast Brain reacts without thinking.

When adults engage in routine actions—driving a car, navigating a crowded sidewalk, mowing a lawn—we tend to rely increasingly on habit and “muscle memory” to accomplish such tasks. In the workplace, this habitual, Fast Brain response to routine tasks can lead to missed steps, incomplete work and a dangerous reliance on past experiences to predict and direct current actions. That means, if the circumstances are not identical, incorrect actions will be taken.

The Fast Brain operates in “Sketch Mode.”

The goal of the Fast Brain is to process visual information and deliver feedback as quickly as possible. The result is a quick, generalized “sketch” of a situation based on color, shape

and movement, and an ensuing response based on habit, experience, and limited memory recall. The risk is that these generalized visual perceptions miss important changes in the work situation, including “weak signals” that might otherwise spur preventative action in a high-consequence or safety-critical work environment.

The Fast Brain simply operates, well, too fast.

True performance reliability demands the conscious cognition that only the Slow Brain can provide. However, research has shown that the Slow Brain takes a full half-second to activate. The Fast Brain, by comparison, processes visual cues and reacts in 4/10 of a second—initiating responses or actions before the Slow Brain has even had a chance to weigh in.



“True performance
reliability *demands* the
conscious cognition that
only the Slow Brain
can provide.”

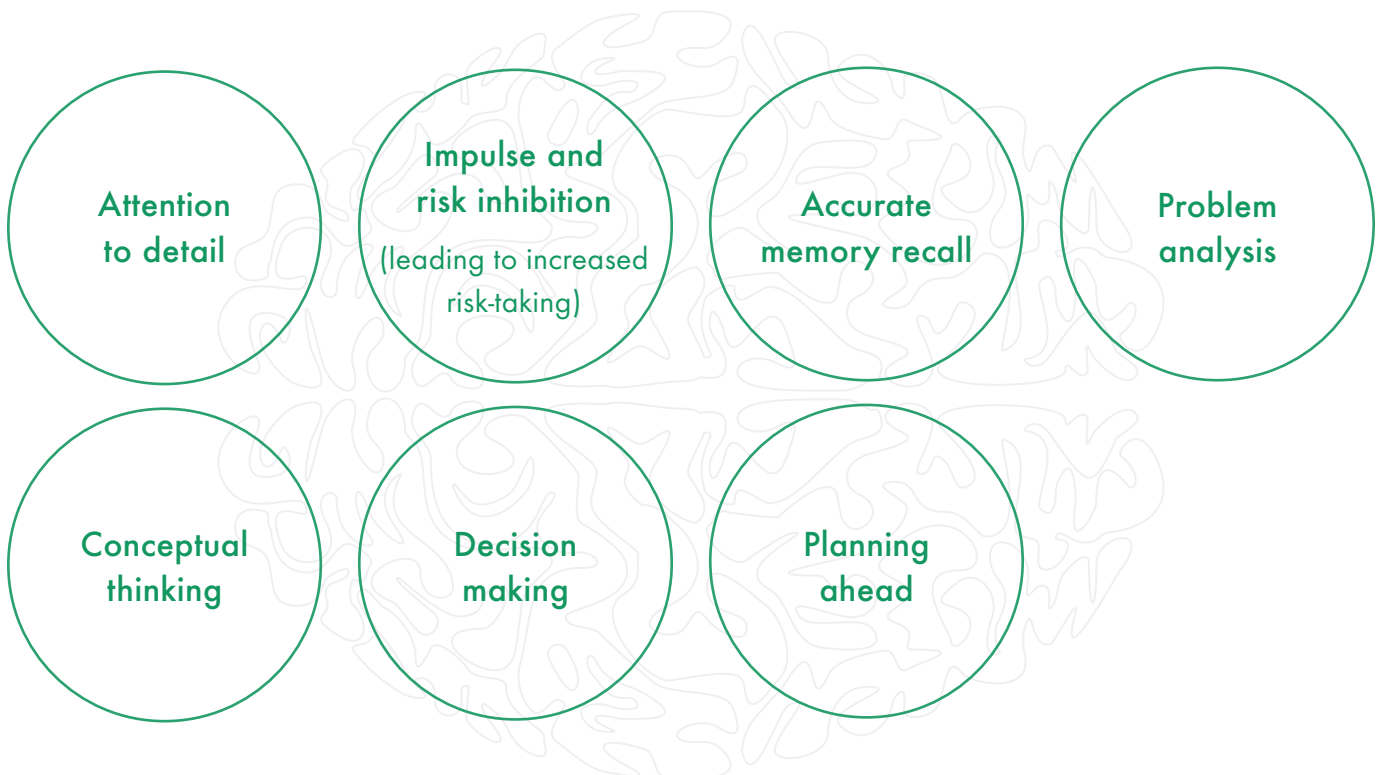




BAD NEWS FOR THE SLOW BRAIN.

Fatigue impairs brain performance.

Recent fMRI studies of the human brain show that insufficient delta-wave sleep impairs cognitive (thinking) capabilities. By attacking and degrading the brain's neuronal firing mechanisms, sleep deprivation and its corollary condition of cognitive (brain) fatigue have proven to dramatically impair:



And, it only takes one episode—one 24-hour period—of loss in deep, delta-wave sleep for moderate to severe cognitive fatigue to occur. In a world where each day sleep deprivation is occurring in 39% to 67% of the worldwide workforce, it is clear that this type of fatigue has emerged as a significant and dangerous challenge to human performance reliability and safety.



SO WHERE ARE WE?

And what can be done?

In many situations that demand thoughtful and reasoned action, neurological research now shows that the brain is not designed well for modern, technology-driven operations. While we cannot change the way our brains work, we can change the way that our organizations work with our brains. Our goal is to help companies implement a Brain-Centric Reliability™ System with organizational, team and individual solutions that support greater human performance reliability and improve safety and reliability outcomes. The solution?

