

Case Study

From Fires to Fatalities: Why Safety Is a State of Mind

DEKRA is helping companies in the energy industry prevent serious injuries and fatalities by addressing the all-too-human factors that cause accidents.

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Tuesday 7th January 2025 is etched on the mind of Marc Ulrich. That's the date when some of the most destructive wildfires in California's history ignited, ravaging the Los Angeles metropolitan area and San Diego County.

For Ulrich, the vice president of environment, health, safety and quality at Southern California Edison, the impact was personal.

The wildfires were exacerbated by drought, low humidity, buildup of vegetation, and hurricane-force winds. They killed 31 people, forced more than 200,000 to evacuate, destroyed more than 18,000 homes and structures, and burned more than 57,000 acres of land. Two of the largest fires, the Eaton and Palisades fires, took until the end of January to contain.

For teams of engineers at Southern California Edison (SCE), which has been working with operational safety specialist DEKRA for many years, damage to electricity infrastructure meant a huge "wrecking out" operation. "As soon as we could get into the area, we were doing demolition or removing downed wires, burnt poles, or carrying out damage assessment."

"I was on the LA County Sheriff's department search and rescue team," he tells Utility Week. "That night we were doing searches and rescues and evacuating elderly and infirm individuals. My house is a quarter mile from the origin of the fire and the houses of my neighbours on the left burnt down. My neighbours on the right, their houses are still there. My house survived. It was tough."

Marc Ulrich, vice president of environment, health, safety and quality, Southern California Edison

The devastation meant debris had to be removed, and restoration planned and then executed. To assist, the parking lot at the Santa Anita horseracing track in Arcadia was transformed into a laydown yard ("like a small city", recalls Ulrich) with new poles, conductors, wires and transformers staged in the area. From this impromptu set-up, crews worked tirelessly to remove wreckage and restore the grid.

It was difficult and high-risk work. "The volume is high, the complexity is high, the hazards are high, and there's a multiplying factor: I am changing a pole here, they are changing a pole there, this truck's in front of that truck," explains Ulrich. "Normally when I am doing one pole, it's not a big deal. But now I've got 50 crews doing 50 poles and everything is interacting."

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As a safety expert, once normalcy returned, he was keen to share best practices and experiences with other utilities in the region. At an Edison Electric Institute conference, a major irony of the response to the wildfires became apparent. “I asked the other safety leaders, ‘how many times do your guys get hurt in those situations?’, and almost everyone said, ‘never’. It’s the same for us. During those high restoration periods our safety performance is really good. That’s not just at Southern California Edison, it’s across the board.”

This counter-intuitive finding is arguably a product of attentiveness, says Ulrich. “It [the response to the wildfires] takes a lot of energy, because people are working for 12 hours. But their focus is really good. They are concentrated on the job, the safety of the job, and they take their time to do things safely. It is the blue-sky days when engineers are doing a normal pole replacement that they might become complacent.

“We have had serious injuries and fatalities because of complacency, but during a storm restoration, for example, everyone performs well on safety.

“It helps that they are mission driven. When people feel like they are doing valued work, they do better work.”

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Targeting life-altering injuries and deaths

SCE’s partner DEKRA has been carrying out pioneering research on serious injuries and fatalities (SIFs) since the early 2000s. Electric utilities across the US increasingly view the reduction of serious, life-altering injuries and fatalities as the new playbook in health and safety. Despite longstanding reduction of minor health and safety incidents (often measured by the TRIR metric – total recordable incident rate), over the past few decades rates of SIFs have, in general, plateaued. “The fatality rate is pretty stable,” Ulrich says, “although it has come down slightly over the last decade.”

The standard approach was to try and reduce the TRIR. “The feeling was that if you could get rid of TRIRs, then you will get rid of the life-altering and life-ending incidents. But what we have found with the TRIR falling is that the number of fatalities hasn’t gone down.

“And I’ll take 1,000 TRIRs over one fatality.”



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Prior to teaming up with DEKRA's operational safety and risk consulting practice in 2010, Duke Energy, a major American electric power and natural gas company with a large nuclear fleet, also had challenges in preventing fatalities across its operations. Most notably, in 2014, the company experienced three employee fatalities.

