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Convective Force Derived from Arc Jet Affected by Convective Force of Lateral Gas Flow for Elucidation of Arc Deflection Phenomenon YOSHIFUMI MAEDA, YUKI SUGIYAMA, ZHENWEI REN, YUSUKE NEMOTO, Tokyo City University Graduate School, TORU IWAO, Tokyo City University — The arc welding has a problem that the heat transfer to the base metal decreases when the arc is deflected by lateral gas flow because the energy loss occurs in the leeward direction. For this reason, it is necessary to elucidate the factors that cause the arc deflection in order to obtain an appropriate heat transfer. It has been reported that it is difficult to deflect when the flow velocity in axial direction is large. Hence, it is necessary to clarify the relation between the arc deflection length and flow velocity considering not only the force to leeward direction but also the force to axial direction. However, the flow velocity and mass density have a three-dimensional distribution, which is difficult to clarify experimentally. Therefore, it is important to visualize the force generated by the convection of lateral gas flow and arc jet using a three-dimensional electromagnetic thermal fluid simulation. In this paper, the convective force derived from the arc jet affected by the convective force of lateral gas flow for the elucidation of arc deflection phenomenon is analyzed. As a result, the convective force generated by the arc jet tended to increase and then decrease with the increase in the convective force generated by the lateral gas flow.

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