Optimize human performance reliability by catering to the Slow Brain.

With our new, deeper understanding of the workings of the brain, it has become clear that the way our work systems operate and the way the human brain works are not always in sync. The time has come to reexamine our systems, processes, and procedures, to isolate the newly-identified Brain-Centered Hazards, and to put in place solutions that encourage intentional actions, eliminate reflexive risk, and enable employees to respond to all operating conditions with Right-First-Time performance.

To illustrate how the Brain-Centric Reliability™ System can help you achieve these important safety goals, we have identified three sample steps for leaders to take on their path to performance reliability.



“Neurological research now shows that the brain is *not* designed well for modern, technology-driven operations.”





THE POWER OF WORDS:

Change cultural messaging.

Culture starts at the top. Leaders create corporate cultures by sending messages to their organizations that define organizational success and set the tone for how people work.

If these messages are messages of urgency—

**Get it
done**

**Finish
quickly**

**What's next?
Move on**

**Accomplish
more, faster**

—leaders are inadvertently sending a signal to work from the Fast Brain only. Under time pressures, adrenaline is released and our Slow Brain is isolated, causing us to speed up and move faster, but also creating the risk that we will skip steps or miss weak signals in our hurry to complete the task at hand.

We need to reexamine our corporate cultures and leader messaging from a brain-centered perspective. Messages such as—

**Take
your time**

**Think
it through**

**Focus
on doing the
job right the
first time**

encourage measured, Slow-Brain responses. To build smarter, safer cultures of thoughtful, precise execution, and Right-First-Time Reliability, leaders need to consistently send the right verbal messages to the workforce.



PROCEDURAL AMBIGUITY:

Create Brain-Aligned SOP™ Designs.

When the performance of crucial procedures relies on past experience or rote memory, the door is opened for human error. If we want error-free actions, and we must, then we have to provide the workforce with clear, concise procedures that reflect and align with the way our brains work.

Now that we know our brains often fire quickly, based on immediate responses to visual stimuli, it is critical that we eliminate confusing instructions, poor design and other opportunities for mis-cueing and misinterpretation in our written SOPs—standard operating procedures.

Clearly written, well-designed, and approachable SOPs provide critical guidance and can make the difference between rock-solid performance reliability and devastating misinterpretations that result in high-consequence errors.





