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High-Efficiency Submerged Arc Fillet Welding Process for Heavy Section T-Joints

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Synopsis :
To enable a high-efficiency welding process for heavy section T-joints, welding materials and welding conditions were examined from the viewpoints of penetration depth and weld defects, especially weld metal cracking. The most appropriate submerged arc welding materials and welding method for

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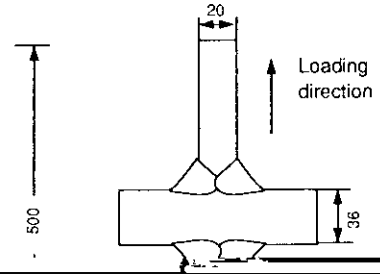
Table 1 Chemical compositions of base metals and wire (mass%)

2.5 Fatigue Test of Welded Joints

Since fatigue strength is important, for example, in crane girders, the fatigue tests of cruciformed full penetration fillet welded joints with a web thickness of

tem (KB-US) containing iron powder and having a high softening temperature was developed. The addition of iron powder to the flux is beneficial to the increase in deposition rate without increasing the weld heat input.[1] The above mentioned flux made it possible to obtain

welding methods were carried out. **Figure 3** shows the geometry of the specimen, which is of the load-carrying type. The axial loading of the zero-tension test was adopted.



deposited metal with a lower heat input.

The low carbon wire KW-50 is recommended to avoid weld metal hot cracking with the combination of fluxes KB-U and KB-US.

3.2 Optimum Welding Conditions for High-Efficiency Welding

3.2.1 Optimum welding conditions for T-joints without groove preparation

The determination of the optimum welding parameters for ensuring penetration depth and avoiding weld defects, such as undercutting and solidification cracking,


b
T-electrode
I-electrode

3.2.2 Optimum welding conditions for T-joints with groove preparation

Basically, the optimum welding conditions for T-joints with groove preparation are the same as those for T-joints without groove preparation mentioned above. Wires with the diameter of 6.4 mm were used in both the leading and trailing electrodes, because the welding cur-

between the new high-efficiency one pass per side fillet welding method and the conventional multipass welding method.

3.3 Results of Restraint Cracking Tests

3.3.1 Results of restraint cracking test for 25-mm-thick specimen

One of the reasons why the high-efficiency welding

C content of the weld metal for preventing cracking in ing test conducted with various plates, although not all

$$C_{WM_{crit}} = 0.39C_{web} + 0.22C_{flange} + 0.39C_{weld}$$

C content of the weld metal without cracking decreases

combination with the low C wire and newly developed fluxes.