

Safe-ing History

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Introduction

How do we make buildings safe while preserving history and historic aesthetics? It seems a simple question. However, as anyone working as a Safety Professional at an historic site knows, it requires creativity and concessions.

The United States has been occupied by immigrants from all walks of life for more than 400 years. In that time, laws have changed, architecture has changed, and lifestyle has changed. The first buildings were likely constructed, discounting Native American traditions, by Europeans c.1607 in Jamestown, VA. These were simple structures whose architecture was adapted from the European techniques based upon topography, climate, materials available, and a lack of tradesmen and poverty of the citizens¹. Through the 17th and 18th Centuries, Europeans began a vast settlement of the land we now know as the United States of America. Buildings during these eras ranged from many-gabled structures with brick chimneys in New England, to simple brick structures in the south². We were developing our own style and our own way of living. Moving into the 19th Century we began the expansion west and became involved in the



Industrial Revolution. Structures became larger encompassing a monumental aesthetic, architecture began to become more professional, and in the South large mansions were built³. It is later in the 19th Century that indoor plumbing, telephones, and electricity came to the forefront. They would eventually become standard in most construction across the USA. Finally we began living in urban areas and buildings grew taller and more populated. Structures moved from ornamental styles to styles using open plans and asymmetrical facades along

with broad roofs that provided shelter to the structure, to unornamented functional structures and back again to ornamentation combined with vivid color and eclectic styling.⁴

What we have ended up with is a Society that heralds its past and yearns to preserve its history while at the same time struggling to protect the lives and welfare of its citizens. We began with architecture that needed no air plenums, no duct work, no plumbing, no railings, etc. From there, we moved into a time where these things are now required by building codes and Safety Regulation. So how do we keep our historic sites looking as they did originally and still provide the safety required by current law? It can be a challenge and an opportunity for dramatic creativity. It can also lead to an internal battle for the Safety Professional as we try to meet the needs of all of our customers and abide by the laws applicable to our sites.



Regulations

As our architecture progressed, so did our laws. Safety Laws and Standards can be found as far back as Biblical times and with our increasing interest in our history, Preservation laws began to develop in the 20th Century. Let's examine some of these laws, how they have progressed, how they interact, and how we respond to them.

The first mention of safety as a law appears in Deuteronomy 22:8 "When thou buildest a new house, then thou shalt make a battlement for thy roof, that thou bring not blood upon thine house, if any man fall from thence."⁵ In fact, people recognized and attempted to assure the safety of personnel. The following lists some significant steps listed in A History of Safety by Charles Morrison⁶:

1. c. 2000 BC the Code of Hammurabi was written and is similar to worker's compensation laws of today.
2. c. 1600 BC the Egyptians noted the danger of inhaling metal fume.
3. c. 460 – c. 377 BC Hippocrates linked respiratory problems to exposure to stone dust.
4. 1700 Bernardino Ramazzini writes a thesis attempting to show the link between occupation and disease.
5. 1854 The Pennsylvania Mine Safety Act is passed.
6. 1877 Massachusetts begins requiring machine guarding.
7. 1897 factory inspections are instituted in Massachusetts.
8. 1911 ASME is founded to develop safety codes regarding boilers and elevators.
9. 10/14/1911 ASSE is founded as the United Society of Casualty Inspectors.
10. 1912 the National Safety Council is founded as a group of engineers meeting to represent insurance companies.
11. 1918 ANSI is founded
12. 1931 the Uniform Traffic Code is established
13. 1936 the Walsh-Healey Act is passed
14. 1952 the Coal Mine Safety Act is passed.
15. 1969 the Construction Safety Act is passed.
16. 1970 the Occupational Safety and Health Act, and the Environmental Policy Act are signed into law.

New and revised laws continue to be developed today. We, as Safety Professionals, have come a long way in ensuring the safety and health of employees. But wait, there's more.