“When the performance of crucial procedures relies on past experience or rote memory, the door is opened for *human error*.”





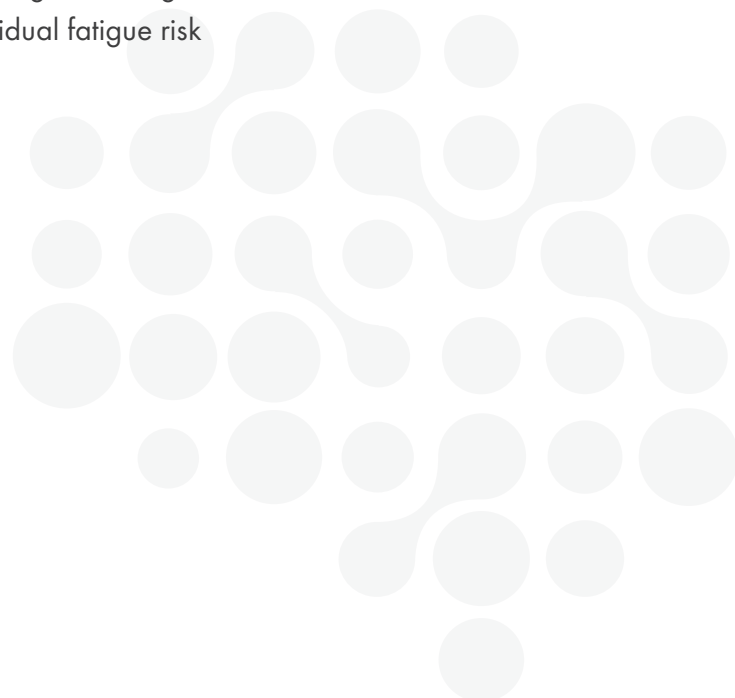
WAKE-UP CALL:

Manage fatigue risks

Most organizations would do well to take a long look at all of their management systems, to determine whether they are brain-aligned. For many organizations, there also is a management system they need to add—an FRMS or Fatigue Risk Management System.

As we now know, fostering conscious cognition improves error-free performance. Conscious cognition is housed in the Slow Brain. And cognitive fatigue from sleep deprivation is, quite simply, the enemy of the Slow Brain. Now that we know definitively—from actual brain imagery—that sleep deprivation leads to cognitive impairment and severe gaps in performance capability, we can no longer turn a blind eye to the rampant levels of cognitive fatigue across all levels of the workforce.

Overcoming the Microsleep Mishap Hazard that results from sleep deprivation requires a robust, multi-faceted FRMS that ensures effective, in-depth fatigue training, sufficient unrestricted sleep opportunities, real-time and objective individual fatigue risk assessments, and much more.





SUMMARY: EMBRACE THE OPPORTUNITY.

Change is the law of life and those who look only to the past or present are certain to miss the future.

– John F. Kennedy

As we have seen, recent neuroscience research has provided brand-new insights into our brains, how they function, and how they impact the way we work and our resulting safety and performance reliability. These cutting-edge insights present valuable new opportunities for leaders responsible for operational reliability as well as organizational and process safety. The solutions listed above are just a few of the actions leaders need to take. We now have the knowledge and tools to challenge existing misperceptions about human error and to mitigate or virtually eliminate those errors. We know how to better support and protect our employees in the performance of their duties, and to build safe, smart, High Performance Reliability Organizations (HighPROs) based on sustainable Brain-Centric Reliability™ principles and practices. So now this work must begin!



“The overarching “human error” hazard can only be effectively controlled by aligning existing organizational culture with the functional realities and limitations of the human brain; that is, by *making our organizational systems brain-aligned.*”



SEIZE THE OPPORTUNITY TODAY!

Our professionals are proven experts and thought leaders in delivering Brain-Centric Reliability™ (BCR™) Solutions for our clients. Download our accompanying white paper, Brain-Centered Hazards: Risks and Remedies, for a more in-depth look at the science behind our Brain-Centric Reliability™ System, or visit us at www.dekra-insight.com and talk to us about how the right safety and reliability solutions can make your organization a smarter, safer, and more sustainable one.

