Underwater welding

Welding is commonly used for a range of offshore and marine applications. Given the difficulties and dangers of underwater welding, much of this work is carried out in shallow waters or by moving structures to dry areas first. However, welding structures at greater depths can save the cost of removing a structure from the water, as well as dry docking costs. Underwater welding not only allows for these cost savings but can also be used to effect emergency repairs. Used to weld fully or partially submerged marine structures, underwater welding is used on ships, dams, oil rigs, pipelines, bridges and more. Underwater welding techniques are also used in applications related to nuclear power stations, rivers, and canals.

■ Types of underwater welding

The welding can therefore take place:

- in a dry, pressurised enclosure, known as dry welding or hyperbaric welding, or
- in the water itself, known as wet welding or underwater welding, with steel being the most commonly welded material.

Dry welding

Dry welds tend to be better quality than wet welds because of the greater control over the welding conditions and the ability to perform pre- and post-weld heat treatments. In dry welding, a hyperbaric chamber is sealed around the structure to be welded. The chamber is then filled with gas, typically a mixture of oxygen and helium, to expel the water and create a dry atmosphere for the weld to be performed. The chamber needs to be pressurised to the right level to prevent welders from suffering from decompression sickness while working.



■ Wet welding

There are situations where welder-divers do not have access to a hyperbaric chamber or when urgency means that a repair needs to be done immediately. In these cases, wet welding may be used instead. **Wet welding** relies on the release of gaseous bubbles around an electric arc to shield the weld and prevent any electricity being conducted through the water. This insulating layer of bubbles protects the diver but also obscures the welding area, making it harder to complete the weld correctly. This increases the risk of defects such as cracking. Underwater welding uses direct current rather than alternating current as it is safer for the underwater welders to work with.

diver: sommozzatore dry docking: rimessaggio a secco oil rig: impianto di trivellazione shallow: poco profondo

1 📃 Answer the questions.

- 1. Where is underwater welding used?
- 2. Why are hyperbaric welds better than underwater welds?
- 3. Why is the dry welding chamber filled with gas?
- 4. Why does the hyperbaric chamber need to be pressurised to the right level?
- 5. What are the functions of the gaseous bubbles in wet welding?
- 6. What is the type of current employed in wet welding? Why?