In addition to Safety Regulations, we today also have laws related to Historic Sites and their Preservation. In The Historic Sites Act of 1935⁷ Congress gave the Secretary of the Interior the responsibility for oversight of historic sites on Federal lands. This Act declares national policy as follows: *"It is declared that it is a national policy to preserve for public use historic sites, buildings, and objects of national significance for the inspiration and benefit of the people of the United States"*⁸ The Act authorizes the Secretary of the Interior to accept assistance



from other levels of government, including States, and other organizations and/or individuals. The Act also mandates that States not be deprived of their Civil Rights "in or over lands acquired by the United States..."⁹ In an effort to accomplish the goals and mandates of The Historic Sites Act of 1935 some Federal agencies have developed their own programs which may be useful to the Safety Professional working at Historic Sites other than Federal. The Department of Energy (DOE), for example, has enacted a brief policy outlining their intentions for preserving historic property¹⁰

Another Federal Agency that takes Historic Preservation seriously is the National Park Service (NPS). NPS has written a thorough program that spells out how they will handle historic properties, including the address of some modern Safety Regulations¹¹. NPS has gone from a total of 26 properties in 1916 to a total of 166 today¹². In addition NPS has developed The National Survey of Historic Sites and Buildings to designate as Historic Landmarks, the survey totals 800 properties as of the writing of this article¹³. In addition, NPS has begun expanding its National Register to include State and Local Historic properties as well. They also recognize the need to regulate some of these areas as a means of preserving the resource.

But that's not all. The NPS Program addresses, specifically, Building and Fire Codes as well as Fire Detection and Suppression¹⁴. The program states: "In the preservation of historic structures, every attempt should be made to comply with local building and fire codes.....However, compliance should not be allowed to destroy or impair the integrity of the structure." The program goes further to state that fire detection is preferred over fire suppression as water may seriously damage Historic Assets. In addition, this program addresses "[m]odern additions" requiring that the addition blend into the historic fabric as well as possible to the extent that they can be hidden from view. In some ways, this may directly conflict with NFPA and BOCA requirements as well as with OSHA requirements, and that is where the challenges begin.

Challenges for the Safety Professional

Today the Safety Professional is faced with a vast number of regulations requiring Fire Prevention and Suppression, Guarding, Sprinkler Systems, Exit Signs, and Fall Protection, among others. None of these issues existed formally for the architects of our distant past. Buildings were constructed without Stair Rails, Utility Chases, Plumbing, or Signage, but today these things are standard. For these historic structures, in which we work and visit, how do we progress?



We first must consider whom we are serving. We are serving the public. The public wants to be able to step back in time to see how our ancestors lived and they want to be safe. These can be contradictory issues. For example, let us assume there is an historic building dating to nearly 200 years ago, with beautiful stone stairs installed. Some of these are traditional staircases and some are spiral. In both cases no handrails are provided. Today, many people visit

the building each year but, as Safety Professionals know, they are used to using handrails when ascending and descending staircases. So, what do we do? This is just one example of the challenges facing, not only the Safety Professional, but also the architects and engineers hired to maintain historic buildings. We'll address this challenge in the next section entitled *Addressing the Challenges*.

We next must consider what Safety Regulations and Building Codes will apply to the historic building in question. Do local building codes grandfather historic buildings? Do we need to adhere to Federal OSHA Regulations or does the state have its own program and regulations that meet or exceed OSHA? For our previous example, we will assume we must comply with OSHA Regulations and that the building has been grandfathered. Meaning, we are not required to bring the building into compliance with present building codes. Does this mean we can avoid OSHA Regulations as well? No. Should we apply best practices for building codes even if they aren't required? Possibly, this is a site specific and personal decision. For our example, we want to do as much as possible to bring the building into compliance with applicable federal, state, and local codes. We will confine our example to the OSHA Regulations for now. In regard to stairs, 29 CFR 1910.23 states:¹⁵



“Every flight of stairs having four or more risers shall be equipped with standard stair railings or standard handrails as specified in paragraphs (d)(1)(i) through (v) of this section, the width of the stair to be measured clear of all obstructions except handrails:

1. On stairways less than 44 inches wide having both sides enclosed, at least one handrail, preferably on the right side descending.
2. On stairways less than 44 inches wide having one side open, at least one stair railing on open side.

3. On stairways less than 44 inches wide having both sides open, one stair railing on each side.
4. On stairways more than 44 inches wide but less than 88 inches wide, one handrail on each enclosed side and one stair railing on each open side.”

“On stairways 88 or more inches wide, one handrail on each enclosed side, one stair railing on each open side, and one intermediate stair railing located approximately midway of the width. Winding stairs shall be equipped with a handrail offset to prevent walking on all portions of the treads having width less than 6 inches.”

