

# HOT WORK

## AN INTRODUCTION TO HOT WORK ACTIVITIES AND EFFECTIVE RISK MANAGEMENT

GENERALI GC&C RISK ENGINEERING & LOSS PREVENTION

### BACKGROUND

What does *hot work* mean?



- Any operation that results in the **emission of concentrated sources of heat such as sparks or molten metal**. Examples include cutting, welding, brazing, grinding, torch applied roofing, etc.
- Virtually all occupancies use these techniques in their **manufacturing or maintenance activities**.
- **Hot work operations** are introduced on a temporary basis often outside a pre-defined risk management activity, related mainly **to maintenance and alteration works**.

### COMMON HOT WORK ACTIVITIES

**Grinding:** A machining process that involves the use of a disc-shaped grinding wheel to remove material from a workpiece.



**Welding:** A fabrication process that joins materials, usually metals or thermoplastics, by using high heat to melt the parts together and cause fusion.

**Cutting:** The separation of a physical object, into two or more portions, through thermal processes or the application of an acutely directed force.



**Torch Applied roofing:** The process of laying out sheets of modified bitumen and then heat the material so it bonds permanently with the roof.

**Soldering:** A process of joining two metal surfaces together using a filler metal called solder.



**Brazing:** A joining process traditionally applied to metals & ceramics in which molten filler metal flows into the joint.

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## POTENTIALLY CRITICAL SITUATIONS

**Uncontrolled hot work operations** cause a high percentage of the total number of fire incidents.

Approximately **one out of every three hot work** originated losses is caused by outside contractors.

**Storage areas are in first place.** The danger of hot work close to combustible storage is often underestimated.

**Sparks from cutting or welding** can fly for 11 m or more, pass through small cracks or holes and start fires.

## MOST COMMON CONSEQUENTIAL RISKS INCLUDE:

**Explosion:** This can result from the release of sparks in combination with flammable materials

**Fire:** The products of the hot work processes could trigger fire into a confined space

**Thermal runaway:** A rapidly self-heating fire that can cause an explosion.

**Toxic Gases:** Explosion, fire and thermal runaway can create irritating, corrosive or poisonous gases.

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### HOT WORK DANGER: FACTS AND FIGURES

When looking at data, it is clear just how dangerous hot work can be for the public and private property as well as to first responders.



**4.580**

Structure fires involving hot work per year

Of the fires involving hot work...

**57%** were in or non-home properties

**43%** were in or on homes



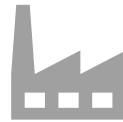
**22**

Civilian deaths per year



**171**

Civilian injuries per year



**\$484M**

Property damage per year



**5**

Number of firefighter fatalities

### GENERAL SAFETY RULES

#### ✓ ENSURE THE SAFE HOT WORK OPERATION

Management shall establish permissible areas for hot work and designate a permit authorizing individual (PAI).

#### ✓ USE OF APPROPRIATE EQUIPMENT

All equipment shall be examined to ensure it is in a safe operating condition. When found to be incapable of reliable safe operation, the equipment shall be repaired by qualified personnel prior to its next use or be withdrawn from service and tagged out of service. Management should also ensure that only approved apparatus is used (such as torches, manifolds, pressure-reducing valves, acetylene generators etc.)

#### ✓ TRAIN YOUR EMPLOYEES AND CREW

Management shall ensure that all individuals involved in the hot work operations, including contractors, are familiar with the provisions of this standard. Individuals involved in hot work operations shall be trained in the safe operation of their equipment and in the safe use of the process.

#### ✓ WARN CONTRACTORS

Management shall advise all contractors about site-specific flammable materials, hazardous processes or conditions, or other potential fire hazards.

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### ✓ **GUARANTEE THE PROTECTION OF COMBUSTIBLES FROM IGNITION**

Permit Authorizing Individuals (PAI) should consider alternative methods to hot work. Also, they should move the work to a location free from combustibles. If the work cannot be moved, moving the combustibles to a safe distance (min. 11 meters) or having the combustibles properly shielded against ignition, including air conducts. Scheduling hot work so that operations that could expose combustibles to ignition are not begun during hot work operations.

### ✓ **PROVIDE PERSONAL PROTECTIVE EQUIPMENT**

The PAI shall consider the safety of the hot work operator and fire watch with respect to personal protective equipment (PPE) for other special hazards beyond hot work. Moreover, it should be determined that appropriate fire protection and extinguishing equipment are full in service and located at the hot work site.

### ✓ **ESTABLISH FIRE WATCH**

The fire watch shall be trained to recognize the inherent hazards of the work site and ensure that safe conditions are maintained during hot work operations. Also, the fire watch shall have the authority to stop hot work operations if unsafe conditions develop. The fire watch must remain in the area for duration of hot work and for 60 minutes after completion of work.

### ✓ **ESTABLISH FIRE MONITOR**

In order to ensure that there is no sign of fire, and it is safe, a fire monitor should be carried out, after the completion of fire watch, for further 3 hours.