

# Controlling Hot Work

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## The Need to Control

Fire on board a vessel can be devastating. Vessels have been lost and people killed as a consequence of fire and explosions.

Fire can originate from a number of sources. But a major cause is hot work that was carelessly carried out, or when defective equipment was used. This can include electric arc welding, plasma cutting, oxy-acetylene burning and grinding.

The risk of damage and injury from hot work has long been identified. In many industries hot work operations are controlled. A widely used method is the permit-to-work system.

The systems to control hot work do not have to be complicated. Keep it simple, brief and easy to understand. If the system is bureaucratic, time consuming or confusing, it will not work.

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# Controlling Hot Work

## The Basic Requirements

Hot work is a high risk task and the basic aim is to control it and prevent unauthorised work.

A system that controls hot work should be easy to understand and be workable. It should:

- Prevent hot work being carried out without managing the risks
- Prevent hot work being carried out without supervision
- Prevent hot work being carried out by untrained people
- Ensure that a competent person takes responsibility
- Makes sure that the master, skipper or the person in charge of the watch knows where and when hot work is taking place

From this, a fire policy and procedures (or protocol) can be created. These should then be widely communicated and is understood by all on board.

## Hot Work: What are the Risks?

A key component of a system to control hot work is the permit-to-work.

There are many hot work permit templates that can be found on the internet. Ideally it should be a standard design that is formed from the control measures identified in a risk assessment.

Risk assessments do not have to be complicated and control measures are quite simply the actions that can be taken to lower either the chance of something going wrong or to make it less harmful if it does go wrong.

An example of this would be as follows (though not limited to the following):

## What Can Go Wrong?

- Fire.
- Oxy-acetylene gas explosion.
- Emitting sparks, splatter or hot debris.

Therefore we have at least three clear **hazards** that could result in damage to the vessel and injury or death to people.

## What Could Cause These to Happen?

- A flammable atmosphere (such as an ammonia leak from the refrigeration plant).
- Combustible material or debris nearby.
- Flammable or combustible material stored on the other side of the welded area.
- Careless or dangerous use of burning or welding equipment.
- Defective welding or burning equipment.
- Lack of physical barriers or shields.

## What Harm Can it Do?

- Uncontrolled fire on the vessel.
- Personal injury or death to the worker and those nearby.

## What Can We Do to Prevent These From Happening?

- Ensure the space is well ventilated.
- If flammable gasses are suspected then test before and during the hot work task.
- Check that the immediate area is free from combustibles.
- Check neighbouring or connected areas (such as other side of bulkhead) or internal areas (such as inside a tank) that may be heat affected to make sure they are free from flammables and combustibles.
- Bulkhead insulation may need to be removed.
- If appropriate, use portable barriers or shields and warning signs.
- Maintain a dedicated fire watch for both the immediate area and any potentially affected neighbouring/connected areas throughout the full operation.
- Proper use of Personal Protective Equipment (PPE), such as welding mask/goggles, gloves, apron.
- Make sure that the welding and burning equipment is properly maintained and serviced.
- Welding and burning equipment must be checked by a competent person before every use. Check that the hoses, cables and connections are in good condition.
- Check that flame arrestors are in place on both the oxygen and acetylene lines at both the torch and bottle ends.
- Persons carrying out the hot work should be properly trained and checks made to ensure they are competent.

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## What Can We Put in Place to Limit the Damage if it does Go Wrong?

- Have fire extinguishers and blankets ready and make sure the crew are confident in their use.
- Rapid response to a fire – crew who are suitably equipped and trained.
- A well drilled team who have practiced various scenarios in firefighting, boundary cooling and rescue
- The wheelhouse should always be aware of where and when hot work is taking place so they can quickly send a team if they receive an alarm.
- Have crew that are trained in first aid.
- If in port, call the local port and fire authorities.

## The Hot Work Permit

When creating a hot work permit system, it is important that it is easy to use. The more complicated it is the more likely it will be disregarded by the crew and it also increases the potential for mistakes and confusion.

There is no need to over-complicate what should be a simple process!

Crew should understand the rationale behind it and appreciate that it isn't just a paper exercise. The system is there to make sure people on board know that a high risk activity is going on and that it is properly authorised and supervised.