"There comes a moment when you think you're turning the corner and making meaningful progress. Then a fatality occurs, and you're reminded how quickly circumstances can change," says Danny Landis, director of the corporate health and safety organisation at Duke. He adds that DEKRA helped Duke Energy internalise a key concept: that catastrophic events are typically not caused by a single mistake, but by a breakdown in the reliable execution of the basic practices that control hazards, a concept that DEKRA refers to as 'behaviour reliability'.

"In the wake of a tragic event, you naturally ask, 'Why did this happen, why did our controls fail?' We try to focus the conversation on ourselves as a leadership team. That means a willingness to look inward before looking elsewhere, and a commitment to develop sustainable actions that will prevent reoccurrence."

The fatal threshold: 1,500 joules

Both Duke Energy and SCE have established the baseline level of exposure to energy that has the potential to result in a SIF. An energy source (such as electricity measured in MW or MWh) is converted into joules. The more joules a body takes, the higher the likelihood of a severe injury. Ulrich says: "What we have found is that if a body takes 1,500 joules, the likely outcome is a fatality."

At Duke there is a similar 'high energy' approach to SIFs. Following the employee fatalities in 2014, DEKRA was instrumental in assisting Duke in redeploying its Keys to Life (KTL) programme, which is still in place today. The programme was the company's first engagement in energy-based safety. The individual keys are the high-energy activities Duke performs. The keys are aligned with an energy wheel and identify controls, both direct and alternative, that have been formally evaluated and prescribed for each KTL activity. "This is critical," says Landis, "because every fatality we've experienced since the merger [with Progress Energy in 2012] has been in that high-energy space. We try to drive the high-energy risk out of the business, and where we have it, ensure we have robust controls to manage that risk."

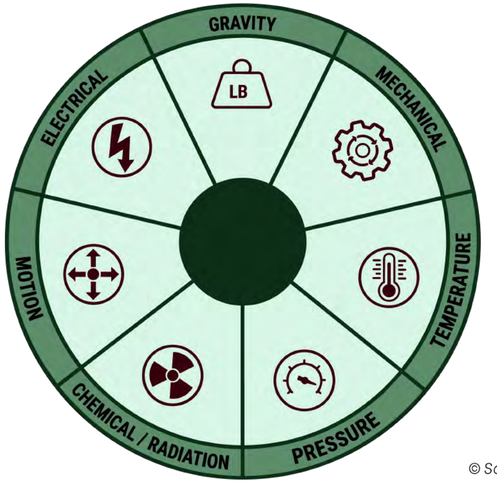
With a nuclear fleet, Duke Energy also applies the health and safety rigour associated with that sector to its operations.

"It's no secret the nuclear industry is next level when it comes to health and safety," says Landis. "Our nuclear generating fleet is one of the largest nuclear fleets in the country. The nuclear business unit rarely experiences a serious injury and typically experiences less than handful of recordable injuries a year, which is impressive.

"That experience in the nuclear industry has played a pivotal role in shaping our safety culture and fostering the company's unwavering commitment to operational excellence.

"Years ago, some leaders viewed serious injuries as an unfortunate but inevitable part of working in the utility industry. Today, the organisation has a different mindset, and I attribute much of that to our nuclear heritage."

Southern California Edison also uses a wheel to depict hazards. It codifies operations with potential for SIFs using a STKY ("stuff that kills you") wheel:



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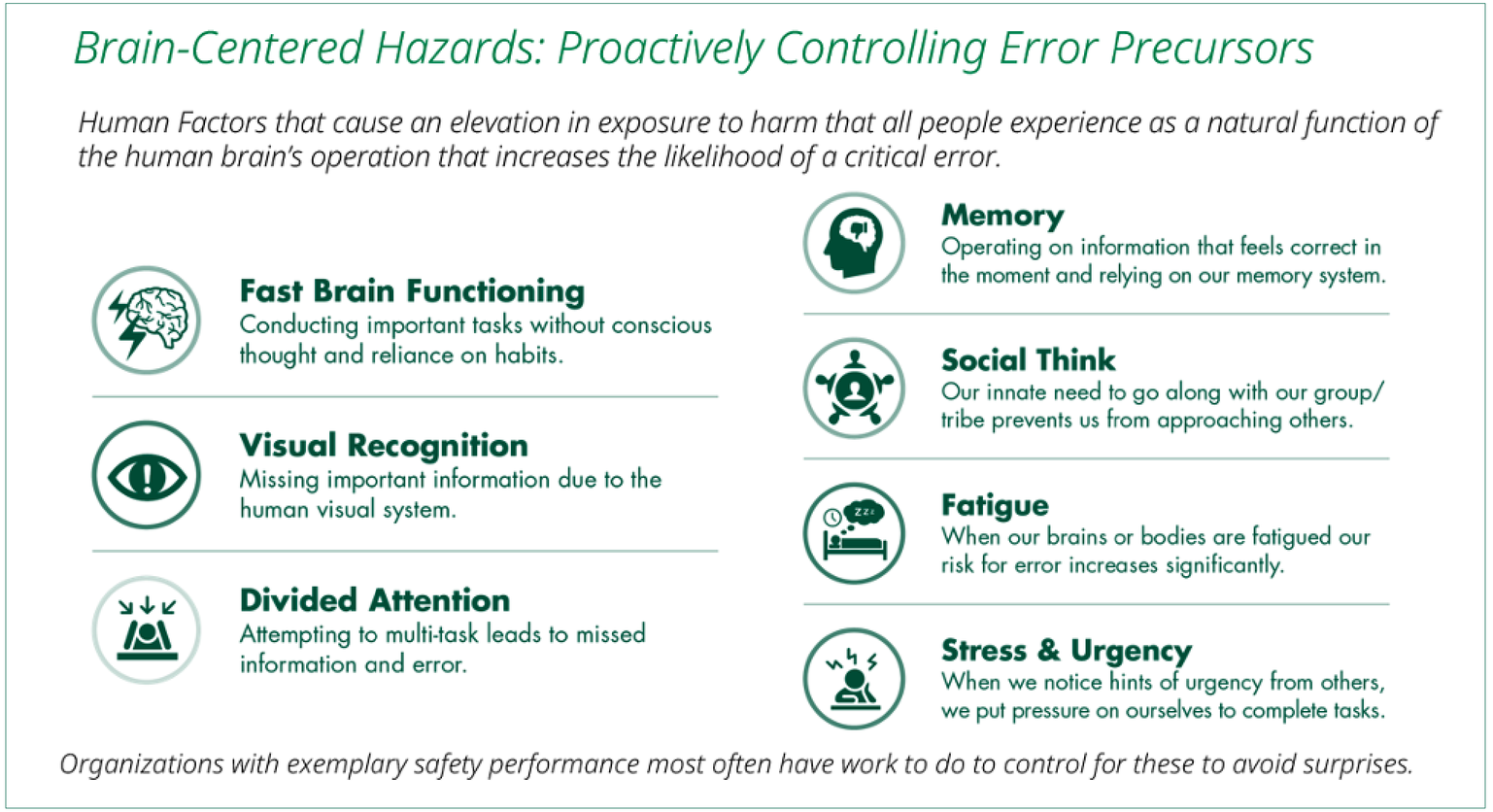
The STKY wheel helps engineers identify hazards before they start work on a site. The aim is to help them introduce safety controls that alleviate or ideally eliminate risk. Controls that are incapable of being compromised by an employee are known as ‘direct controls’. For example, if a team is working on a road, then putting out traffic cones would be a control. Installing two-tonne concrete barriers is a direct control.

If an engineer is working at the top of a pole, a harness that works automatically is a direct control to prevent falls from height. The methodology is, “if you can eliminate the risk, eliminate the risk. If you can’t eliminate the risk, engineer a way to capture the high energy with direct controls, and if you can’t do that use alternate controls. Cones plus a flag are better than no controls,” explains Ulrich.

But controls, vital as they are, are only part of the story. “From DEKRA’s point of view, culture is what drives behavioural reliability in safety performance,” explains Dan McGonegle, vice president, DEKRA North America. “And what drives culture? Safety leadership.”

Human psychology is an important influence too. DEKRA has identified what it calls ‘brain-centred hazards’ to which we are all susceptible, which include conducting tasks unconsciously (ever driven somewhere with no recollection of how you got there, for example?), working with divided attention, and even the desire to fit in socially. This latter factor can make it difficult to speak up if a person feels work is not being conducted safely.

James Grant, of DEKRA North America, says that for most of us, a negative social reaction is akin to “getting punched in the face”. “People want to avoid that so they assimilate for survival. But that is also what we call a ‘human error trap’, where we won’t bring up things that we should.” Knowing about these error traps means understanding that “our brains are wired for failure”, adds Grant. “It also helps leaders understand that people will always fail, and if you rely on a human being to be perfect, your system is broken. The possibility of error has to be built in.”



