As ASSE begins to observe 90 years as an organization, we have an opportunity to reflect on events that have shaped our profession and this organization. Although we will focus on advances during this time, it is interesting to note that safety’s roots can be traced to ancient history. For example, the ancient Chinese (circa 2500 BC) practiced “risk management” when they would place one-sixth of their harvest on each of six boats traveling to market. Early Egyptians (1600 BC) recognized the hazards of breathing fumes produced by melting silver and gold (although it is unclear what steps, if any, were taken to mitigate the problem). Other early examples of this recognition of the importance of occupational safety:

- In 1770, Benjamin Ramizzini, an Italian physician, published the first thesis attempting to prove the connection between occupation and disease.
- In 1730, Benjamin Franklin organized the first firefighting company in the U.S.
- In 1812, an embargo spurred development of the New England textile industry and the founding of factory mutual companies. These firms inspected properties and suggested loss control and injury-prevention methods that policyholders could implement to secure low premiums.

What events/advances would you classify as “safety milestones”? A range of events was offered. Nearly all cited landmark legislation that led to the formation of OSHA, the National Institute for Occupational Safety and Health.
In 1864, the Pennsylvania Mine Safety Act was passed into law.
In 1877, the state of Massachusetts passed a law requiring guarding for dangerous machinery.
In 1896, the National Fire Protection Assn., a group dedicated to fire prevention and code development, was founded.

These are just a few of the events that preceded the beginning of our journey—the birth of ASSE on Oct. 14, 1911. In its early years, the Society was dedicated to developing accident prevention techniques and advancing safety engineering as a profession—a mission that continues today. The organization was headed by a group of leaders who were true visionaries in advancing the industrial revolution and making a difference in the lives of workers every day.

To provide a true picture of the events that have helped shape this profession, let’s examine some tragedies that have occurred since 1911—and the results of those tragedies.

THE TRIANGLE SHIRTWAIST FIRE—1911
On March 25, 1911, fire broke out in the Triangle Shirtwaist Co. facility in New York City. The firm, which occupied the top three floors in a 10-story building, had locked the doors leading to the exits to keep the workers at their sewing machines. As the fire spread rapidly, fed by thousands of pounds of fabric, workers rushed to the stairs, freight elevator and fire escape. Many died when the rear fire escape collapsed, and many others jumped to their deaths in an effort to escape the burning building. Although firefighters arrived quickly on the scene, their ladders only extended to the sixth floor.

In total, 146 women died. Despite the public outcry, the owners were acquitted of manslaughter charges, though they were ordered to pay $75 to the families of 23 victims. As a result of the fire, the city established the Bureau of Fire Investigation. This event remains a vivid symbol of the need for all stakeholders to ensure a safe workplace.

THE RMS TITANIC—1912
Labeled the “unsinkable ship,” RMS Titanic was designed to cater to the rich and famous. In their haste to make a good impression, the owner and officers decided to reduce the number of lifeboats carried because they would “clutter the deck.” When it left port, the ship carried enough boats for 1,178 people—well short of the 2,207 passengers and crew on board. The logic behind this decision? “This boat is unsinkable. We don’t need lifeboats.” During the fateful voyage across the Atlantic Ocean, the ship’s officers received at least seven warnings about icebergs. Yet, just after 11:40 pm, the ship struck an ice-

By M.E. “EDDIE” GREER

A worker strings cable—stories above the ground—on the Empire State Building construction site.
ships must have 24-hour radio watch. In Because it is easy to send and receive, and passengers and crew. The universal dis-

workable plan. Of the 2,207 people on the icy waters, many more likely could have been saved had the crew devised a workable plan. Of the 2,207 people on board, only 705 survived.

As a result of this tragedy, all ships must now carry enough lifeboats for all the passengers and crew. The universal distress call “SOS” was adopted as well, because it is easy to send and receive, and ships must have 24-hour radio watch. In addition, travelers on large ships are required to attend lifeboat training and know about donning life preservers. This tragedy also prompted the founding of the International Ice Patrol, which informs ships of ice conditions near shipping lanes.

MINING DISASTERS

Stag Canyon Mine—1913 & 1923

The quiet atmosphere of the mining town of Dawson, NM, was shattered in 1913 by an explosion in coal mine No. 2 that claimed the lives of 263 miners. It was considered the second-worst mine disaster in U.S. history. On Feb. 8, 1923, a fire in mine No. 1 killed 125 miners.