For railings, OSHA makes the following requirement in regard to stairs: “A stair railing shall be of construction similar to a standard railing but the vertical height shall be not more than 34 inches nor less than 30 inches from upper surface of top rail to surface of tread in line with face of riser at forward edge of tread.”

So, what do we do? Historically there were no railings, but current law requires them. It can be a conundrum. Think about what you would do and we’ll see how we compare under *Addressing the Challenges*.

Next, we must look at how the historians have interpreted the look of the building and what they are willing to do. This can be a great challenge; it often may come to a compromise, a little give and take from both sides. OK, I hear the Safety Professionals out there letting out a collective gasp. You want to compromise on Safety? Maybe. This is one of the unique challenges to working with historic buildings. You will see that there can be compromises made that will address the intent, if not the letter, of the regulations. Consider the following when working toward a compromise:

1. Does OSHA address this specific situation?
2. What exactly does the law require?
3. What is the intent of the law addressing this situation?
4. Is there an option to request a variance based upon the specific situation and age of the building?
5. What are the options for a fix?
6. How historically accurate can we make the fixes?
7. Can fixes be done in such a way as to be unobvious to the public?
8. How critical is historical accuracy to the site?
9. What will the curators and historians accept?
10. What suggestions do the curators/historians have for fixing the situation?

It is imperative that we, as Safety Professionals, recognize that there are other interests involved. Things are not always black and white. We must work closely with the curator/historian to develop a mutually acceptable solution that respects the history of the site.

Finally we reach the point at which design and installation occur. You will need to be creative in what you do and you will need to maintain close contact with all interested parties. For example, let’s say our stairway runs between 2 walls on which beautiful frescos were painted when the building was originally constructed. We’ll assume our staircase is 88 inches wide. How and where do we install handrails? Are we willing to damage the frescos? What material should be used for the railings so that historic accuracy is implied? Do we follow OSHA to a ‘T’ or can we compromise and still provide safety?

These can all be difficult questions to answer. The solution to the problem is not as simple as installing railings to meet OSHA specifications. Let us proceed to the next section and examine a possible solution.

Addressing the Challenges

OK, we've started with some 200 year old staircases that do not have railings. The stairway in question is 88 inches wide. The building has been grandfathered in respect to building codes, but not OSHA Regulations. The following questions have been answered as indicated:

1. Does OSHA address this specific situation? No, OSHA addresses fixed industrial stairs.
2. What exactly does the law require? Fixed industrial stairs must adhere to OSHA Regulations as noted above.
3. What is the intent of the law addressing this situation? Safety for persons ascending and descending the stairs.
4. Is there an option to request a variance based upon the specific situation and age of the building? We can show that our solution meets the intent of the law and is more feasible than the letter of the law. OSHA may or may not accept this.
5. What are the options for a fix? Install railings attached to walls, install railings attached to steps, install with a middle railing, install without a middle railing or leave as is.
6. How historically accurate can we make the fixes? We can use historically accurate materials to blend in with the aesthetics.
7. Can fixes be done in such a way as to be unobvious to the public? No handrails must be seen to be used.
8. How critical is historical accuracy to the site? Curators insist on historical accuracy.
9. What will the curators and historians accept? Curators have agreed to accept railings with historic materials as long as no impact is made to the frescos.
10. What suggestions do the curators/historians have for fixing the situation? They leave it to the Safety Professional and want to approve of the solution and materials used.

In this example with curator approval, we will choose to provide handrails, on either side of the staircase, attached on the step and without the middle railing. The railings will be made of brass. We have made a compromise and no, it does not meet the letter of the OSHA Regulations. This solution gains us increased safety for employees and visitors and allows for easy blending-in to the historic nature of the building. The compromise on Safety's part is to eliminate the center staircase handrail. Adding this railing is going too far away from historic practices for the Curators. After all, they didn't have any railings to begin with, and adding the middle railing is far too obvious a change from history, in their opinion. We will install the railings on brass posts and the posts will be secured directly to the stair. There will be no mid-rail. The top rail will be flat but with decorative details and will extend beyond the top and bottom steps, curving under in a scroll pattern.

