

5.4 Creep Rupture Strength of Weld Metals

Creep rupture test results of weld metals are reported in Fig. 11 and Fig. 12. The relation between tensile strength and creep rupture strength is illustrated in Fig. 13. This figure reveals that weld metals made of newly developed welding consumables have almost the same creep rupture properties as V-modified 2.5 Cr-1Mo steel.

6. CONCLUSION

An increase of creep rupture strengths without in-

creasing tensile strengths at room temperature has been achieved by decreasing the content of C, Mn and N in weld metals. Other mechanical properties of weld metals have satisfied the requirement of V-modified 2.5 Cr-Mo steel. The newly developed welding consumables are expected to provide an actual application for V-modified 2.5 Cr-1Mo steel.

REFERENCES

1. Hojo, I. et al., IIW/IIS, Doc.II-1045-85

Some Hazards of Welding Fume

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As many welders are already aware, packs of electrodes and bare wires carry a health warning against the dangers of welding fume. What are these dangers and what should welders do to ensure that they have adequate protection? There are all kinds of face masks and respirators on the market. Some are disposable, some made of rubber, others consist of a simple gauze pad, many only protect against large dust particles and provide little protection against the fine particulate of welding fume and the potential health hazards that it presents.

A common health hazard associated with welding is fume fever, often caused by exposure to zinc or galvanized metals. The effects, which include fever, chills, nausea, body and head aches, are similar to influenza symptoms and usually begin with 24 hours of overexposure to a metal fume. These are short lived and full recovery is normally made until the next overexposure.

The potential effects of overexposure to substances commonly associated with welding should be clearly understood by welders and employers alike. In fact, not all are as easy to recover from as fume fever, some are far more serious. Although many of the following substances are found in welding materials, much of the evidence as to their potential health effects has been obtained from other industries and processes.

Cadmium Oxide

Short term exposure to cadmium oxide in high concentrations of 0.5 mg/m³ or more can cause irritation of the breathing passageways and pulmonary oedema (fluid in the lungs). At concentrations of 50 mg/

m³ the reaction is usually delayed but is sometimes fatal. Long term exposure to low concentrations can lead to emphysema, a disease which affects the ability of the lungs to transfer oxygen to the bloodstream, and also damages kidneys.

Cobalt

Cobalt fume irritates the nose and throat and some reports suggest that it causes respiratory diseases ranging from coughs and shortness of breath to permanent disability.

Copper

Often causing a metal fume fever similar to that associated with zinc and galvanised surfaces, the health effects of copper fumes include irritation of the nose and throat as well as nausea.

Fluorides

Found in many electrode fluxes and coatings, exposure to fluorides can cause eye, nose and throat irritation and skin rashes. High concentrations over long periods may result in pulmonary oedema and bone damage.

Iron Oxides

Other respiratory irritants and the major fume to which welders are exposed are iron oxides. Affecting nose, throat and lungs, long term exposure can cause siderosis (deposits of iron oxides in the lungs, visible on x-ray but believed to have no harmful consequences).

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