This article discusses the whys of performing a job safety assessment (JSA) or a job hazard assessment (JHA). This often comes up during safety classes where attendees say, “Oh, I had no idea why we did those. It was just something we were told to do.” While employees should comply with standard operating procedures (SOPs) or company directives, since we are dealing with adults, they also need to understand why we do things. Once they do, compliance goes way up.

**RISK VERSUS FREQUENCY**

Risk is defined by NFPA 70E as “a combination of the likelihood of occurrence of injury or damage to health and the severity of injury or damage to health that results from a hazard.” Risk assessment is defined as “an overall process that identifies hazards, estimates the potential severity of injury or damage to health, estimates the likelihood of occurrence of injury or damage to health, and determines if protective measures are required.” NFPA 70E adds this to the definition of risk assessment: “Informational Note: As used in this standard, arc-flash risk assessment and shock risk assessment are types of risk assessments.” Frequency, of course, is how often a task is performed during the work day. Figure 1 shows the four quadrants comparing risk to frequency.

**Figure 1: Risk versus Frequency**

- **HIGH RISK**
  - HIGH FREQUENCY
  - LOW FREQUENCY
- **LOW RISK**
  - HIGH FREQUENCY
  - LOW FREQUENCY
High Risk/High Frequency tasks include utility work on overhead lines or live-line bare-hand work on energized electrical lines or equipment. Most industrial companies try to limit or eliminate tasks such as these to prevent electrical events. Utilities, however, operate in this environment frequently. High Risk/Low Frequency tasks include racking a circuit breaker in or out of its enclosure and removing or installing a MCC bucket or a bus duct fuse. These tasks are rarely done, but the risks involved are high. Low Risk/High Frequency tasks are things like driving a car, walking, or climbing stairs. These tasks are performed thousands of times each day, but accidents are infrequent. Examples of Low Risk/Low Frequency tasks are riding a merry-go-round, playing billiards, or other similar activities.

Of these four types of tasks, which one would have more injuries? Surprisingly (or, maybe not), most events happen in the Low Risk/High Frequency category. We perform these tasks day in and day out, hardly giving them a thought — and that is where we get into trouble. Our brain goes into auto-pilot mode, and we just go through the motions. For example, as we drive on an interstate highway, we tend to use only that portion of our brain really needed to get us from point A to point B. Since our brain is the biggest energy user of our entire body, it automatically throttles back to conserve energy. We don't consciously do this; it just happens. If a police car comes up behind us with its lights flashing and siren blaring, we go into full alert mode. Once that police car passes us, we drop back into interstate driving mode. We are conserving energy.

Many would argue that driving a vehicle is not low risk, but consider how many millions of miles are driven each year and the number of vehicles on the road at any given time. According to the National Highway Safety Traffic Administration, there were 32,719 deaths attributed to traffic accidents in 2013. That's a lot, but there were also about 212 million drivers who drove about 2.96 trillion miles. This works out to 1.13 fatalities per million miles driven. Those fatalities were not in any way acceptable, but for the number of miles driven, the fatality rate is relatively low.

The implications of the way our brain operates are tremendous. The first time we perform a task, we are focused and sharp. As we perform the task repeatedly, we tend to be less focused. Our brain is conserving energy, preserving our energy stores in case we have to run from a sabertooth tiger, climb a tree, or some other survival-related task. We go through the motions, not really paying attention. If anything different should happen — anything not planned for — we could quickly be in a safety-critical position.

**PROBABILITY VERSUS CONSEQUENCE**

We are all familiar with the concept of probability. We constantly weigh probabilities, sometimes more successfully than others. If we make a sudden lane change or we decide to answer a cell phone call while driving, we are weighing the probability of an accident, and we all deal with the consequences of decisions made every day.

