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# Engineering Services

## Safer Than Most, but Plenty of Room -- and Reason -- to Improve

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With so much construction going on these days, how are the engineering services firms providing much of the oversight doing on the safety side of the equation? This article is a brief examination of their safety performance as a group and a few thoughts on how and why they could improve.

The U.S. Census Bureau defines Engineering Services firms (NAICS 541330) as "establishments primarily engaged in applying physical laws and principles of engineering in the design, development, and utilization of machines, materials, instruments, structures, processes, and systems. The assignments undertaken by these establishments may involve any of the following activities: provision of advice, preparation of feasibility studies, preparation of preliminary and final plans and designs, provision of technical services during the construction or installation phase, inspection and evaluation of engineering projects, and related services" (U.S. Census Bureau, 2012). It does not sound particularly dangerous, and it usually is not, but some of the numbers tell a different story.

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Bureau of Labor Statistics (BLS) data indicate that in the third quarter of 2018 (most recent available), there were 75,956 privately-owned engineering services firms employing 989,000 workers (13 employees each) at an average wage of $1,792 per week. (U.S. Bureau of Labor Statistics, 2018).

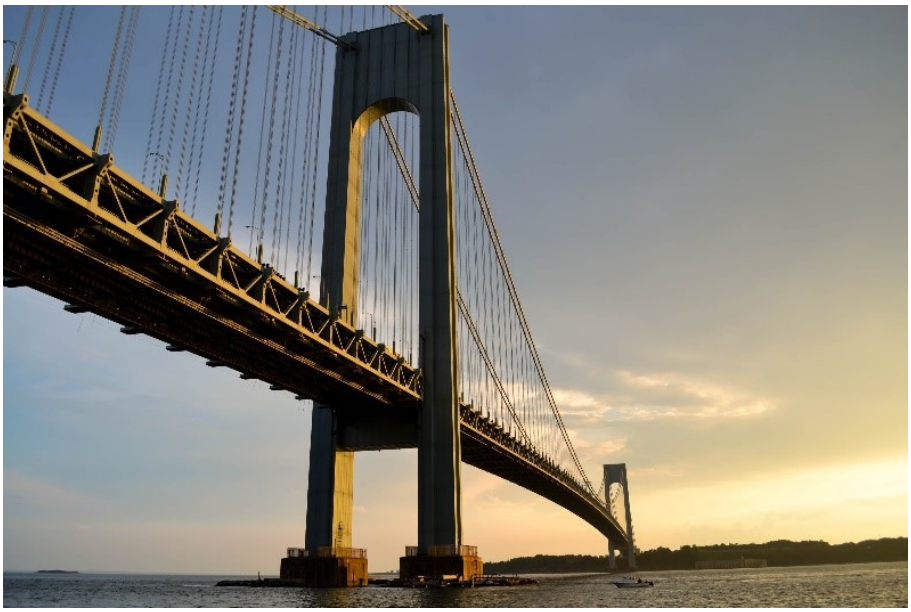
From October 2017 through September 2018, engineering service firms were the subject of 51 federal Occupational Safety and Health Administration (OSHA) inspections, receiving 55 citations from 18 of those inspections, about three per inspection. Most commonly cited were Lockout / Tagout (7), Lead (5), PPE general requirements (4), Respiratory Protection (4), and Fall Protection (4). Fed-imposed penalties averaged $4,370 per citation, well above the all-sectors average of $3,030.

During the same period, engineering firms were the subject of 64 state OSHA inspections receiving 99 citations from 35 of those inspections, about 2.8 per inspection. Most commonly cited were Heat Stress (7), Hazard Communication (4), Lockout/Tagout (4), PPE general requirements (4), and California Illness and Injury Prevention Program (4). Many states issued no citations, while California led with 50. State-imposed penalties averaged $1,628 per citation, well below the sector federal average of $3,030.

BLS data indicate nine engineering services fatalities in 2017, with six of those coming from transportation incidents (e.g., vehicle crashes and/or being struck by vehicles). On an hours-worked basis, this group posted 1.1 fatalities per 100,000 employees in 2017 as compared to a national all-sectors average of 3.5 per 100,000. In addition to vehicle-related deaths, descriptions included "crushed by hoist", "inspecting bridge, killed in fall", and "engulfed in coal ash while inspecting ash pond". While the rate is indicative of a relatively safe workplace, consider that other environments

likely perceived by many as more hazardous had lower fatality rates that year, including chemical manufacturing (1.0) and construction managers (1.0).

With a Total Recordable Incidence Rate (TRIR) of 0.7 per 100 employees (6,000 cases) in 2017, engineering services firms performed much better than the combined private sector national average of 2.8 for non-fatal injuries (2.8. million cases). This group performed similarly well regarding DART rate (Days Away, Restricted, Transferred), posting a 0.4 per hundred workers versus the national average of 1.5 (Bureau of Labor Statistics, 2018), but may still have spent $136 million on 2,120 days-away cases (injuries that resulted in days away from work but not job transfer or restriction) (Occupational Safety and Health Administration, 2018).



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The leading natures of injuries and illnesses resulting in days away from work for engineering services that year were sprains, strains and tears (460), other – not classified (360) and cuts, lacerations and punctures (280). Most frequently injured were hands (730), knees (210), and backs (170) from contact with objects or equipment, overexertion and falls, slips and trips (Bureau of Labor Statistics, 2018).

