

Finite element simulation of butt fusion welding process

유재현, 오주석¹, 안경현[†]
서울대학교; ¹한남대학교

This study concerns a simulation for the heat transfer and melt flow behavior in the butt fusion welding process. The butt fusion welding is one of the most effective processes in thermally joining the plastic pipes. In this process, there are two main stages. (a) Heat soak : the pipe ends are pressed against a hot plate so that the pipe ends touch the hot plate and continue to melt. (b) Jointing : the hot plate is removed, and the molten pipe ends are impacted together to form a fusion weld. In the above stages, there is a heat transfer, which results in solid and melt phase transition. While solid part moves like a rigid body, the melt flows due to thermal expansion or imposed pressure on the pipe ends in each stage. And, that flow makes pipe deformed. It is hard to study the heat transfer and melt flow behavior experimentally. Therefore, numerical approach is needed to investigate this process. In this study, we define a melt region in which temperature reaches the melting point, and use finite element method with a Lagrangian mesh update. With this we can consider melt flow behavior and the deformation of the pipe as well as heat transfer.

Aknowlegment : This study is supported by KETEP (No. 20131510200400)