

► Using Incident Data as a Valuable Tool

By Hari Vasudevan, CEO, and RL Grubbs, Safety Manager, Think Power Solutions

Safety is an integral part of doing business. During the Industrial Revolution, businesses had to adapt to new ways of protecting their assets, including employees. Machines were used in large-scale manufacturing and the new sources of power to run those machines presented new hazards to employees and new challenges to the companies that employed them.

The impact of World War I and II made it clear there was not an inexhaustible supply of workers. With the passage of the Williams-Steiger Occupational Safety and Health Act in 1970, the Occupational Safety and Health Administration (OSHA) required companies to “provide a workplace free of recognized hazards.” Now, requirements such as those mandated by OSHA, Bureau of Labor Statistics (BLS), and Experience Modification Rates (EMR) require companies to paint a detailed picture of their involvement in the safety of employees.

Government-mandated regulatory requirements aside, it is good business to protect employees. According to a recent BLS report, nearly one million employees per year lose time from work due to injury. Taking into account the loss in productivity and the associated increases of insurance premiums, the financial impact of workplace injuries becomes obvious. Whether driven by regulatory compliance or financial or moral motivations, businesses are presented with the challenge of constantly improving safety programs.

The source of the most traumatic injuries is usually obvious and it’s easy to focus only on this type of event. Falls, electrical hazards, and cutting and chipping equipment are all identified as obvious hazards. They also come with rules, practices, and guards that are easily compromised.

Herbert William Heinrich introduced the accident triangle in 1936 (Figure 1). He was an assistant superintendent for an insurance company. Due to limited available data, his research consisted of company records and interviews with personnel involved in various

types of incidents. His book, *Industrial Accident Prevention: A Scientific Approach* indicated that there is one major accident to every 29 minor injuries, to three hundred non-injury incidents.

► THE HEINRICH ACCIDENT TRIANGLE

His results were later reproduced in 1969 with better data by Frank E. Bird of the Insurance Company of North America. As you can see in Figure 2,

there was little change in his findings. These theories have often been contested. While there will be variations among different industries and certainly across individual companies, we can make the idea work for our industry. Although the ratios and shape of the triangle for your company may vary, the concept remains the same.

► BIRD’S ACCIDENT TRIANGLE

Developing a company-specific triangle can provide insight into the effectiveness of various worker-safety initiatives. The easiest numbers to find are the most serious ones, such as fatalities. How much time between these incidents? Let’s say, as an example, the business suffers a fatal injury every two years. Look at the lost work days and restricted duty days in that two-year period; those

► COLLECTING BETTER INCIDENT DATA

While most companies that perform work in the utility industry have some form of near-miss reporting, many wildly underreport these types of events. An accident triangle that is very narrow is an indication of under-reported incidents. It may be due to the lack of importance placed on incident reporting, a fear of drawing attention to a situation or condition, a