Lost-time injuries in this sector also tend to be relatively long-term, with a median loss of six days per injury and nearly 24% out for 31 days or more, contributing to at least 27,000 work days lost in 2017 (Bureau of Labor Statistics, 2019).

Even with these relatively good safety numbers, the hit to the industry in 2017 was serious, forfeiting $475 million in sales (at an example 15% profit) to make up for $71.2 million of indirect costs not covered by workers' comp. If direct costs are considered, additional sales needed to recover the loss reached $906 million (Occupational Safety and Health Administration, 2018).

Aside from the human and financial impacts, engineering services firms risk being excluded from work opportunities for not being better than average on safety. Fatalities are an obvious deal-breaker for most, if not all, potential clients, but many require evidence of robust safety programs and strong results. For example, it is not uncommon to see an eligibility threshold of one-half the NAICS code TRIR average, which would have required an engineering firm to deliver a 2017 TRIR of no higher than 0.35. The same goes for DART and workers' compensation experience mod rates. Firms that cannot produce and sustain such numbers are excluded from even bidding on often the most lucrative projects for very large clients.

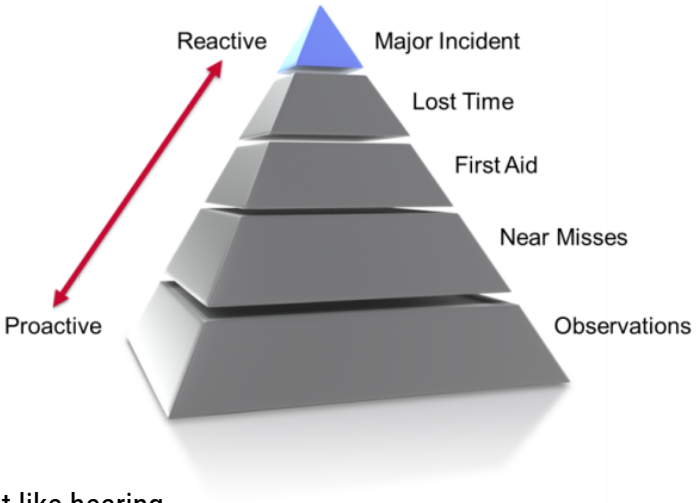
Thousands of work days and millions of dollars lost to injuries and the hundreds of millions of dollars in additional sales needed to cover it are not going away on their own. A tendency to eat the loss is how firms continue financing

risk instead of managing it, nor does being average attract high-end clients that demand top safety performance. Engineering services can keep chugging along business as usual, or maybe we can figure out a way to stop hurting our workers.

The sustainable solution is building a culture of safety. Real safety culture is a lifestyle change for the organization that starts with an absolute commitment to safety, then going after the data to drive measurable improvements based on solid information. It doesn't happen by writing a memo, firing "unhappy people", or continuing the proverbial floggings until morale improves.

Start with measuring what matters. Here are some recommendations to get started:

- Make safety a top priority and do whatever it takes to succeed.
- Make safety part of the performance evaluation for every employee.
- Know your numbers and how they affect everything you do.
- Use Job Hazard Analysis (JHA) to understand work activities that cause injuries.
- Measure and track everything you can through a formal incident management system (IMS) that promotes early reporting and intervention. Electronic and mobile systems are preferred, especially for larger firms.
- Be proactive and use the IMS to capture and investigate observations and near misses with the same resolve as if they were injuries. These leading indicators are warning signs and are your best chance to improve the process and prevent injuries and illnesses.
- "Top-down" approaches where only managers observe and report do not work. Every employee is a potentially rich source of information, and no manager or supervisor can possibly be in a better position to observe and report what is happening at the employee/risk interface (the job) better than the employee doing the job.




- No retaliation for reporting -- especially for things you do not like hearing.
- Asking everyone on the team to step up and help improve workplace safety will not succeed unless the process is credible, transparent and positive.

Engineering service firms may not be the most dangerous environment in which to work, but it has significant potential to improve. Establishing a culture of safety across the industry can reduce risk, save money, attract better clients, and most importantly, prevent injuries, helping us all to be better at what we do.

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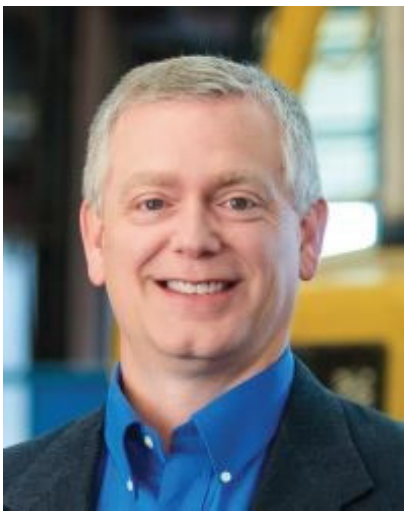
# About the Author



Dr. Scott Harris is a Course Director and Advisory Board member of the North Carolina Occupational Safety and Health Education and Research Center at UNC - Chapel Hill, a guest lecturer for the Oklahoma State University Fire and Emergency Management Administration program, a Continuing Education Instructor for the Rocky Mountain Center for Occupational and Environmental Health at the University of Utah, and a Graduate Environmental Science Instructor for the University of Texas at San Antonio.

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