Hot Work Best Practices

A leading cause for building damage and total loss is due to hot work. FM Global, TWCA Risk Management Fund's excess property carrier, reported that worldwide clients suffered $1.9 billion in losses over a ten-year span. In fact, the most expensive property loss for TWCARMF during this same period was caused by hot work. It is hard to fathom that an industry that works primarily with water would have to worry about hot work, but we do. There are safeguards and best practices to follow and we will discuss several in this article.

We should start by explaining what hot work is. Hot work is any operation involving open flames or producing heat or sparks, including welding, brazing, soldering, torch or radial saw cutting, grinding, and torch-applied roofing.

When deciding on whether to perform hot work to complete a job, you should always consider if the job can be completed without it. Hot work should be used as a last resort alternative. Here are a few alternatives versus hot work application examples:

Hot Work Application	Alternative to Hot Work Application
Welding	Mechanical bolting
Saw/torch cutting	Manual hydraulic shears
Radial saw	Reciprocating saw
Sweat soldering	Screwed or flange pipe
Torch or radial saw cutting	Mechanical pipe cutting
Torch-applied roof system	FM Global approved roof covering

Written Policy

The first step to managing hot work is to establish an effective written policy. The policy should detail the appropriate procedures required to safely complete hot work and needs to be endorsed by senior management. The designated employee responsible for ensuring compliance with the policy should be identified in the plan and will have the role of fire-safety supervisor or operations supervisor. The policy needs to require a Hot Work permit be filled out and maintained. Roles of Hot Work personnel should also be included in the written policy. This includes the roles of the fire safety supervisor/operations supervisor, hot work operator, and the employee responsible for fire watch.

Fire Safety Supervisor/Operations Supervisor

- Responsible for the safe operations of hot work activity under their supervision
- Determine what areas are appropriate for hot work
- Approve and issue hot work permits to hot work operators

Hot Work Operators
- Complete required hot work training
- Must be approved for hot work activities by the Fire Safety Supervisor/Operation

Supervisor
- Inspect all equipment for defects or damage prior to each use
- Properly use any required personal protective equipment (PPE)

Fire Watch Personnel
- Watch for fires, smoldering material, or other signs of combustion
- Be aware of the inherent hazards of the work site and of the hot work
- Ensure that safe conditions are maintained during hot work operations and stop the hot work operations if unsafe conditions develop
- Have fire extinguishing equipment readily available and trained in its use
- Extinguish fires when the fires are obviously within the capacity of the equipment available. If the fire is beyond the capacity of the equipment, sound the alarm immediately
- Be familiar with the facilities and procedures for sounding an alarm in the event of a fire
- Maintain a fire watch for 30-60 minutes after completion of hot work operations in order to detect and extinguish smoldering fires
- More than one fire watch shall be required if combustible materials could be ignited by the hot work operation and cannot be directly observed by a single fire watch (e.g. in adjacent rooms where hot work is done on a common wall or in lower levels below the hot work)

Once the policy is established, personnel should be trained on the written policy and procedures and on the facility specific fire and explosion hazards. Training should also extend to contractors who perform hot work on-site.

Hot Work Permit

In addition to your Hot Work Policy, you will also need to create your own or use FM Global (2018 version) Hot Work permits. Permits are perfect for documenting work that has been completed. They also help create an audit trail for program effectiveness. TWCARMF Loss Control Staff has FM Global permits readily available or you can order packs and have them sent directly to your office. If you decide to use your own developed permit, it should contain:
- Who is performing the hot work
- The date the hot work is occurring
- Where the hot work is occurring
- What type of hot work is being performed
- Who is responsible for fire watch
    - **Important Note** this person cannot be the same person who is performing the hot work

- Signature of fire-safety supervisor/operations supervisor verifying that the location has been examined and pre-work precautions were checked and therefore authorizing hot work

Universal Required Precautions include (requires a “yes” or “Not Applicable” answer):
- The fire pump is in operation and switched to automatic
- Control valves to water supply for sprinkler system are open
- Extinguishers are in service/operable (yes only answer)
- Hot work equipment is in good working condition (yes only answer)

Requirements within 35 feet of hot work (require a “yes” or “Not Applicable” answer):
- Shield combustible construction using welding pads, blankets and curtains
- Remove or shield nonremovable combustibles using welding pads, blankets and curtains
- Isolate potential sources of flammable gas, ignitable liquid or combustible dust/lint (e.g. shut down equipment)
- Remove ignitable liquid, combustible dust/lint and combustible residues
- Shut down ventilation and conveying systems
- Remove combustibles and consider a second fire watch on opposite side of floor, wall, ceiling, or roof when openings exist, or thermally conductive materials pass through
- Is work on a combustible building assembly (e.g. torch-applied roofing)?
    - If yes, provide additional required precautions for approval

Hot work on/in closed equipment, ductwork or piping (requires a “yes” or “Not Applicable” answer):
- Isolate equipment from service
- Remove ignitable liquid and purge flammable gas/vapor
- Prior to work, and/or during work, monitor for flammable gas/vapor
    - Provide Lower Explosive Limit reading(s)
- Remove combustible dust/lint or other combustible materials
- Is work on/in equipment with nonremovable combustible linings or parts
    - If yes, provide additional required precautions for approval

**** Safety Note **** Be sure to follow confined space guidelines and precautions if hot work is conducted inside of a confined space

Fire watch/fire monitoring the hot work area (requires a “yes” answer):
- Perform a continuous fire watch during hot work
- Perform a continuous fire watch post work for 1 hour
- Perform fire monitoring for XX hours
    - Loss Control can provide Best Practice fire watch/monitoring table upon request
    - Fire monitoring can be conducted via periodic walk-by observations or video surveillance

Contractors
The trend towards outsourcing maintenance and renovations has its advantages but it also has its risks. A contractor may have the technical expertise to perform hot work but most likely does not have a full understanding of the facility's fire and explosion hazards. Additionally, the contractor will be unfamiliar with management policy and procedures.

Before allowing contractors to start any job, it is crucial you make sure:

- A section in the contract addresses hot work compliance that the contractor will follow and acknowledge the job will not proceed without one
- The contractor will demonstrate proficiency in your company's hot work safety training program and the ability to carry out procedures
- A designated employee is assigned to supervise the contractor

All hot work fires and explosions are preventable. Yet every year there are hundreds, if not thousands, of preventable hot work fires and explosions, thus, placing facilities, business operations, and people at risk. Preventing fires and explosions ignited by hot work takes collaboration between facility management, personnel, and contractors. In addition, the TWCARMF Loss Control staff can provide added resources through written policy templates, FM Global permits and training, and facility safety audits.