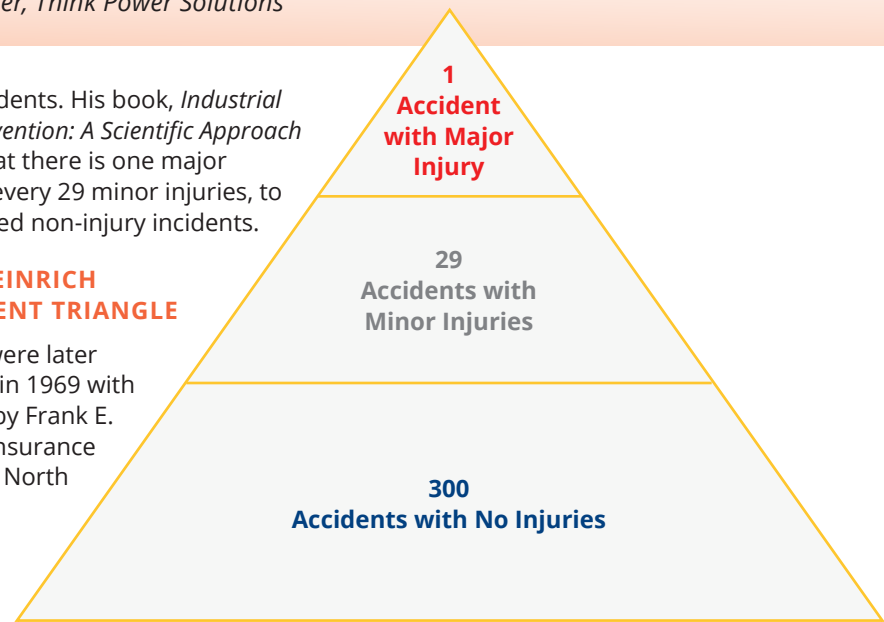


Figure 1. The Heinrich Accident Triangle

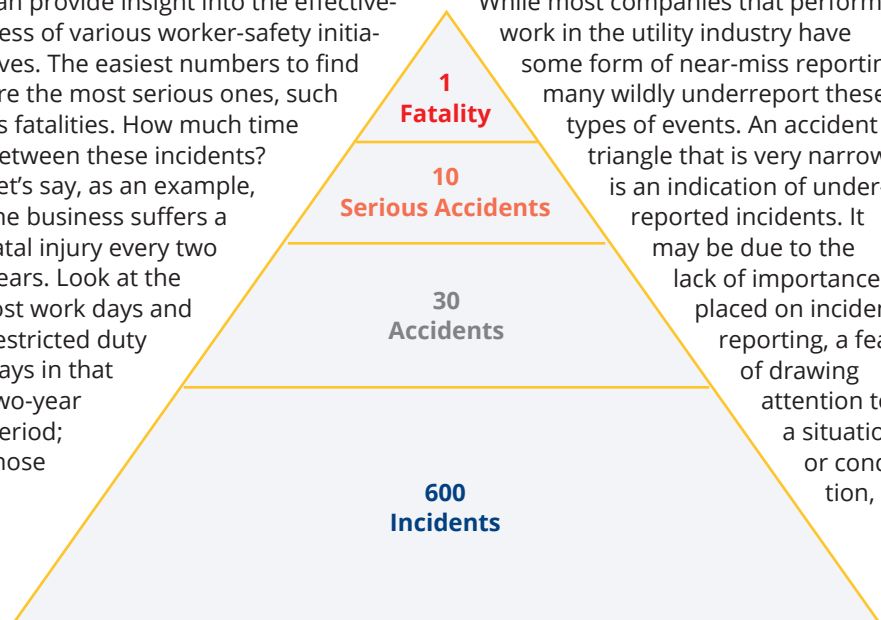


Figure 2. The Bird Triangle

production-focused mindset, or simply because it is difficult or time consuming. Think Power Solutions performs contract field services in addition to software and technology services for utilities. The goal is to improve the quality of our field services and support our employee protection efforts. We incorporate what we learn from our field efforts—including matters of employee safety—into the software products.

One way to remedy underreporting is to simplify the process for reporting near misses. Nearly every employee in the U.S. has a smartphone with a camera, the ability to text, and an internet connection. Whether you develop your own tool or use one of the many available incident-reporting apps, reporting near misses is quicker than ever and right at your fingertips. Gone are the days of reaching into the glovebox for paperwork and a disposable camera. We now track incidents or near misses in real time and the data is

processed relative to location, weather, time of day, and uses any other set of factors that may help reveal trends that can be reversed before developing into serious injuries.

▶ **ENCOURAGING MORE REPORTING**

A desire to improve safety performance should be rooted in a genuine concern for the well-being of those around us. It should not matter whether the affected person is an employee of your company, someone working for another company, or a member of the general public; the concern is for all who have the potential to be affected by the work conducted on a public utility.

▶ **A THINK POWER SOLUTIONS “SHARABLE MOMENT”**

Some time ago, our company began the process of adopting prevention techniques based on Human Performance (HP). This is greater than accident

avoidance as it includes all errors. The core principles of HP are that:

1. People are fallible, and even the best people make mistakes.
2. Situations resulting from error are predictable, manageable, and preventable.
3. Individual behavior is influenced by organizational processes and values.
4. People achieve high levels of performance largely because of the encouragement and reinforcement received from leaders, peers, and subordinates.
5. Events can be avoided by understanding the reasons that the mistakes occur and applying the lessons learned from past events or errors.

