

Hot Work Permit Program

UW-Stevens Point

Safety and Loss Control
Environmental, Health, and Safety



UW-Stevens Point
September, 2007





HOT WORK

- “Hot Work” can be defined as any operations involving open flames or producing heat and/or sparks. This includes, but is not limited to, grinding; cutting, brazing, soldering; thawing frozen pipes by torch; torch applied roofing and welding
- The United States averages 12,630 hot work fires, \$308.9 million in property damages and 31 deaths per year (Source: U of Iowa)



DESIGNATED HOT WORK AREAS

Designated Hot Work Areas

- A designated hot work area is a permanent location designed for hot work. These areas do not require a permit to perform hot work
- A designated hot work area shall be:
 - of non-combustible, fire-resistive construction, essentially free of combustibles and flammables
 - suitably segregated from adjacent areas
 - equipped with fire extinguishers
 - inspected and approved by management
- Our concern in today's discussion is with work **OUTSIDE** of designated hot work locations.

Hot Work Related Fire at U – Iowa.



Photo by Gary Galluzzo, University News Services, University of Iowa

- Old Capitol Building at the University of Iowa
- November 20, 2001. Fire destroyed the building's 160 year old cupola, dome and bell
- The fire was started accidentally by a torch or heat gun during renovations
- Over \$5 M Damages
- <http://www.uiowa.edu/~oldcap/fire/index.html>



NFPA 51B

- Fire Prevention During Welding, Cutting, and Other Hot Work
 - Administration
 - Referenced Publications
 - Definitions
 - Responsibility for Hot Work
 - Fire Prevention Precautions
 - Sole Proprietors and Individual Operators
 - Public Exhibitions and Demonstrations



NFPA 51B - Administration

- Prevent loss of life and property from fire or explosion resulting from hot work
- Provide guidance for persons who manage, supervise, and perform hot work
- Provide an acceptable degree of protection from the hazards associated with hot work

We want to avoid injuries and property loss



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B.2.1 Kaukauna, WI, Warehouse. While an arc welder was being used on the second floor, sparks dropped through an opening to cardboard boxes below and the boxes ignited. There was no fire watch on the first floor, and when the fire was discovered 15 minutes later, employees could not put it out. They finally called the fire department, but were too late to save the two-story building of ordinary construction. The total loss was \$1.6 million.



NFPA 51B - Administration

- This standard applies to:
 - Welding
 - Heat Treating
 - Grinding
 - Thawing Pipe
 - Powder-driven Fasteners
 - Hot Riveting
 - Torch-applied roofing (NFPA 241)
 - Similar applications producing or using a spark, flame, or heat



NFPA 51B - Administration

- This standard does not apply to:
 - Candles
 - Pyrotechnics or special effects
 - Cooking Operations
 - Electric Soldering Irons
 - Design and Installation of gas-cutting equipment and welding equipment covered by NFPA 51
 - Additional requirements for hot work operations in confined spaces
 - Lockout/tagout procedures during hot work



Stop and think!

- Before initiating Hot Work, determine if there is a safer way to complete the work

“Is it possible to accomplish this task without hot work?”



NFPA 51B - Responsibilities

- Management is responsible for safe operations of hot work activity
 - Designate a Permit Authorizing Individual (PAI)
 - Establish permissible areas for hot work
 - Ensure only approved apparatus are used
 - Ensure equipment is safe for use and properly repaired by qualified personnel before use, when repair is needed
 - Ensure personnel are familiar with this standard, trained, and aware of risks and emergency procedures
 - Advise contractors of fire hazards and risks



NFPA 51B - Responsibilities

- **Permit Authorizing Individual (PAI):**
 - Responsible for the safe operation of hot work activities
 - Determine flammable materials, hazardous processes, or other potential fire hazards in the work area
 - Not allow hot work if:
 - The work cannot be moved to a location free of combustibles
 - If combustibles cannot be moved to a safe distance or shielded against ignition
 - If hot work cannot be scheduled so operations that could expose combustibles to ignition are not begun during hot work



NFPA 51B – Responsibilities cont'd

- Permit Authorizing Individual (PAI)
 - Determine that fire protection and extinguishing equipment are properly located at the work site
 - Ensure that a fire watch is at the site, if needed
 - Check ½ hour after completion to check for smoldering fires if a fire watch is not needed
 - Post the permit at the work site



NFPA 51B – Responsibilities

- Hot Work Operator shall handle equipment safely and not endanger lives and property
 - Have PAI's approval before starting hot work operations (PAI must sign the hot work permit)
 - Examine all equipment to ensure it is in safe operating condition
 - Have equipment repaired by qualified personnel before use, if equipment is incapable of reliable safe operation
 - Stop hot work and notify management or PAI if unsafe conditions develop to assess the situation



NFPA 51B – Responsibilities

- Fire Watch shall:

- Be trained to understand the inherent hazards of the work site and of the hot work project
- Ensure that safe conditions are maintained during hot work operations
- Be authorized to stop the work if unsafe conditions develop
- Have fire-extinguishing equipment readily available and be trained in its use
- Be familiar with the facilities and procedures for sounding an alarm in the event of a fire



NFPA 51B – Responsibilities cont'd

- Fire Watch shall also:
 - Watch for fires in all exposed areas
 - Try to extinguish fires within the capabilities of extinguishing equipment available
 - Sound the fire alarm immediately, if the fire is beyond the capabilities of the extinguishing equipment available
 - Perform other duties, but none that distract him/her from fire watch responsibilities