Equally as important, it acts as an aide memoir to those carrying out or supervising the work. They are reminded of what needs to be done to prevent an incident occurring or reducing the harm that could result.

The permit system should be in place regardless of who is carrying out the actual hot work. It doesn't matter if it is a shore contractor or a member of the crew, the same process should be followed. Remember, work carried out



by contractors should in any event be fully supervised.

The permit system should not be any different if the vessel is in port or at sea. Having one system simplifies the process and

avoids confusion. The main risks should not be any different. It is likely that the only factor that significantly

differs is the potential ready availability of assistance from the fire brigade when in port.

If a vessel is in a repair yard or dry dock then it is expected that the yard will operate their own permit system. In such circumstances there may be a couple of options. One is to hand over full responsibility to the yard and rely on their system to control hot work. The second is to continue running the vessel's system side by side with the yard's system. The decision on which method to adopt will be depend on the transfer of responsibilities and liabilities during the repair period, but if choosing the former then the crew should closely monitor the yard's activities and permits.

The UK Code of Safe Working Practices for Merchant Seafarers includes details on permit-to-work systems, which hot work would naturally fall under. It includes a useful section on the principles of permits, which apply to any higher risk task, such as working over the side, working aloft or entry into confined spaces.

## Hot Work Policies and Procedures

A simple hot work policy and protocol can support the permit-to-work system. The policy and procedures should be easy to understand and easily referenced. The crew should be left with no confusion as to what needs to be done each and every time hot work is carried out.

The hot work protocol should include details on what constitutes a competent person who can carry out the hot work, who should supervise it and how training and competency assessments are carried out.

A good source of reference is the UK Code of Safe Working Practices for Merchant Seafarers. Chapter 24 of the Code comprehensively addresses hot work.

It might be appropriate to designate an area on the vessel where hot work can be carried out without a permit during normal working hours – normally the on board workshop if there is one. This allows control over hot work activities in an area that can be isolated and it reduces the paperwork burden. This should be identified in any protocol.

## Links

UK Code of Safe Working Practices for Merchant Seafarers:

[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/477576/Code\\_of\\_Safe\\_Working\\_Practices\\_for\\_Merchant\\_Seafarers\\_for\\_gov\\_uk.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/477576/Code_of_Safe_Working_Practices_for_Merchant_Seafarers_for_gov_uk.pdf)

The North of England P&I Association Limited - *Hot-Spots* on Oxygen and Acetylene:

<http://www.nepia.com/media/72823/Hot-Spots-Oxygen.PDF>

# Controlling Hot Work

## Appendix I: Exemplar Hot Work Permit-to-Work

Description of Work:			
Location:		Date:	
Name of Person Carrying Out Hot Work:		Time Start:	
Name of Authorising Person:		Permit Valid Until:	
<b>Safety Requirements</b>		<b>Initial of Authorising Person</b>	
Is the space is well ventilated and free from flammable gasses?			
Is the immediate area free from combustible material and debris?			
Have adjacent or internal areas that may be heat affected been checked to make sure they are free from flammables and combustibles?			
Are portable barriers or shields/screens and warning signs in place to protect others?			
Is a dedicated fire watch for the area and any potentially affected adjacent areas in place?			
Is proper PPE in use?			
Has the welding and burning equipment been checked before use?			
If burning, are flame arrestors in place on both oxygen and acetylene lines at both torch and bottle? Are regulators in use and properly set?			
Are fire extinguishers available and ready for deployment?			
Has the wheelhouse been informed of the hot work?			
<b>Additional Requirements (if appropriate)</b>			
<b>Confirmation and Signatures</b>			
<i>Insert statement to confirm understanding here.....for example:</i>			
I verify the above location has been examined, the precautions checked on the required precautions checklist have been taken and permission is authorised for work.			
Signature of Person Carrying Out Hot Work			
Signature of Authorising Person			
<b>Completion of Hot Work</b>		<b>Initial of Authorising Person</b>	
Date and Time Completed:			
Confirmation Wheelhouse Informed:			
This permit must be posted in the wheelhouse for the duration of the hot work operation and retained on board for a minimum of XX weeks.			
A copy of this permit should be posted at the location of the hot work for the duration of the hot work operation.			