Millfield Mine—1930

Eighty-two employees of the Sunday Creek Coal Co. perished when two explosions ripped through the mineshafts of this operation near Millfield, OH. At the time of the explosion, the company president, other officials and customers were touring the facility. The methane gas explosion was reportedly caused by a short circuit between the trolley wire and rail.

The chief design engineer for the Golden Gate Bridge insisted that workers wear protective headgear.

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EMPIRE STATE BUILDING—1930 TO 1931

At 102 stories and measuring 1,472 feet high, this building was the tallest in the world in 1930. Built at a cost of $24.7 million, the site employed some 3,400 people who worked more than seven million man-hours. The framework rose at the rate of 4½ stories per week.

The real story here is the exposure to falls that workers encountered each day; yet, only one fatality was attributed to a fall. The photo on page 21 offers a sense of the hazards these workers braved to complete this massive structure, which still graces the New York skyline. Looking at this photo, one can also appreciate the strides made since to ensure that workers do not have to depend on luck to stay safe.

GOLDEN GATE BRIDGE—1937

This bridge over the entrance to the San Francisco Bay is considered one of the greatest engineering achievements of the 20th century.
the world’s most beautiful bridges. A unique combination of cantilever and suspension design, the bridge spans 9,266 ft., with some 4,200 ft. of that distance over water. This structure makes our list because of the positive safety procedures implemented—many for the first time.

Joseph Strauss, chief design engineer, insisted that protective headgear be worn. Edward Bullard, a local manufacturer of safety equipment, designed what became the prototype of the modern-day hardhat. In addition, glare-free goggles were worn along with special hand and face cream to protect against the wind. The most conspicuous and proactive aspects at this site were the safety nets suspended along the entire expanse of the bridge—another first in the realm of worker safety. The net saved 19 workers, who became known as the “Halfway-to-Hell Club.”

One predictor used at the time was the expectation of a fatality for every one million dollars spent. Thus, the expectation for this project was that 24 workers would die during construction. However, from January 1933 until Feb. 17, 1937, only one fatality was recorded—quite a feat given all the factors involved in building such a structure. However, on Feb. 17, 1937—just three months before completion—a paving contractor’s scaffold collapsed, sending 12 workers (and 2,100 ft. of safety netting) some 220 ft. to the water below. Ten of them died.

COCOANUT GROVE NIGHTCLUB—1942

The tragedy at this Boston establishment makes the list because of its impact on building occupant safety. The nightclub—an “in place” in the city—occupied a full block along Piedmont Street; it featured a Polynesian motif with fake palm trees, and its walls and ceiling were covered with flimsy colored cloth and rope. Braiding running up poles topped with artificial palm leaves and coconuts. Club capacity was 600, but on Nov. 28, 1942, more than 1,000 patrons filled the club.

A flash fire started when a 16-year-old bar attendant lit a match to screw in an electric bulb. The fire moved up a palm tree decoration, enveloping nearby draperies and pouring choking smoke throughout the club. Lights failed within three minutes of the start of the fire. Means of escape were the revolving doors at the entrance, a side door equipped with a panic lock designed to open under pressure and another door that opened inward. The side door panic lock was broken, so it was secured by another lock. Some 492 people died in the blaze. More than 200 bodies were found stacked behind the revolving doors; another 100 were found near the locked and inward-opening doors.

As a result, several occupancy and fire safety regulations were promulgated.

- Revolving doors must have additional means of egress that provide a clear path of travel.
- Exit doors must swing in the direction of the exit.
- Authorized occupant capacity must not be exceeded.
- Exits must be maintained free and clear of storage or any obstructions.
- Decorative material must be fire-resistant, flame-retardant or non-combustible.
- At least two means of egress must be available in places of public assembly.

HOOVER DAM—1931 TO 1936

This structure is located in the Black Canyon on the Colorado River, about 30 miles southeast of Las Vegas. Some 726 ft. high, it weighs more than 6.6 million tons. The dam, powerplant and appurtenant works contain nearly 4.4 million cubic yards of concrete—enough concrete to pave a standard 16-ft.-wide highway from San Francisco to New York City.

On average, 3,500 workers were on site—with employment reaching its peak at 5,218 during summer 1934. The cost of the dam was $126 million. Working conditions, especially during the summer, were horrific, as daytime temperatures reached 130°F, while nighttime temperatures hovered in the 90s. But the workers on this project were hardly—many considered any injury that did not result in death as “minor.”

