

TerranearPMC Safety Share

Week of September 16, 2013 – Looking Beyond the Accident

I remember reading about a particular worksite that touted a very impressive safety record: over 15 million hours worked without a lost time incident. That is, indeed, quite remarkable. Consider that OSHA accident rate statistics are based on the typical facility; having 100 employees, with each employee working 40 hours per week and 50 weeks per year; that calculates to 200,000 working hours every year: which means for the average sized company, it would take five years to reach one million working hours. Therefore, for a typical organization to reach 15 million work hours, it would take 75 years. That's 75 years without a lost time incident! That would mean a company that started out in 1938, having a continuous employee roster of 100 employees, would have never incurred an incident that resulted in lost time. If an organization achieved such a milestone, it seems logical to assume that a strong safety culture existed, and if an accident finally did occur, the incident would be minor. However, in the case of the site that achieved 15 million hours, the incident that finally put a halt to their safety record, was a fatality. According to the investigation, a subcontractor was performing work with a truck that was situated on heavily sloped terrain and upon moving, the vehicle's center of gravity shifted, causing it to tip over onto an employee.

The subject of accident causation is firmly rooted in the philosophy of Heinrich's triangle. This is a concept that states that for every serious accident (fatality), there are numerous events that resulted in a less serious case, as well as other incidents, where a notable consequence was not even apparent. In such cases the unsafe condition or act was present but due to the specific set of circumstances, what could have been a disaster went unnoticed.

If we accept that Heinrich's triangle is more than just a theory, then, the site that everyone thought was so safe (boasting over 15 million safe hours), was apparently, not so safe. After all, there should have been quite a number of occurrences at this site. Based on Heinrich's theory, that would be 29 less serious injuries, 300 hazardous conditions, and 3000 unsafe acts – all stemming from a similar root cause. Yet, the root cause went unnoticed and without proper recognition, eventually, the specific influential condition was allowed to continue and finally, manifested itself in a most serious event. While recent studies are now questioning the specific intricacies of Heinrich's original premise, no one disputes that unsafe conditions or acts can result with varying degrees of severity.

Many of us work with various types of heavy equipment in the field. Typical hazards associated with heavy equipment include; run-over or struck-by, caught between solid objects and moving equipment, falling from machines or overturning equipment, contacting overhead or underground utilities, and struck-by flying debris and rocks. The results can range from a near-miss to a minor contusion or laceration to a very serious injury, including a fatality.

There are many reasons or causes why heavy equipment hazards can result in an incident. Some include improper set-up and/or use of equipment, not following manufacturers' instructions and warning labels, and even defective equipment. Looking at these potential causes, an example comes

to mind where, fairly recently, in the Seattle suburb of Bellevue, Washington, a 210-foot crane collapsed onto an occupied apartment building, killing an unsuspecting resident.

After a six month investigation it was determined that a flawed engineering design was the cause of the tower-crane collapse. As it turns out, the engineered foundation was designed to withstand only about one-fourth of the pressures that the 210-foot tower crane actually required. In addition, it was observed that the crane was deflecting at an angle, causing the crane to tilt at least three feet to either side. Operator error was not a factor. The investigation found the crane operator was well experienced and was operating the crane properly.

So how could this tragedy been avoided? According to the investigation report, it was determined that the engineering firm that designed the base failed to ensure that the design specifications met the specific recommendations of the crane manufacturer. The general contractor for the project was cited for failing to conduct periodic inspections to ensure that the crane's deflection limits were not exceeded as specified by the manufacturer. Another citation was issued to the general contractor for having tower crane structure advertising banners that exceeded the size recommended by the manufacturer. Oversized signage can potentially affect the control and operation of the crane (reduced visibility, wind currents, etc.).

As proclaimed by modern accident investigation philosophy, an accident is not the result of any one event, but rather a series of events. In this case, there was a failure to meet design specifications, a failure to conduct periodic inspections to ensure the crane's stability, and using an accessory (banner) that could have exacerbated the crane's condition of stability. Whether the third factor had an influence on the cause of the event is hard to tell; however, the first two were definite factors. In addition, if daily or periodic inspections were properly conducted, in all likelihood, the tragedy could have been averted ó even if the crane was initially placed on a base that was not designed properly. The point is, even though a design feature was responsible for the actual event, there was an opportunity for site personnel to take control and prevent this disaster.

Because the three infractions were classified as OSHA violations, three separate penalties were levied: \$5,600 to the engineering firm that designed the base, and \$5,600 and \$3,600 to the general contractor for their failure to perform routine inspections and placing an oversized banner on the crane, respectively. That's a total of \$14,800 ó not a lot of money for such a disaster. As far as the building resident fatality, it is not unlikely that the engineering firm and construction company are in the process of dealing with a much larger settlement than an OSHA citation.

Accidents do not just happen, they are caused. While the initial or root cause of a serious event may be due to a design failure or misinterpretation of an operating instruction, we still may have the opportunity to correct a mistake and thereby, prevent a serious event. By noticing an action that may not have resulted in an unwanted event, but under slightly different circumstances, could have, we can take control of our work environment and help to have a smooth and accident-free workplace.

A joke is a very serious thing

Winston Churchill (thanks Carl!)