



Education and Culture

Leonardo da Vinci

Course: Health, Safety and Environment
Module 2

Table of Contents

MODULE 2.....	3
Health and Safety in Welding.....	5
The workshop environment.....	5
Electrical safety.....	6
Fume.....	6
Noise.....	6
Optical radiation.....	6
Burns and Mechanical Hazards.....	6
Gas Bottles.....	7
Welding in difficult situations - outdoors, confined spaces etc.....	7

MODULE 2

Objective:

Know how to perform welding activities in the fabrication shop in a safe manner.

Scope:

The working environment of the fabrication shop; general hazards, dust, heavy and hot material, electrical cables
Welding in the fabrication shop; protection of other workers from welding hazards,
General ventilation to minimise background pollution levels from welding hazards,

Expected results:

Know the general hazards in a fabrication shop.

Know your duties and responsibilities related to health, environment and safety

General.

Safety in welding starts before the welding itself. Some of the key elements in the company strategy for environment and safety can be listed as follows as the managements tasks and responsibility:

- 1- The Safety Analysis during the welding activities/processes of the Company;
- 2- The Safety management programmes;
- 3- Structure and responsibility;
- 4- Training, awareness and competence of personnel;
- 5- The Health, Safety and Environment Handbook (HSE), documentation and document control;
- 6- The control of the elements implemented for Safety purpose;
- 7- Emergency situation control;
- 8-Nonconformities, preventive and corrective actions.

These objectives and tasks shall be clearly identified and cared for as procedures and actions that are clearly defined for all personel invoøved in the management and fabrication itself.

The company recognise that you have the necessary professional qualifications, competencies, skills and experience to fulfil your role within the company but in order to make sure you are aware of recognised HSE and security best practice you should also be provided with specific instructions and guidance on the particular features and activities of your new worksite.

The worksite manager or supervisor is responsible for arranging your 'safety induction' as soon as possible after your arrival. Your introduction shall be in accordance with the company Introduction Policy and may include the following issues:

- Organisation of the worksite – roles and responsibilities.

- The emergency plan and its location.
- Emergency alarms and responses.
- Overview of work areas, 'no-go' areas and general traffic areas.
- Muster points.
- Escape routes.
- Survival craft and equipment.
- Fire fighting equipment.
- First aid treatment and location of equipment.
- Safety signs and their meaning – first aid, warnings etc.
- Identification of safety representatives.
- Review of safety noticeboard.
- Documentation and procedures.
- Hazard identification and risk assessment system at the site.
- Hazardous areas and precautionary measures.
- Confined space working.
- Handling of dangerous substances.
- Protective clothing, equipment and what you must use in your job.
- Reporting of incidents, damage and injuries.
- Action in the event of incident, damage or injury.
- Reporting of safety observations.
- Worksite waste disposal policies.
- Worksite security procedures.

All incidents are preventable. You choose yourself what type of risks you are encountering by deciding your work procedure, your attitude, your habits...

- Do it safely or not at all
- There is always time to do it right
- When in doubt, find out

Your duties and responsibilities.

Your job description specifies your work duties and responsibilities, but you also have a duty to ensure the safety and welfare of you and your work colleagues as well as preventing damage to equipment and the environment.

To make sure that all work to the same basic standard then the following tasks is also your responsibility:

- Learn, understand and work to outline instructions set out in the HSE handbook.
- Read and understand the procedures listed in the handbook.

- Work safely in accordance with the security processes and specific project procedures; seek help from your supervisor if you are unsure.
- Think about the hazards and risks you and others may be exposed to before you start any task and take the necessary precautions to minimise these risks.
- Do not take short cuts or become complacent with regard to safety in carrying out your duties.
- Stop or shut down any activity or operation which is unsafe (including those of contractors).
- Report promptly all unsafe conditions and practices (including those of contractors) to your supervisor.
- Report all injuries, no matter how minor, to your supervisor or the medic promptly.
- Perform your tasks safely, with regard for your own personal safety, the safety of fellow workers, and the protection of the environment and company property.
- Always use the proper safety equipment and keep to safe work practices and established safety standards.

