

# THE FORENSIC P.E.

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## Partnering for Safety Management - by Gregory W. Miller, P.E.

### Electrocution - The Tragic Facts

The statistics from NIOSH – National Institute of Safety & Health tell us “there were 93,338 civilian workers who died from injuries sustained while working in the U.S. from 1980 through 1995.”<sup>1</sup> If you look at the deaths attributed to machines, falls, electrocution, falling objects, and explosion, these violent industrial incidents accounted for 35,965 or 38% of occupational deaths during this period.

Those of us who have electrical construction experience are aware of the extremely dangerous nature of electrical T&D construction, maintenance and operations. Looking into the above numbers, 6,233 were fatalities by electrical energy (electrocution).

A first step towards correction requires a deeper look into their causation before we can arrive at a solution. The following NIOSH report on “Worker Deaths by Electrocution”<sup>2</sup> reveals that the majority of these injuries are due to human error by the injured party or other co-worker.

Even though there are a multitude of specific reasons for these human failures, they are a fact of life. This report reveals that utility workers, who are probably trained better on electrical safety than most industries, had the highest fatality rate in the incidents included in the NIOSH survey.

The conclusions of the report unfortunately go on to focus on recommendations that more training is required. In my experience, this is

the typical solution to most loss incidents. More training, better training may help, but I would like to focus on one of the most important bullet points from their conclusions.

- “Develop and implement procedures to control hazardous electrical energy which include lockout and tagout procedures and ensure that workers follow those procedures.”<sup>2</sup>

An entire field of engineering study is devoted to the engineering design and analysis associated with “human factors”. This article will focus briefly on a proposal to develop and implement procedures that are designed to minimize the influence of human factors.

### The “TQM” Example - A Solution for Injury Prevention

In the implementation of a “TQM” Total Quality Management solution to quality problems, manufacturers must focus their attention on the “deviation” from the required quality target. In verifying “where” the cause of the quality deviation occurred, the manufacturing industry came up with ways to document who, where, when, and how the quality was impacted during the fabrication and inspection cycle. If we draw parallels from TQM for Loss Prevention management, the deviation is an injury or near miss that must be addressed with feedback mechanisms, procedures, training, team building and management ownership. It is our opinion that the improvement of the injury frequency can be successfully implemented by adopting techniques similar to those that have been successful in the TQM world. Total Safety Management (TSM) is a parallel and growing area of safety policy and practice. But let’s look at some simplified examples and techniques that could counteract the human factors that are involved in many incidents. – Cont’d next page -

<sup>1</sup> NIOSH link:  
(<http://www.cdc.gov/niosh/NTOF2000/pdfs/ntof2fbc.pdf>)

<sup>2</sup> NIOSH link: (<http://www.cdc.gov/niosh/pdfs/98-131.pdf>)

## THE FORENSIC P.E. (continued)

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### The Partnering Technique Methods

The OSHA regulations have very valuable procedures for locking out and tagging sources of hazardous energy.<sup>3</sup> Even though similar procedures have been promulgated in industry for decades, their existence doesn't seem to prevent all injuries. The reason: human beings take shortcuts, get distracted or sometimes accept verbal information or confirmation without jointly verifying the safety hazards or lockout/tagout status with co-workers.

Our preferred solution can be as simple as a one-page written checklist procedure designed specifically as a step-by-step implementation of safe methods.

The key to this safety checklist is that it must be jointly initiated and completed by two workmen. Each planned safety step requires signoff by both partners during the work at the site.

This was a common practice for project activities on my previous utility projects. And it worked! Maybe two heads are better than one !!!

The salient points of the safe partnering procedures are:

- Design generic procedures for repetitive electrical work, but each work procedure must have date, location and names for every hazardous task
- Write special procedures for unique switching/lockout/construction tasks
- Include site-specific "look & see" requirements in the initial steps to identify all of the site-specific hazards (overhead/underground power lines, back-feeds, etc.)

<sup>3</sup> OSHA 1910.147 and Interpretive Guidance links:  
([http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=9804](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9804))  
([http://www.osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=DIRECTIVES&p\\_id=1792](http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=DIRECTIVES&p_id=1792))

- Add value by building quality testing procedures into the steps to assure that work is done right the first time
- The form content should have the approval signature of the safety officer or designated person having safety authority
- The right hand side of the form should have dual columns for each partner to sign off after completion of each step

Management and the Safety Officer should require and monitor the preparation and archival of these procedures as a part of the documented safety program. The periodic monitoring of these documents can aid the Safety Officer in identifying those who are not in strict compliance and who may need additional safety orientation.

The implementation of these safe partnering procedures does not require enormous resources and could save a life. Utilities and industries that hire contractors can also require that their contractors and their sub-contractors implement these safety-partnering procedures as a contract requirement. ?

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