Using the formula of one death per million dollars spent, one would have expected 126 workers to die during construction. While the official “industrial” total number of fatalities was 96, the real figure comes closer to 213. Many deaths caused by heart attacks, heat prostration and other “natural causes” were not included in the official tally. (It was also rumored that many workers were buried in the construction to cover up such statements and would passively yield to management.” Now, safety professionals respond with an “assertive boldness.” Put another way, “The profession has evolved from one that limited safety professionals to decisions based on ‘gut feel’ to decisions based on ‘sound data’ that can be proven through empirical research or established math and/or science,” Ulmer says.

As professionals have adapted to their ever-changing roles, Weaver sees the “specialization” of the profession as a defining change. “There was a time when you could not become a full-time member of ASSE unless you were an engineer,” he recalls. “This perception that engineering was the only discipline that applies to this hydra-headed monster [safety] we deal with was extremely restrictive. Now that we have perceived what we are dealing with, we are doing much better.” As he further explains, “Safety is a generalist profession with a specific application. Safety has made me continue to learn anthropology, history, engineering, statistics. None of these things I know well. I’ve seen it stated this way, ‘Jack of all trades but master of some.’ You have to be a master of some discipline amongst all of our disciplines—that’s your entering wedge. Then you must know where to go to get the information you need.”

MacCollum also cites the lasting impact of legal obligations that have grown over time. “The real driving force in safety and industry has been largely the result of the justice system, which has placed an economic value on human life,” he says. “This has made moral responsibilities become a legal duty to provide for safe products, facilities, services and workplaces that will not harm the environment we live in. . . . This really has been the thing that has made management responsible and provided incentives for the legislative branch of government to become involved and to promote general welfare.”

Fred Manuele also sees a change in performance expectations. “Those engaged in the practice of safety are expected to demonstrate a higher level of performance. Education requirements are higher and certification has become widely recognized,” he explains. “Industry has changed significantly as the content of work performed, and the safety results achieved are noteworthy,” he says, citing statistics that show a dramatic drop in the death rate between 1949 and 1999. “I believe safety professionals can share in this achievement.” Manuele also suggests that management now better understands its role. “Many more executives have recognized their role in providing leadership in attaining a safer workplace,” he says.

What role has ASSE played in these changes?

Echoing ASSE’s mission, advancement of the profession and the professional were cited as the Society’s marks of distinction. According to Weaver, “ASSE has been the sole motivation towards professionalism in this business.” Ulmer adds, “The Society has been the most-critical organization to acknowledge state-of-the-art changes at their earliest stages of development and inform the profession of their existence. . . . Through its professional journal and professional conferences, it became the logical forum for advancements in the profession to have proper ‘hearing and debate.’”

For Rhodes, the Society’s various programs—
crete. This is untrue—a so-called “dam rumor.” The dam was built in interlocking blocks placed on top of each other. These blocks ranged from 25x25 ft. to 25x60 ft.; an eight cubic yard bucket would only raise the concrete level from three to six inches—no room to hide a worker.

SAFETY LEGISLATION

Certainly, these tragedies and others like them focused public attention on the need for occupational safety. Our story would be incomplete, however, if it neglected the effect that legislation has had on our profession and industry. Between 1912 and 1999, the work-related death rate per 100,000 population dropped more than 90 percent.

In 1912, some 18,000 to 21,000 work-related deaths occurred compared to 5,100 in 1999. While progress has clearly been significant, the toll is still unacceptable. Even as recently as the 1970s and 1980s, between 11,000 and 14,000 work-related deaths occurred each year.

In 1918, the American Standards Assn. was founded. This group developed many voluntary safety standards, some of which were later referenced in laws. The organization eventually evolved into the American National Standards Institute (ANSI).


This act gave the Bureau of Mines limited enforcement authority, including power to issue violations and imminent danger withdrawal orders.

In addition, civil penalties could be assessed for non-compliance with withdrawal orders or for refusing access to mine property; at that time, however, no provisions were made for monetary penalties for noncompliance.

In 1970, the Occupational Safety and Health Act was signed into law. This created the Occupational Safety and Health Administration and the National Institute for Occupational Safety and Health. The enforcement arm of OSHA forced many companies into a compliance mode—a situation which remains true in many settings today. OSHA continues to promulgate standards that address myriad work-related hazards, offers compliance assistance, and conducts outreach and training designed to advance safety and health in the workplace.

In 1977, Congress passed the Federal Mine Safety and Health Act, which consolidated federal safety and health regulations of the mining industry to include coal and non-coal mining.

