Safety Engineer

BY LUBA VANGELOVA

Safety engineers focus on reducing worker injuries and deaths. Their tasks can include evaluating workplaces; recommending modifications; educating workers on safety protocols; investigating accidents; and testing or maintaining equipment or materials. They work in many industry sectors, as well as in government agencies and consulting firms. Thomas Kramer, a work-at-heights specialist, is a managing principal at LJB Inc., a national engineering consulting firm headquartered in Dayton, Ohio.

Work Overview

I work with clients in sectors such as heavy and light manufacturing, logistics, and different levels of government. Some of my work is focused on client projects, and some is related to the safety industry as a whole. For client work, I look at how an organization functions versus how they want to function, identify issues, analyze what it would take to fill that gap, and recommend next steps. I travel to client facilities across the country and talk directly to workers, in order to better understand tasks and safety challenges. For solutions to be effective, I have to design around what workers are already doing, rather than force them to do something that will fit into my design.

If I’m working to reduce a specific hazard, I may start with a concept, superimposing a safety system onto a photo of a workplace to make sure we’re taking all variables into account, and to get client buy-in. I then do calculations to get the details right, based on safety and building codes. Structures such as roofs are designed by engineers, who perform calculations to make sure they are strong enough for the expected loads. If we’re changing the use of a roof and adding new loads (such as by adding anchors from which people will be suspended with harnesses while working), we have to make sure the structure design is still adequate.

My work doesn’t end with the design. We produce a certified system, which includes documentation to show it was designed correctly. Certified doesn’t mean guaranteed, but we create procedures, specify needed equipment, and conduct training, in order to increase the success rate as much as possible. Then at least every year, I go back to inspect the system and make sure it is still fit for its purpose. Every
five years, I do a more thorough assessment to recertify that all the documentation is still valid. We do this because things change. For example, if trucks are now stopping in a different part of a loading area, the original anchorages we recommended would not be valid anymore, and some corrections would need to be made.

Some of my client work involves looking at systems across an entire operation. For example, when the Air Force was in the process of changing the height at which personnel were required to have fall protection, my team analyzed the issues and budgeted the costs, to help military leaders understand the full picture.

My work is much more automated now than when I started in the 1990s. There will be more automation in the future, but there will always be a need for humans to do essential engineering problem solving. Having conversations in the field, and collaborating with workers, architects, company owners, subcontractors and other interested parties, is tough to automate.

In addition to my project work, I serve as the chair of a national fall protection standards committee (ASSP/ANSI Z359), and I produce webinars and other materials to better educate people in the industry. I am also on the board of the American Society of Safety Professionals.

My favorite part of the work is seeing a lot of different types of buildings and operations, and getting behind-the-scenes looks at different industries. For example, I got to visit a water treatment plant, and learned what is required for us to have clean, fresh water. My least favorite part of the work is the administrative tasks, but I know that without them, the business couldn’t run properly and meet our clients’ needs.

Career Highlights
In 1998, I got a call from the safety director at one of our client organizations. A worker had fallen head first from a 20-foot-high concrete wall. He was saved by a horizontal lifeline we had designed. My work had changed someone’s life for the better. That’s my goal—trying to improve quality of life. I’ve also enjoyed being able to give presentations at conferences around the world.

Career Path
In school, I had a talent for math and science. I also had a passion for technical drawing, and seeing my drawings become tangible. I applied to architecture school but wasn’t accepted. My father pointed out that architects create the equivalent of the skin and features of a building, while civil engineers create its bones. So, I got an engineering degree instead, focusing on analyzing and designing structures. In hindsight I’m glad I went this route; I work with architects, but I enjoy working on this side of things more.

I started with my current company in 1995, while finishing my Master’s degree. At first, I was primarily analyzing industrial structures such as cranes, foundations, and building renovations. But I also got involved in some safety projects, such as designing a tie-off anchor point so that a worker falling from a crane didn’t hit the ground. After a few years, I was exclusively working on safety projects.

In addition to becoming a professional engineer, I decided to become a certified safety professional, to help me better ensure that I was always taking the person into account in my design work. A major part of designing a fall protection system is ensuring that an anchor point is strong enough, but it’s much more than that. The structure doesn’t change in the short term, but the person and how they use the safety system can change hour to hour, depending on what they’re doing, how much they’ve slept, what they’re thinking, and so on.

Advice for Students
Be a lifelong learner, even if you’re working and think you’re good at your job. I’m the president of the International Society for Fall Protection so I know a lot about this industry. But when I meet someone, I am learning something from them, because everyone has a different perspective. Push yourself to grow. Read, and listen to podcasts and presentations on topics you’re trying to better understand.

Also try to meet as many people in as many situations as you can. You might be able to help them out, or they might be able to help you out sometime.

BONUS POINTS

Kramer’s Education: BS and MS in civil engineering, University of Cincinnati; MBA, Miami University (Oxford, Ohio).

On the Web: https://www.assp.org/resources/free-learning-resources

Related Careers: Structural engineer, safety professional

In 2006, I decided to get an MBA, to better understand how our company and clients make business decisions. Over the years, my work responsibilities have grown to include managing projects, client development and a division, among other things.

Knowledge, Skills and Training Required
You need both hard and soft skills. Math and science help you formulate ideas and possible solutions, but you also have to be able to communicate ideas to workers, managers and other stakeholders in a confident and effective way. Toastmasters is probably the most effective way to learn presentation skills. You don’t need to be great at it, just better than most.

www.nsta.org/science-teacher