For some Safety Professionals, this may seem unacceptable as we have not met the letter of the law. However, we can show that we have met the intent of the law and increased safety on the staircase. We can also show that, due to the historic nature of our building, meeting the exact letter of the law was infeasible. Will OSHA agree? Maybe, maybe not. Whether or not a citation

would be issued likely depends upon the inspector and how strictly he/she believes we should follow OSHA Regulations. It will also depend upon the district and whether or not the mitigator at a formal or informal hearing will accept our reasoning. We are taking a risk and betting on not receiving a citation. However, in light of the nature of the building, the desires of Curators and Historians, and history itself, it is likely an acceptable risk.

So, how did your solution work compared to the one discussed above? There are probably many different ways to handle this situation and any one of them may or may not be right for your site. Below we will examine some other instances, similar to the one we have solved above. It will not always be necessary to compromise. Sometimes a little creativity can go a long way towards preserving history and making an historic building safe.

Case Studies

In addition to the example shown above, this particular site also needed fire protection. The local Fire Marshall wanted the building to be sprinklered despite the fact that the building was grandfathered. As you can imagine, the Historians and Curators were not happy. So a project team was assembled and advised of the following parameters:



1. No sprinkler heads could be visible to the public,
2. No chases existed to run piping, and
3. Historic accuracy was paramount.

So, the first thing needed was areas through which piping could be run. Initially this was not a problem as the building had a cellar to which visitors had no access. Therefore visibility was not an issue. To get to the upper two floors, engineers develop means by which workers that specialized in carpentry and plaster work could remove undecorated walls, without damaging them, section by section, and reinstall in a manner as historically accurate as possible. These had to be men with a high level of experience and a keen attention to detail. Once removed the stone behind these walls was cut slightly, by expert stone cutters, just enough to allow pipe installation.

The same methods were used to remove ceiling tiles to allow creation of interstitial space and the passage of the sprinkler pipes. They were successful in installing and hiding the pipes. In order to now supply sprinkler heads the team examined the elaborate artwork on the ceilings. It was discovered that the sprinkler heads could be installed in such a way as to appear to be a part of the ceiling decoration and not obviously sprinkler heads. The team was successful at fully sprinklering an historic building and installing the systems so as to be hidden to anyone who did not already know they were present. Thus the curators and historians were satisfied and the Fire Marshall granted occupancy.

In another instance, an historic, 19th Century building was having instances where visitors ascending a stair would strike their head on an overhang in the doorway. The staircase was comprised of narrow steps installed at a steep incline. The overhang was of historic plaster work.

The curators wanted to find a solution that would keep visitors from sustaining any kind of head injury while leaving the stairway and doorway unchanged.

In this case they decided to pad the overhang and paint it in such a way as to have it blend perfectly with the plaster. Expert painters were able to paint the pad with the same color paint as was on the walls and texturize it to appear to be plaster as well. In addition, an operational mandate was initiated in which docents warned visitors of the low hanging door jamb as they ascended and descended the staircase. They still had a few bumped heads, but the risk was significantly reduced.

Conclusion

As we have seen, making an historic site safe, to 21st Century expectations, can be a difficult process. However, it can also open up an opportunity for vast creativity and inspire the imagination of even the Safety Professional who has been at the job for years and become set in his/her ways. For that matter this also applies to engineers, curators, historians, and tradesmen. We have learned that everything is not always black and white in every situation, and that compromise may be warranted. However, if great effort and determination are vended by the entire project team, amazing things can happen.

As Safety Professionals we want to believe that “Safety is our Number One Priority”, however I submit that this is not entirely true. Safety is not its own entity in a business, safety is an integral part of each task and must be worked into the task to assure the business achieves its priority to make a profit. Each site has its own concerns, not the least of which is to stay in business and turn a profit, after all that’s why the business was started in the first place, someone wanted to make money. We must be willing to work with other trades and professions, and avoid butting heads, if we are to effectively perform our jobs and keep people safe. Conflict never solved any problem well, and often leads to animosity. It is very difficult to work with people if the atmosphere is tense, and this may lead to Safety being ignored or thought of as nothing but a problem with which we must learn to live. It is likely that none of us wants to see our job, our concerns, ourselves to be seen as getting in the way. Therefore, compromise is likely to be a wise compromise in and of itself.



It is important to remember that Safety Professionals are not taught to apply OSHA regulations by rote. We must think. We must deal with others amicably. We must be creative, in so many ways, if we are to obtain the buy-in to Safety Regulations that we all seek. After all, the person that buys-in is the person who will work to assure their own safety.

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