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Hot Work: Don't Let a Small Welding Job Result in Major Damage

The owner of a small strip shopping center never thought a damaging fire would leave the shopping center closed for nearly three months after being alerted to a problem with the air conditioning system one late Thursday afternoon.

After one of the retail tenant's units had become warm, the property manager contacted the local air conditioning company. Despite the late time, the loyal AC company agreed to come out and investigate the problem. The technician quickly diagnosed the problem after noticing

the copper coils on one of the roof mounted condenser units had a leak. A quick soldering job and refill with Freon would do the trick.

The technician grabbed some solder and his soldering gun, and began repairing the system. As he was repairing the AC system, his cell phone continually rang before he finally answered it as he put the last bit of solder on the leak. He learned that he was needed for one more job as he finished the soldering. He put down the soldering gun and added more Freon to the condenser. After reluctantly agreeing to the next job, the technician grabbed his tools and went inside the building to make sure the system worked before rushing off to the final job of the day.

Since the air conditioning system was working again, no one inspected the roof or realized that when the technician had put down his soldering iron he placed it on some dried leaves and actually burned a hole in the roof cover where the cover meets the parapet. The leaves smoldered and eventually ignited the combustible polystyrene insulation within the parapet. The undetected fire grew within the concealed parapet and spread through the wall cavity. The retail stores experienced significant fire, smoke, and water damage.

HOT WORK LOSS STATISTICS AND SCENARIOS

“Hot work” operations conducted outside of a designated hot work area (a weld shop for example) are a major cause of fires. Between 2005-2009, the United States averaged 3,165 fires, \$145 million in property damage, 8 deaths, and 116 civilian injuries per year relating to torch, soldering, and burner equipment [1].

According to NFPA’s report summary of U.S. Large Loss Fire in 2009, the largest fire related property loss in 2009 involved a casino pavilion where a welder was adding new duct work to an existing grease vent in the kitchen area when he spotted smoke and fire [2]. He tried to find a fire extinguisher but was unsuccessful, resulting in a \$340 million loss. Another 2009 fire involved a block of stores being renovated when embers from hot work fell into a basement partition wall and ignited paper and plastic, resulting in a \$10 million loss. An apartment building under construction had a \$12 million loss after roofers using a torch during the day allowed embers to fall into a void between the insulation, ceiling, and roof assembly.

Hot work operations include but are not limited to: soldering, welding, metal cutting, heat treating; grinding; thawing pipes; hot riveting; torch applied roofing; and any other application involving heat, sparks, or flames. Most small businesses—such as small retail shops, office buildings, medical offices, apartment complexes, grocery stores, and multi-tenant facilities—will at one point have a work order that requires hot work operations. Some common hot work operation examples that may be encountered in these types of occupancies include:

- Thawing/sweating of air conditioning lines or frozen pipes
- Installation or repairs of air conditioning equipment including piping and ventilation ducts
- Work on kitchen ductwork
- Plumbers working on metal piping
- Installing a roof cover system
- Various renovations of office, retail, or warehouse spaces
- Work involving metal partitions
- Renovations including shelving and storage racks
- Renovations of various metal structures including mezzanines, railings, catwalks, stairs, fences
- Cutting of metal containers and drums



Fire potential greatly increases any time an ignition source is introduced into areas that are not designated hot work areas. Unfortunately, many small businesses typically do not have the expertise to oversee hot work operations. It therefore usually makes sense to look for alternative ways to complete the work that does not require heat sparks or flames. Similarly, if possible, have the hot work operations conducted offsite or outside (at least 35 ft. away from the building and combustible materials).

THE HOT WORK PERMITTING PROCESS

Often, hot work is necessary and must be conducted on equipment that is not portable. Therefore, proper precautions should be taken prior to, during, and after the work is completed. Implementing a hot work permit program can help small businesses to manage this process and greatly reduce the fire hazard.

Hot work permit programs are designed to prevent fires through proper authorization, supervision, and control of temporary hot work operations conducted by employees and contractors outside of a designated hot work area. They create checks and balances that involve personnel that do not conduct the actual hot work operation. The hot work permit itself should be used as a checklist to confirm that proper safety precautions are being taken. Hot work permits should be required for any hot work operations performed outside of a designated hot work area and by anyone at the site. It should be kept at the area where the operations are taking place and retained for future reference.

To obtain hot work permit information and guidelines on implementing a thorough program, as well as sample hot work permits, the Insurance Institute for Business & Home Safety (IBHS) recommends obtaining a copy of NFPA 51B: Standard for Fire Prevention During Welding, Cutting, and Other Hot Work [3]. [Click here](#) to download the publication for a nominal fee. Hot work permits also may be available through your insurance company or insurance agent.

A hot work permit program can be created and easily implemented at any size business. It takes a minimal amount of staff, money, and time, while also being easy to follow. Most importantly, taking these very small steps can prevent significant property damage and business interruption.

Designate a person that oversees the program, such as a safety supervisor or manager.

RESPONSIBILITIES INCLUDE:

- Management of safe hot work operations.
- Ensures that all other alternative to hot work have been explored.
- Verifies that the fire alarm system and fire protection system, such as the overhead sprinkler system, are in full operation.
- Inspects the area where the hot work is to take place and verifying the safety precautions to be taken by the operator through the use of the hot work permit checklist.

Hot work operator

- Must obtain a permit before any work begins.
- Be well trained in the equipment they are using.
- Ensures that all equipment is in good working condition.
- Incorporates proper safety precautions described in the hot work permit.
- Trained in the use of fire extinguishers and has one on hand.
- Keep the hot work permit visible during operations.

Fire watch person

- Must obtain a permit before any work begins.
- Be well trained in the equipment they are using.
- Ensures that all equipment is in good working condition.
- Incorporates proper safety precautions described in the hot work permit.
- Trained in the use of fire extinguishers and has one on hand.
- Keep the hot work permit visible during operations.
- Can perform other duties in that area as long as they are not distracted from the fire watch duties.



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References:

[1] Hall Jr., John. "Non-Home Structure Fires by Equipment Involved in Ignition." National Fire Protection Association (NFPA), March 2011. <http://www.nfpa.org/assets/files/pdf/os.non-homefireequipment.pdf>.

[2] Badger, Stephen. "Large-Loss fires in the United States-2009." National Fire Protection Association (NFPA), November 2010. <http://www.nfpa.org/assets/files//PDF/LargeLoss2009.pdf>.

[3] National Fire Protection Agency. "NFPA 51B: Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, National Fire Protection Association." Quincy, Massachusetts. 2009.

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