

Development of a new integrated welding mechanism combined with ultrasonic and rotary welding

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Summary

Ultrasonic welding is the joining or reforming of thermoplastics through the use of heat generated from high-frequency mechanical motion. Rotary welding is a technique to press two parts together and one part is hold fixed the other rotates at high speed, the friction between the two parts generate heat which causes the parts to melt at the interface, when rotation stops, the weld cools down and solidifies. In this research, an experimental set-up integrated these two different welding processes in one machine set was designed and fabricated to provide a tool to study the integrated welding mechanism.

In this study, modeling of vibration model for various shape horn designed for integrated welding was attempted and simulation was done in ANSYS, and the optimum shapes of horn were suggested. Tensile strengths and micro structures in the interfaces of the joint were also obtained and compared with those of data obtained by unique welding process. Then, the optimum welding parameters for the welding joints were discussed through Taguchi method.

keywords: Ultrasonic welding, Rotary welding, Integrated welding mechanism, Horn design, Welding parameters.

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