Alternatives to acetylene

Acetylene is a highly flammable and explosive gas and poses a significant safety risk to the railway. A fire near acetylene is extremely dangerous.

It is treated by the Fire Service as an explosive and an exclusion zone of 200 metres around the scene of the fire is immediately set up. The exclusion zone stays for a minimum of 24 hours resulting in the following:

- Trains being stopped incurring severe delays
- Road closures
- Surrounding businesses shut
- People evacuated

The cost of disruption can amount to hundreds of thousands of pounds and in some cases millions.

This can result in third-party claims for losses being made against the company or person responsible. Many businesses now use alternatives to acetylene which work just as well but pose far lower risks.

Please note: Customers must have written permission from Network Rail before they store any fuel gas in the property.

Welding

Most metals and metal combinations can be arc welded. There are three fundamental arc welding techniques, each with many variants. All processes use cables to carry current from a power source to a welding torch, via an arc to the work piece and then by a return lead back to the power source.

Tungsten Inert Gas (TIG) welding: a welding arc, formed by an electric current passing between a pointed tungsten electrode and the workpiece, melts a weld pool. The electrode and the weld pool are protected by the inert gas shield. TIG is best for fine, high quality welding especially in thinner materials. As the electrode is not consumed, the input of heat and the formation of the weld pool are separate from the addition of filler metal (as for oxy-acetylene welding).

Metal Inert and Metal Active Gas (MIG & MAG) welding: (also known as CO2 and semi-automatic) describes those processes where a continuous wire electrode is used. A gas shield gives weld pool protection. Welding wire: a wide variety of solid and tubular (containing metal and or flux) wires are available to match the composition & properties of the metal being joined. There are also MIG brazing wires available.

Manual Metallic Arc (MMA) welding: with this process an arc is struck between a flux coated metal rod (electrode) and the work piece. The flux melts forming a gas and a slag, which protect the weld pool. The slag must be chipped off at the completion of each weld run. Only short lengths of weld are made before a new electrode needs to be used. Weld penetration is low and the quality of the weld deposit is highly dependent on the skill of the welder.

Propane and Apachi: this is used in oxy-propane cutting and brazing. It is often used as an alternative to acetylene when high cutting speeds and efficiencies are not required. Oxy - propane is widely used for preheating components. Apachi is a method in which air produces own brand gas used as above.

Cutting

Mechanical cutting: many metals can be effectively cut using saws (band and jig), angle grinders, slitting wheels or guillotines. They can give good performance and productivity.

Plasma cutting: is carried out by a high velocity jet of ionised gas (plasma) that is formed by electricity flowing from the cutting torch to the work piece. The plasma melts work piece material, and the gas jet blows the molten metal away to make the cut. Any conductive metal can be cut using compressed gas, typically air (note oxy-acetylene cannot cut stainless steel or aluminium). Easy to master, the process is much faster than oxy-fuel cutting (for less than 25mm metal).