NFPA 51B – Responsibilities cont'd

- Mutual Responsibility for safety in hot work operations.
 - Management
 - Contractor(s)
 - Permit Authorizing Individual
 - Fire Watch
 - Operator



NFPA 51B – Fire Prevention Precautions

- Hot Work may only be performed in Permissible Areas - Designated or Permit-Required Areas
 - Designated Areas are those designed (welding shop) or approved for hot work
 - Permit-Required Areas are made fire-safe by removing or protecting combustibles from ignition
 - Non-Permissible Areas are work areas not authorized by management



NFPA 51B – Fire Prevention Precautions

- Hot Work Permit

- A written Hot Work Permit shall be required before hot work operations begin in a non-designated location, the Permit Authorizing Individual (PAI) will prepare the permit
- The work area must be made fire-safe
- May not be approved if hot work is to be done on a combustible covering or insulation or on walls of combustible sandwich-type panel construction



NFPA 51B – Fire Prevention Precautions

- Hot Work Permit cont'd
 - Before the permit is authorized:
 - Equipment and apparatus must be in satisfactory condition
 - Combustibles must be moved, covered tightly (with fire-retardant or non-combustible material), swept clean, or kept wet within a 35 foot radius
 - Operators must be protected from possible shock



NFPA 51B – Fire Prevention Precautions

- Hot Work Permit cont'd
 - **Also, before the permit is authorized:**
 - Cracks in walls and floors or ducts within a 35 foot radius must be covered with fire-retardant or non-combustible material
 - Shield or shut down conveyor systems
 - Shield or guard combustible walls, partitions, ceilings, or roofs
 - Prevent ignition of combustibles on the other side of walls or ceilings being worked on, or provide a fire watch
 - Hot work on pipes or metal in contact with combustible walls (etc) shall not be undertaken if the work might cause ignition by conduction



NFPA 51B – Fire Prevention Precautions

- Hot Work Permit cont'd
 - Also, before the permit is authorized:
 - Fully charged and operable fire extinguishers, appropriate for the possible type of fire, shall be readily available
 - Extinguishing hose lines, if available, shall be connected and ready but not necessarily unrolled or charged



NFPA 51B – Fire Prevention Precautions

- Hot Work Permit cont'd
 - Also, before the permit is authorized:
 - If sprinkler heads are close to the hot work, a wet rag shall be laid over the head and removed when the hot work is completed
 - Special efforts shall be made to avoid accidental operation of automatic fire detection or suppression systems
 - Nearby personnel shall be protected from hazards of heat, sparks, slag, etc.



NFPA 51B – Fire Prevention Precautions

- Hot Work Permit cont'd
 - Also, before the permit is authorized:
 - The PAI shall determine the length of time the hot work permit is valid
 - The PAI shall inspect the area at least once per day while the permit is in effect to ensure the area is fire-safe
 - The PAI shall post the permit at the work site



NFPA 51B – Fire Prevention Precautions

○ Fire Watch

- Required by the PAI when hot work is to be performed in a location where other than a minor fire might develop; or
 - Where combustibles are closer than 35 feet from the point of operation; or
 - Where combustibles easily-ignited by sparks are more than 35 feet away; or
 - If walls or floor openings within 35 feet of the operation expose combustible materials in adjacent areas, such as concealed spaces in walls or floors; or
 - Where combustible materials are adjacent to the opposite side of walls (etc) and are likely to be ignited



NFPA 51B – Fire Prevention Precautions

- Fire Watch shall also:
 - Be maintained at least ½ hour after completion of hot work operations to detect and extinguish smoldering fires
 - Multiple fire watches may be necessary if direct observation is not possible due to walls, ceilings, floors, or partitions



NFPA 51B – Fire Prevention Precautions

- Hot Tapping shall be performed only by a crew qualified to make hot taps
- Cylinder use and storage shall be in accordance with NFPA 55
- Personal Protective Clothing shall be selected to minimize the potential for ignition, burning, trapping hot sparks, or electric shock



29 CFR 1910.252 – Welding, Cutting, and Brazing

- See [1910.252](#) for precautions related to:
 - Welding or cutting containers
 - Working in confined spaces
 - Fall Protection
 - Welding cable placement
 - Selection of eye protection
 - Helmets and hand shields
 - Protective clothing
 - Securing cylinders and machinery
 - Precautionary labels for fluxes, coatings, coverings, and filler metals



29 CFR 1926.352 – Welding and Cutting Fire Prevention

- **1926.352(e)** “When the welding, cutting, or heating operation is such that normal fire prevention precautions are not sufficient, additional personnel shall be assigned to guard against fire while the actual welding, cutting, or heating operation is being performed, and for a sufficient period of time after completion of the work to ensure that no possibility of fire exists. Such personnel shall be instructed as to the specific anticipated fire hazards and how the firefighting equipment provided is to be used.”
- **Use a Fire Watch when feasible**



Emergency Responses

- Despite all the preparations, everyone involved with hot work must be prepared for an emergency
- Be certain there is a means of communicating with the local fire department



Best Practices

- Is hot work necessary?
- Hot Work is to be done only in Designated or Permit-Required Areas
- Review Hot Work Program
- Delegate responsibilities
- Train Personnel
- Check equipment
- Plan for emergencies



Summary

- Work safely
 - NFPA 51B and
 - [1910 subpart Q](#)
- Avoid fires, but be prepared
 - Make the area fire-safe
 - Be sure there will be no fire after the work is completed
 - Regardless of how unlikely a fire might occur, be prepared for emergencies