

## When Disaster Strikes at Your Historic Site During Construction

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Cultural resources are unique, non-renewable, and irreplaceable. Once a resource is gone, it is gone forever. Our cultural resources are most vulnerable during construction for a variety of reasons.

Most of what I have to say applies both to an in-house job where you use your own employees, and to a job where a contractor accomplishes the work.

Natural disaster can strike at almost any time. Check the weather forecast daily. In the Midwest there are weather alert radios that switch on to broadcast when there is a weather change. What is the nature of the risk? Think about it. Develop an emergency preparedness or disaster plan. If it is a contract job, involve the contractor in developing and implementing the plan.

This is not something that we must think about once and then forget. What is the risk today of a storm: ponding on the roof because of a clogged drain, lightning, a flood, mudslide, snow overload or avalanche, frozen pipes, a forest fire, an earthquake, etc.? Is there a special hazard adjacent to your site: a dam, a highway, a railroad, a factory?

Human error is always possible. Remember Murphy's Law: If it can possibly happen, sooner or later it will happen and usually at the worst possible time. What are the chances of an oil spill or a toxic hazard? These, of course, have adverse effects on cultural, natural, and human resources.

Human attitude: you value your cultural resources and are passionate about their preservation but the construction worker you hire or the contractor you retain and his or her employees may or may not care about the site. Some may be very professional and be very proud of working on a historic site. To others it may be just a job in a dirty old building. Attitude can make a big difference.

Human attack: theft, vandalism, graffiti, arson, terrorism, etc. We must provide securi-

ty to prevent these.

Combination of circumstances: There are risks during construction of which we must be constantly mindful. Electricity may be turned off to do electrical work; therefore, any smoke or fire detection system and alarms may not be operable. Water may be turned off to do plumbing work, so you may not have water when you need it most. Phone lines may not be operable. How do you call 911 if you do not have an operable phone? If there are cell phones on the job, where are they? Can you pinpoint your location to the 911 operator? The 911 operator cannot pinpoint the location from a cell phone number. If in an urban or a remote location, can you give good directions to the fire department? More than one fire truck has gotten lost trying to find the fire. If you are in a remote location, there may not be a fire department. You may have to provide your own fire protection.

We need to think both about what we want to accomplish, but also what we want to prevent.

Be concerned for both the safety of the workers and the safety of the historic building. Look for slip or fall hazards. Railings may be removed for repairs. Use barricades where needed. Injury or death on the job site cannot just ruin your day; it can end your career and maybe your life. Safety is everyone's business.

Think about how to minimize risks. If at all possible, prohibit any open flames on the job.

Communication is very important: Does everyone know what to do if a disaster strikes? Has there been a pre-construction meeting on safety? Are there weekly meetings and reminders? Are signs posted? One of my

favorites is: “SAFETY IS NO ACCIDENT! SAFETY IS GOOD PLANNING AND TRAINING.” Safety does not just happen. Be redundant. Post several signs where they cannot be missed.

Selection of a contractor is very important. What is the contractor’s safety and loss record? Contractors are required to have construction insurance. Make sure it covers disasters. What is the contractor’s track record? Check with the insurance company on the contractor’s past history of claims.

How should we communicate to the workers or contractor? Use meetings with contractors and workers. Holding a pre-construction meeting is very important. Workers, whether they are employed by a contractor or by the National Park Service, must have a fire safety orientation. Monitor changes in personnel. Contractors often send their best staff to the pre-construction meeting. Sometimes you may not see them again. If there is a change in personnel, each new person must go through a safety orientation. If it is a long job, have regular safety meetings and refresher safety briefings especially on the days of hot work. Hot work includes, but is not limited to, welding, soldering, brazing, hot roofing, removal of paint by heat gun (never remove paint by using a torch). Don’t forget about sparks from cutting or grinding. My Uncle Edward was killed in 1929 by an aluminum dust explosion caused by a spark.

Make sure to stress to the contractor and/or employees why the historic building is significant and that it is an irreplaceable cultural resource. Once destroyed, no replica can ever replace it and be as significant.

The purpose of construction specifications is to communicate. Specifications are usually dull but they are a legal document and take precedent over plans because a lawyer can read specs and tear them apart; lawyers usually do not know how to read plans. Contractors do not always read or re-read the specs after making their bid.

For two years I worked for an architect in private practice. He hid things in his specifications to determine if the contractor read the specification. One contractor actually found

the requirement of delivering a free case of gin to the architect’s office every Friday at noon. Many contractors did not read the specifications thoroughly. I began to look forward to noon on Friday because the architect frequently handed out bonuses on Friday—a bottle of gin (or rum, or vodka) to everyone on the staff. We cannot use this clause in government contracts, but we could test the contractor in other ways. Maybe this is how we can get someone to dress up in a bunny costume and hand out Easter eggs at the NPS Employees Association spring party.

Also, put important notes on the construction drawings because workers and contractors usually refer to the plans more often than they re-read the specs.