In the spirit of these principles, there has been an attempt to remove the fear or stigma of reporting undesirable occurrences in the field or blaming someone because the goal is to learn from them and ultimately

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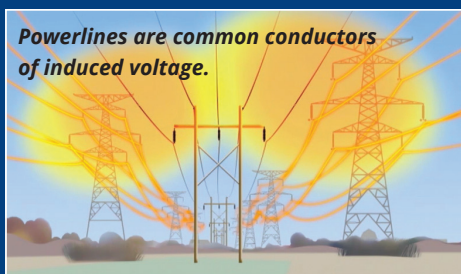
SILVER LEVEL

The Hidden Danger of Induced Voltage



With safety as one of our core values, FirstEnergy is committed to identifying potential risks. Electrical hazards can pose a danger to line clearance arborists around the country. Knowing the voltage, operating conditions, and presence of grounds or electrical isolation equipment is essential to working safely around power lines. We must remain cognizant of lines that have been removed from service but could inadvertently be energized by induced voltage.

Induced voltage is voltage that has



been electromagnetically or electrostatically introduced onto a conductor. Unlike static voltage, induced voltage has the potential to create significant currents through conductors in a common right-of-way (ROW), which can be lethal. Induced voltage may be present when conductors are near other energized lines, like when low-voltage cables are run close to energized conductors or when conductors cross or are crossed by energized lines. Other metal objects in the ROW, like fences, streetlights, and metal structures, may also have the potential to become energized.

Certain variables can increase the risk of exposure to induced voltage. The risk is highest when:

- The nearby conductor’s operating voltage is high
- The distance between the energized and a deenergized conductor is small
- Two conductors run parallel to each other for a long distance

Workers must always remember that these conditions may be out of sight elsewhere on the circuit, even if they are not observed at the jobsite.

Remember, less than one ampere of current can stop the heart. To protect yourself and others, follow FirstEnergy’s mantra of *Stop. Look. Live:*

- 1. Stop**—verify the absence of voltage on the line
- 2. Look**—ensure that affected conductors are grounded or isolated from the circuit
- 3. Live**—never make direct contact with conductors, for the sake of your life and the lives of others

Contact your local utility partners with questions about induced voltage. For more tips on staying safe, visit firstenergycorp.com/publicsafety. ■

safety share
THINK POWER SOLUTIONS

MISLABELED EQUIPMENT

Date: December 2020
Summary: A contractor was tasked with energizing a single phase pad mounted transformer to a 23 kV circuit after the transformer had been set in place. The contract workers discovered that the voltage rating on the name plate inside the transformer was different from the voltage rating on the transformer compartment door/ hood.

They stopped work and did not proceed. The compartment door/ hood was stenciled "13.2". A 13.2 kV single phase transformer is intended for 23 kV circuits. The nameplate indicated that this was a single phase 7.2 kV transformer which is intended for 12 kV circuits.

Had the 7.2 kV transformer been energized on a 23 kV circuit it would have been subjected to higher voltage than designed or rated for and catastrophic failure could have occurred.




prevent serious injury. Think Power Solutions refers to this reporting process as "sharable moments" (some companies use phrases like "near-miss incident" or "good catch"). While this includes the traditional concept of a near miss, the definition has been broadened to encourage sharing other learning opportunities with the entire organization. Even ways of improving the process can be shared. Some examples might include the time a non-functioning guard was discovered, the use of inadequate or outdated PPE, improper work area protection, or giving a lacking pre-job briefing. Incorporating events such as these can help tailor the triangle for your company and provide a more realistic number for the base of the triangle.

▶ **BEYOND REQUIREMENTS**

Companies are required to follow the OSHA 300 report, recording all reportable injuries and illnesses that occur in the workplace for the year, such as days away from work, restricted work, transfer to another job, medical treatment beyond first aid, loss of consciousness, significant injury, or illness diagnosed by a physician or death. The purpose of this report is to track any trending serious incidents at a company. In 1970, there was a limited ability to track



