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Heat Transfer Affected by Transverse Magnetic Field using 3D Modeling of Arc Plasma. YOSHIFUMI MAEDA, TATSURO TANAKA, SHINJI YAMAMOTO, TORU IWAO, Tokyo City University — Gas shielded metal arc welding is used to join the various metal because this is the high quality joining technology. Thus, this welding is used for a welding of large buildings such as bridges and LNG tanks. However, the welding defect caused by the heat transfer decrement may occur with increasing the wind velocity. This is because that the convection loss increases because the arc deflects to leeward side with increasing the wind velocity. In order to prevent from the arc deflection, it is used that the transverse magnetic field is applied to the arc. However, the arc deflection occurs with increasing the transverse magnetic field excessively. The energy balance of the arc is changed with increasing the convection loss caused by the arc deflection, and the heat transfer to the anode decreases. Therefore, the analysis including the arc and anode is necessary to elucidate the heat transfer to the anode. In this paper, the heat transfer affected by the transverse magnetic field using 3D modeling of the arc plasma is elucidated. The heat transfer to the anode is calculated by using the EMTF(electromagnetic thermal fluid) simulation with increasing the transverse magnetic field. As a result, the heat transfer decreased with increasing the transverse magnetic field.

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