Safe Performance Self-Assessment. Before beginning any activity/task/job, after an incident or near miss, any unusual circumstances, then:

- Assess the risk
- What could go wrong?
- What is the worst thing that could happen if something does go wrong?
- Analyze how to reduce the risk
- Do I have all the necessary training and knowledge to do the job safely?
- Do I have all the proper tools and personal protective equipment?
- Take necessary action to make sure the job is done safely!
- Follow written procedures!
- Do not proceed unless everything is safe!

Health and Safety in Welding

In most countries there is extensive legislation assigning responsibilities to employers to take reasonable care of the health and safety at work of their employees.

Welding is associated with several hazards to health and safety, and the employer needs to be able to ask informed questions:

The workshop environment

The employer needs to ensure that the lighting conditions are adequate for the work undertaken - giving extra lighting where necessary. Welders stand for long periods of time, since they must keep a very steady hand position, and this means that they can become quite cold if the workshop is not sufficiently well heated. Conversely in hot weather, the environment can become unbearably hot, and the welder has not got the option of removing clothing. Both overheating and underheating can cause fall in comfort, efficiency and productivity.

Housekeeping is extremely important to avoid slips, trips and falls, damage to equipment and fire.

Electrical safety

Clearly, the employer needs to establish the level of competence of the electrician who is given the task of wiring the installation, and the type of maintenance which the installation and the equipment will subsequently need. In the UK there is a requirement for periodic electrical checks to be done on power sources. The design of welding power sources themselves has gone through a number of changes, and for each, there are different standards of safety. The employer must ensure that his installation is correctly matched to the type he is using - for instance double insulated power sources should not be used with a separate earth lead to the workpiece.

Fume

Welding vaporises metals, and anything which is resting on the surface. This gives rise to fume, which is condensed fine particulate material. The fume is mostly oxides of the metals, including any alloying elements, but it also contains gases produced in the arc, such as ozone or oxides of nitrogen, and decomposition products from any paint or coating which was on the metal surface. The nature and quantity of this fume depends critically upon the welding process, the materials and the welding parameters. Some is harmful to health, for instance stainless steel fume contains chromium, and welding galvanised steel produces zinc fume.

Effects can vary from a bout of 'metal fume fever' to longer term, more serious problems if suitable fume removal is not carried out. There is guidance literature which may be consulted regarding the safe levels for each constituent, and the employer needs to be aware that for some fume constituents, there may be no safe level, and a statutory exposure limit may be imposed. Nickel, cobalt and stainless steel welding fume are the subject of statutory limits. Highly efficient exhaust apparatus is available. Some health surveillance may be necessary.

Noise

Welding environments are frequently noisy as other operations such as grinding, etc. may also be taking place. Some operations, such a de-slagging may take the noise up to such a level where it will damage workers hearing. In such cases this would mean that hearing protection is almost certainly required if the noise cannot be controlled by other means. Some health surveillance may also be necessary.

Optical radiation

The welding process produces a large quantity of visible light, ultraviolet and infra-red. Exposure to the radiation from an arc causes burns to the skin, and damage to the eyes. For this reason, welders need to wear clothing to protect their bodies and arms, regardless of the weather conditions. They also need efficient eye protection, which is usually supplied in the form of a protective shield. The precise choice of the shade of glass filter in these shields depends on the type of welding operation, since they vary in their light output.

Welders assistants also need protective clothing and eye protection. Passers-by should be protected by placing opaque or properly filtered screens around the work area.

Burns and Mechanical Hazards

Welders need good quality gloves, preferably leather gauntlets, safety boots or shoes and good quality cap and overalls. A leather apron may also be needed. Welding produces quantities of molten droplets of metal which are

scattered in all directions. It is essential that the welder wears clothing which will not burn or melt, and which is stout enough to provide adequate protection.

In a workshop environment, suitable safety footwear is essential.

Gas Bottles

Gas bottles need to be stored to conform with the regulations, and the welders need to be aware of the safety rules - such as the use of the correct regulator, tethering the cylinder so that it does not fall, keeping the outlets free from contamination such as oil or grease.

Welding in difficult situations - outdoors, confined spaces etc.

There are many work situations which add to the hazards of welding. Each must be assessed carefully, since there may be added hazards such as falls or asphyxiation. This is particularly true of work in confined spaces, where there is a very real risk of death, and the employer should make a critical assessment of the work to be done, and how it may be carried out safely. There may be statutory requirements in these situations.