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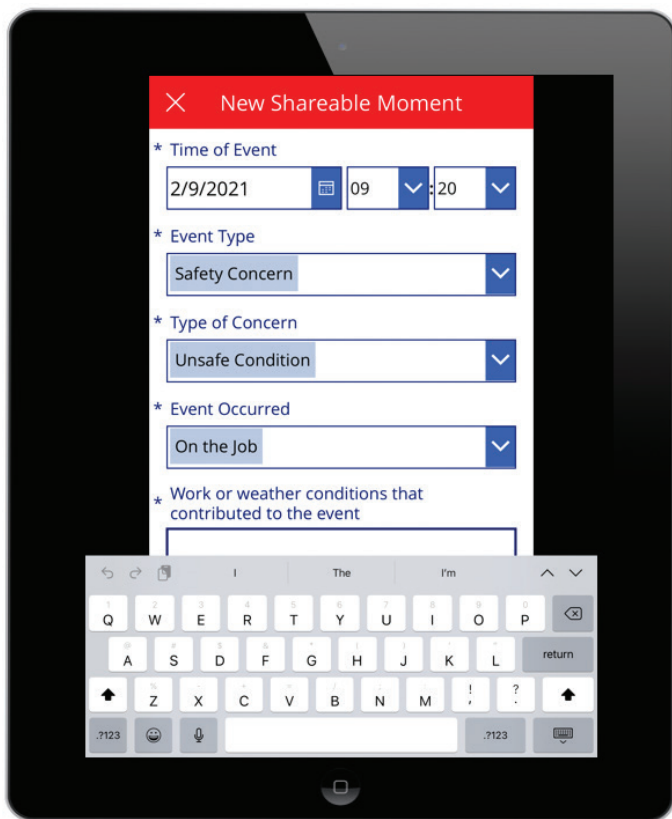
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this information, but now, with modern mobile technology and advanced data analytics, we can track useful data that exceeds the requirements on the OSHA 300. Armed with this additional data and using business intelligence software systems, advanced data processing, and even artificial intelligence (AI), we can profile and predict the next injury based on the age of the injured, time of day, type of work performed, hours worked, weather, and the nature of the injury.

In the 1980s, less serious or “almost” injuries were not given a great deal of consideration. The greatest advancement over the years has been the renewed focus on the bottom of the triangle. Working on leading indicators at the bottom began pushing the top of the triangle to longer periods between incidents. The two-year example used

earlier moved to three years between fatalities, and continued to lengthen. By taking advantage of technology and looking at records and data not simply as a regulatory obligation but as a valuable tool to make genuine improvements, it became possible to make far more informed decisions on accident avoidance. This benefits our companies, the utilities we work for, and most importantly, the individuals who go home every night injury free.

WE CAN PROFILE AND PREDICT THE NEXT INJURY BASED ON THE AGE OF THE INJURED, TIME OF DAY, TYPE OF WORK PERFORMED, HOURS WORKED, WEATHER, AND THE NATURE OF THE INJURY.

AUTHOR BIOS

**Hari Vasudevan
Founder and CEO, Think Power Solutions**

Vasudevan advances and maintains key utility client relationships and ensures client satisfaction. He has a bachelor’s and master’s degree in civil engineering and is a registered Professional Engineer in multiple states. With over a decade in the industry, he has established, led, and managed program teams that provide all engineering, environmental, construction, O&M, asset management, and program management services and support on transmission, distribution, and substation projects across the U.S. Vasudevan led the identification, bid, capital program management, and execution of the Texas Competitive Renewable Energy Zones (CREZ) program for several utilities—a capital investment of more than \$7 billion in a two-year period. As Vice Chair and Strategic Advisor of Edison Electric Institute’s (EEI) Transmission Subject Area Committee (TSAC), he partners with other industry leaders to help shape the industry’s thinking, technology, and future.



**Rayford “RL” Grubbs
Safety Manager, Think Power Solutions**

With more than four decades in the industry, Grubbs has seen myriad positive changes in the evolution of health and safety. In 1982, Grubbs was invited to be involved in a safety project to keep employees protected from significant injuries. He quickly realized that there was much more to safety, so he attended night school to pursue an education in Occupational Safety and Health. With a passion for improving the health and safety culture of the workplace, Grubbs is a Certified Utility Safety Professional and an OSHA Outreach Trainer. He is certified to teach OSHA 10 and OSHA 30 and enjoys standing in front of a group, discussing how to safely complete their assigned tasks. Grubbs is a life-long Texan and a decorated veteran of foreign wars. He and his wife have two children, five grandchildren, and six great grandchildren. ■