Mark the fire lane on drawings. Designate areas on the drawings for dumpster and storage of materials so that they do not block the fire lane.

Put safety reminders in pay envelopes to workers or payments to the contractor.

If workers cannot read or speak English, be sure that there is always a translator on site. You may need to post signs in more than one language.

Have you invited the park safety officer to inspect the site on a regular basis? Include fire marshals—they are good at spotting hazards, better than you or me.

Have you invited the contractor’s insurance carrier to the site for inspections?

Identify hazards: combustible materials, systems, chemicals, finishes, and fabrics.

Inspect storage areas: Are the roofs and/or floors overloaded because of the arrival and storage of construction materials? Is 100% of the new roofing stacked on 10% of the roof?

Are there any old gas fixtures or pipes that still have gas in them? Better to find out before someone cuts the pipe.

What are the risks and hazards in specified materials and treatments? Are there welding gas tanks stored at the site? Steel wool is flammable. Beware of using steel wool around outlets.

Seasonal risks: What are the risks at certain times of the year? Are portable heaters being used in the winter? Could combustible

materials (e.g., empty paper cement sacks) be blown into a space heater when the door opens and there is a draft? Are fans being used?

Demolition is risky! What can go wrong? Everything from stepping on a rusty nail to unknown hazards (such as pigeon droppings in the attic) to unexpected collapses because of improper sequencing of demolition.

How many electrical panel boxes are there? If there are more than one, do not assume that all of the electricity is off just because some of it is off. You could have a rude surprise that could ruin or end your day—or even worse, your life.

Obstruction of the fire lane: Is the dumpster or the construction shed blocking the fire lane? Is the dumpster emptied on a regular basis? One night I was bicycling home from work. When I passed the State Building, I saw a dumpster on fire in the alley behind it. Flames were leaping 30–40 feet in the air. The dumpster was within five feet of the building and almost set it on fire before the Fire Department arrived.

Very few construction sheds are totally fireproof. If a portable heater accidentally sets the construction shed on fire, could the fire spread to your historic building? The construction office trailer should be at least 30 feet from your historic building, if possible.

Means of egress: construction materials, especially paint cans, should not be stored on or under stairs or in exit corridors. These must always remain clear. Incomplete systems (open floor joists and wall studs) allow fires to spread more rapidly. The sprinkler system may be installed but not yet operable.

Hot work: We cannot avoid all hot work. If there is to be hot work, we must plan for safety during and after hot work. There must be a hot work permitting process. The safety officer must be involved. Who is authorized to issue a permit? Who is responsible? Who inspects? These decisions need to be worked out in advance. There must be a hot work permit every day hot work is done—no blanket permit for a long period of time. Do not allow any hot work where there is dust, sawdust, oil, flammable chemicals, animal droppings, etc.

Do not allow any hot work where flammable construction materials are stored. Do as much hot work outside the building as possible. If hot work must be done in or on the building, create a safety zone. Know what's going on each day and where the risks are.

Cover flammable materials that cannot be moved with a fireproof cover. If possible, you may want to wet down surrounding materials. Wet surfaces are less likely to burn. Evaporating moisture cools the surface.

Who supervises hot work and the use of tools? Maintain fire equipment. Always have fire extinguishers on site, especially at the site of hot work. All construction workers should be trained on the use of fire extinguishers. Have the fire extinguishers been inspected? Have they been recharged? Stop all hot work three hours before workers leave. There may need to be a 24-hour guard. The guard needs to know if there has been any hot work that day. Inspect areas where hot work has been done. Don't just look, also feel the surface for any heat. Dust in wall or floor cavities can smolder for hours before breaking into flames.

Use common sense. No smoking should be allowed on the job site, but smokers will smoke. Maintenance workers smoking once set the Main Interior Building in Washington, D.C., on fire. Provide a safe smoking area outside of the historic building and away from all hazards. Enforce the rules. If you are lax on enforcement, workers are more likely to cheat. Do daily checks. Inspect the smoking area. Some people think they can cheat without getting caught.

Keep the site clean. Construction debris, especially an accumulation of sawdust, can be a preventable hazard.

Arson—don't provide an opportunity. Provide site security.

Ever forget to purchase something at the grocery store? Usually you forget less often if you have a list. There are a lot of things that can go wrong and a lot to remember. The larger the job the more than can go wrong. Develop checklists for your construction site and use them. This documents your safety program. If the worst happens, it is good to have a safety paper trail. Store your safety

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records off-site or they may go up in flames with your historic site.

I must re-emphasize communication—what do you want and why is it important? Also, emphasize what you do not want. Assign responsibility for safety. Develop a plan and use it. Drill, drill, drill. You never know when

disaster will strike. Inspect sites often. Speak to individuals. Discipline violators.

I can only hit a few highlights in this paper. For more in-depth coverage, get a copy of the publication *National Fire Protection Association 241: Safeguarding Construction Sites*, read it, and use it.