JOURNEY NOT YET COMPLETE

This article has provided a glimpse of some key events and milestones that have helped shape the safety profession. It is tragic that so many lives have been lost along this road—and even more tragic that more than 5,000 workers continue to die each year.

Throughout history, the safety profession and safety professionals have attempted to improve working conditions. Through these efforts, many lives are spared each day. Our work is not complete, however. Until each worker returns home in the same condition s/he came to work, we still have a formidable task at hand.
Carroll: Never stop learning. You never know it all. It is great, sometime into your career, to take college courses in the field that will cause you to examine why you “know” what you know and why you do what you do.

Never let your job eclipse the importance of your profession. Make time to keep learning, to network, to reflect on the profession and your conduct within it, and to take an active part in it as an ASSE member and as a CSP. If you focus on a job, that’s just what you will have, a job (and probably your current job). If you focus on a career, you have a profession, you grow and you contribute to the field. A profession is for life. A job is for as long as it lasts. Like the Smith System of driving exHORTS, “Aim high in steering.”

Learn to lead, to influence others. And know that there will be hard choices—that you may have to choose professional and personal ethics above other considerations.

Deck: To start, you need an engineering/scientific background. Then, start thinking about getting an M.B.A. so you can understand the business aspects.

MacCollum: This profession isn’t for wimps and the weak at heart. You can’t go along to get along— that’s rule number one. In addition, you need three tools: 1) technical expertise—must know what engineering is, what causes things to fall; 2) a willingness to take on management hierarchy; and 3) the ability to show management that it can make money by using safeguards—that the company loses money when people are injured.

It’s also about how you divide your time. You have to spend half your time finding out why certain failures occur—it might be going to school, reading books, spending time in the field watching what people do. Then you spend one-quarter of your time devising a game plan—what you’re going to do. The other quarter you spend telling top management what they need to do. Top management needs to be educated about safety—and the safety professional needs to provide that education. Sometimes you have to be like a bull in a china shop. Go in and tell top management they are screwing up.

Manuele: Develop a sound technical and managerial base. Recognize that fads come and go and that they should not displace the professional from sound fundamentals. Get a master’s degree—and if your undergraduate degree is in safety, consider an M.B.A. If the degree held is not in safety, consider an advanced degree in safety. Learn the basics of financial management. Look for opportunities to impact on productivity, cost efficiency and quality—as well as safety. Recognize that the future is greater if one is perceived as contributing to financial results.

Perry: Education, professional development and certification. You need to ensure upward mobility.

Don’t be content with your lot as it is today. If you have not finished your degree, get it done. Then get your certifications. These are what establish your credibility with your peers and with your employers. To be a professional, this is so important. Without that, you’re another pea in the pod. It separates you from the rest.

Rhodes: I entered the SHE profession late in my career but I found it to be rewarding and used all that I had learned in my entire career. Many people look at safety as an entry-level position. While this can be true, one should always be open to movement to many areas of a company and companies. Many firms offer tuition reimbursement to enlarge one’s academic background. Take advantage of them.

Above all, innovate not just a service but a position. By innovation, you will be noticed and eventually marked for promotion. Computer skills are important and an absolute necessity as well. If there was ever a time in history when change is a significant factor, it is now.

Tally: Education, education, education. Get the tools you need through both our universities and technical training courses.

I also encourage certification because it is key to holding the corporate safety jobs in the future. Get involved with ASSE and network with some seasoned professionals who have already stumbled over the rocks in the road.

Get involved in some of the voluntary leadership roles in your local ASSE chapter and share your abilities through monthly meetings.

Ulmer: Do not blindly accept conventional wisdom solutions to safety issues. Think for yourself and prove solutions to your satisfaction. Base all opinions and thoughts on verifiable research or proven science. Don’t make things worse by guessing. Maintain the highest standards of professional ethics. Be loyal to your employer, but not at the expense of compromising established professional ethics and professional conduct.

Be as diligent in your understanding of professional ethics in your profession as you are the state of the art of the profession itself.

Weaver: Define what aspects of safety they want you to do—is it industrial safety, does it include the salespeople’s autos, what about fire, product liability, wellness programs? Define what they expect you to be working in. Don’t take the overall stance, “I’m in charge of everything.” Then, find out who within the structure of the organization has clout over the aspects that you are expected to influence. Safety professionals don’t get something done until someone backs an order—and safety professionals don’t bark many orders. Safety gets other people to bark the orders. Don’t end up preaching in vain. Find out who wants it done and help him cause it to happen. All your life, learn beyond your job.