



A New Dimension of Safety Education

Edd Gibson, PhD., P.E., is the director of the School of Sustainable Engineering and the Built Environment at Arizona State University. He is establishing a center to ensure that design safety will be part of every engineering degree. Traditionally, the fundamentals of ensuring safe design and construction methods have been absent from the programs at the various colleges and universities of engineering. At commencement, an individual who receives a degree in engineering has no marketable skills to ensure safe design or planning and organizing construction projects. AECOM, one of the largest engineering firms involved in both design and build, provides training on design-based safety for many of its engineers. The value of this program is substantial, as it prevents injury and death, reduces insurance costs and minimizes costly safety management activity on how to inspect, supervise and train their workforce to recognize and avoid hazardous conditions. The key issue with design safety is that many hazards are eliminated, so there is a reduced exposure to danger during construction, operation or maintenance.

Dr. Gibson is among the rare few in academia who see the bigger picture and are able to formulate solutions that will benefit all enterprises. His solution is to establish momentum and a priority for including design-based safety as a requirement for an engineering degree with short, two-day courses on design safety. These short-term courses will become the proving ground of effective design safety engineering training.

Expertise in the development of design-based safety engineering course training has been largely a result of volunteer support of members of the International System Safety Society (ISSS). Since the 1960s, with the advent of MIL-STD-882, defense contractors have ensured design-based safety. Unfortunately, MIL-STD-882 sets the requirement, but does not provide a methodology to achieve safe design. Engineers on defense weapon development programs have been the real leaders on design-based safety. Engineers who have been expert witnesses for plaintiffs' attorneys in product liability litigation have been on the cutting edge of design-based safety. During the decades since the 1960s, many of these expert witnesses have developed real-life criteria on how to achieve design-based

safety. The justice system is a tough sell, because opinions cannot be accepted on speculation and have to rely on factual evidence. The most-used reference on design-based safety is the book *Construction Safety Engineering Principles*, published by McGraw Hill. It relies on a matrix of five hazard control measures for the horizontal axis, and seven categories of hazards for the vertical axis. Some 50 examples of the use of the matrix are included in the text.

Great credit goes to Dr. Gibson for developing a process within academia to include design and build (D&B) safety engineering. Most engineering professors have not had experience from design through construction management, and are unknowledgeable on safety issues. Many engineering professionals' only jobsite experience is a small contract that provides expertise on a very focused subject.

In days gone by, from the 1950s to the 1980s, the U.S. Army Corps of Engineers was beginning to build huge navigation and power generation plants on major rivers and to develop harbors for both commercial and recreational fishing boats. Safety engineers on these projects were actual engineers who monitored these projects from design through construction. These individuals were also aware of the hazardous design of commercial equipment and established design safeguards such as rollover protection structures (ROPS) on mobile equipment. Further, as cranes evolved, design overcame many inherent hazards.

For those who want to volunteer or learn more about Dr. Edd Gibson's Design Safety Engineering, he can be reached as follows:

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The annual ISSS Conference will be held in Phoenix, Arizona beginning August 13, 2018 in connection with Arizona State University. Dr. Gibson oversees a graduate-level course on design safety. An interesting topic for this Conference should be a summary of the students' opinions concerning design-based safety. ●