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Angelica Grindle, PhD, vice president in DEKRA's consulting practice

DEKRAs Angelica Grindle, who has a PhD in applied behavioural science for improving health and safety, says that utilities don't lack the systems to keep people safe but need to account for the vagaries of people, too. "While it is tempting to assume everyone will do what management wants them to do, this doesn't take into consideration how incredibly important the culture is, and the human side of safety."

McGonegle emphasises this point. "You can be doing everything right as an organisation from a safety standpoint, but people's brains are wired for error. They are not meant to work in these high-hazard environments, so examples of error traps are things like fatigue, lack of communication, or discomfort.

"Am I going to be comfortable shutting down a supply chain by stopping work? If you think about that, there is a staggering amount of pressure to keep that supply chain going. And with fast brain thinking, for people who have done something for 30 years, there's a level of comfort that increases risk.

"New hires might actually be safer. But both mindsets carry different risks."

Will employees speak out?

A good safety culture is one in which employees feel valued and able to speak their mind without fear of reprisal, the experts say. For example, DEKRA helped NASA assess its safety culture in the wake of the space shuttle Columbia disaster in February 2003. DEKRA's survey of all employees at 11 NASA locations found that the space agency scored poorly when it came to perceived organisational support and upward communication, which both had the potential to impact safety.

Psychological safety ("the feeling that your boss has your back", says Grant) is important if workers are to feel able to point out where things aren't being done correctly. Does a supervisor play fair, or play favourites with certain employees? Are they looking out for everyone's best interests? When issues were brought up in the past, were there positive or negative consequences?

"That is extremely powerful for workers in terms of whether they are going to speak up if there is a problem," says Grant. The same rules apply at suppliers, but standards may vary considerably. "Contractors come from different cultures and have different levels of operational excellence in safety performance." Nonetheless, utilities should endeavour to ensure they are on the same page when it comes to safety. "When you look at workplace safety, contractor safety is the most challenging area," McGonegle believes.

In the event of an incident, says Marc Ulrich of SCE, leaders should "turn it into a learning opportunity. The reaction to an injury is important – it should be empathetic, not like a drill sergeant berating people."

He adds: "There are some old-school leaders out there who say, 'if someone got hurt that means somebody was violating a rule, and if somebody was violating a rule I need to fire someone'. That is not the kind of leader that works in today's safety playbook. Accountability means you can account for your actions. It doesn't mean, 'I get fired if I make a mistake'."



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At Duke Energy, accountability starts at the top if there is a safety issue. “When we have a high-energy event, we have a prescribed management response,” explains Landis. “If there is a SIF, it triggers what we call an ‘enterprise prompt investigation response team’.” The response team reports on the incident within 48 to 72 hours, communicating any lessons learnt to each of the business unit leaders. This enables operational learnings can be evaluated by each unit. “The prompt investigation report is followed up by a root cause evaluation,” Landis explains.

If he were able to eliminate one risk that has the potential to cause safety problems, what would it be? Landis doesn’t hesitate. He points to the design of the electricity grid itself. “Lineworkers routinely perform complex tasks on energised equipment, often while working in close proximity to moving traffic – an environment that presents some of the industry's most significant safety challenges.

“If there is one thing I would change, it would be the design of the system. I would engineer out the need for energised work and reduce our employees' exposure to roadway hazards.”

The pressure to do jobs quickly might come a close second, say experts. Grant of DEKRA points out that time pressure discourages conscious, deliberate actions. “When we are under pressure to get something done, our brain shuts down our slow thinking. Pressure will minimise your brain’s ability to do that, making you act unconsciously or out of habit.”

DEKRA chief client officer Jim Spigener points out that it’s easy for employees to get locked into an attitude of, “I do this every day, this one little thing won’t matter’.” The brain, he says, is “naturally going to find the easiest way to do something”.

“But there are tools we can use to keep the brain in slow thinking mode, so I am deliberate, I am conscious.

“That way we don’t end up saying, ‘we knew what we had to do, we had the stuff we needed – we just didn’t do it on this occasion’.”

Interested in learning about DEKRA’s approach to identifying and mitigating serious incidents and exposures?

Connect with Us:
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