Figure 2 shows probability versus consequence. Low Probability/High Consequence would be a task such as racking a circuit breaker in or out or inserting/removing MCC buckets. We don't do these often, and the probability of failure is small; but if a failure does occur, the consequence of failure could be very high — even life-threatening. High Probability/High Consequence tasks are those that have a high probability of injury and the consequences would be high. Going back to utility linemen as an example, they work in close proximity to energized lines and equipment. If they should make contact, the consequences would be high. Low Probability/Low Consequence tasks are such tasks as sharpening a pencil or brushing your teeth, etc. The chances of injury are small, and, if it did occur, the resulting consequence would be very minor. High Probability/Low Consequence tasks are those that have a high probability of an
accident, but the consequences would be very minor. This might include tasks such as playing dodge ball or playing rock-paper-scissors. You know you're going to get it, but if you do, the resulting consequence won't be serious.

Once we begin to roll the dice on the job, we are headed for trouble. Once a person performs a task incorrectly and is not immediately injured or killed, it becomes his way of doing it. Trying to convince people that their way is not the safest way to perform that task is very difficult because these people may have years of experience telling them it is safe. And if everything goes just right, it probably is safe. But if something changes or if something is missed during their risk assessment, they are likely to be injured. The worst part is that they don't understand why they were injured, because they have used their way successfully for so long.

On-the-job safety is not about being safe most of the time or even being safe when you think it is important. It's about being safe all of the time. If a person wants to take unreasonable risks off the job site to satisfy their sense of adventure, so be it. But on the job, that same person has to work according to rules established by the company. That is where job safety assessments (JSAs) and job hazard assessments (JHAs) and all the other seemingly useless paperwork comes in. Because we tend to conserve energy, we also tend to lose focus on the details involved in performing a task. A JSA/JHA forces us to focus on the task we are about to perform and to think all the steps through. At the same time, we are assessing whether or not this task is safe to perform given the equipment, preparation, and experience of those involved. We have to evaluate the consequences of a failure and the steps that can be taken to prevent it or at least lessen its effects.

As required by NFPA 70E, a risk assessment creates the focus needed to perform tasks safely when we are exposed to electrical hazards and risks. In NFPA Section 130.2(B) (2), an energized electrical work permit (EEWP) helps to satisfy the requirements of a JSA/JHA because a shock risk assessment and an arc-flash risk assessment are required to complete it. Steps required to control risk are also part of an EEWP, as are the PPE requirements of the task. Many companies fold the EEWP into their JSA/JHA and cover non-electrical as well as electrical risks.

**SUMMARY**

Don't make the mistake of thinking paperwork serves no purpose. The paperwork, no matter how inconvenient it may seem, is needed to keep us on track and focused. Going into auto-pilot on an interstate is bad business, but when performing a task with electrical risks, it can turn a benign task into a potentially fatal situation. Technicians need to be aware of the risks involved with a task, the probability of an accident, and what the potential consequences would be if an accident occurs. The two important categories are:

- **Low Risk/High Frequency tasks.** These are the ones we do every day, so we tend to be less aware of the risks.

- **Low Risk/High Consequence tasks.** Even though the chances of a mishap are low, if something does go wrong, the consequences could be severe.

No one wants to be a statistic, but we all have human failings. The safety industry has
worked diligently to provide methods to help us overcome these failings, but we have to make use of them. As companies grow and expand, their challenge is to promote a work culture that enhances safe workplaces. How this is accomplished varies from blunt force to training and counseling, or a combination of the two. In boot camp, troops are told that those who can’t do their job well will be an example for everyone else. The smart soldier tries to let someone else be the example.

An event that occurred in 2009 highlights the importance of performing a risk assessment. An employee of Company A was tasked with closing a medium-voltage circuit breaker after the switchgear was cleared by the contractor installing it. The employee assessed the risk and wore the 40 cal/cm² arc-rated flash suit provided by his company. The contractor did not remove the personal protective ground set they had installed earlier, and when the employee closed the circuit breaker, the resultant arc flash blew the door open. Because that employee was wearing his arc-rated flash suit, he received no injuries.

If this employee had not assessed the risk, or had downplayed the risk and not worn the required PPE, there’s no doubt he would have been seriously injured or killed. For the time it took to complete the risk assessment, this worker saved himself several weeks or months of painful recovery. Was it worth it? You bet.

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REFERENCES

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