

ABSTRAK

Proses pengelasan material berbeda dengan ketebalan tipis masih terdapat kendala. Perbedaan sifat panas pada material dapat memberikan masalah pada pengelasan. Penelitian ini mempelajari tentang *micro-friction stir lap welding* untuk menyambung plat *galvanized steel* dan *stainless steel* 201 dengan ketebalan 0,5 mm terhadap kekuatan sambungan. Penjelasan pengaruh diameter *shoulder* dan *traverse speed* dengan kualitas sambungan, ditemukan bahwa semakin rendah *traverse speed* maka semakin tinggi kekuatan sambungan. Kekuatan tarik tertinggi yang dapat dicapai adalah 317,6 MPa dengan kombinasi *traverse speed* 10 mm/min dan diameter *shoulder* 8 mm. Makrostruktur sambungan yang diamati mengindikasikan tingkat pencampuran yang lebih tinggi pada ukuran diameter *shoulder* 10 mm meskipun ditemukan cacat *flash* dan *incomplete fusion* di daerah pengadukan. Kekuatan tarik terendah bernilai 127,9 MPa pada *traverse speed* 30 mm/min dan diameter *shoulder* 6 mm. Ukuran diameter pada *shoulder* mempengaruhi lebar struktur makro serta hasil sambungan yang terjadi.

Kata kunci: sambungan *galvanized* dan *stainless*, *micro friction stir welding*, *lap welding*, *traverse speed*, diameter *shoulder*

ABSTRACT

The process of welding different materials with thin thickness still has problems. Differences in heat properties of materials can cause problems in welding. This research studies micro-friction stir lap welding for joining galvanized steel and stainless steel 201 plates with a thickness of 0.5 mm to joint strength. Explaining the effect of shoulder diameter and traverse speed on joint quality, it was found that the lower the traverse speed, it means higher the joint strength. The highest tensile lap shear strength achieved was 317.6 MPa with a combination of traverse speed of 10 mm/min and shoulder diameter of 8 mm. The observed joint macrostructure indicated a higher degree of mixing at 10 mm shoulder diameter although flash and incomplete fusion defects were found in the stirring area. The lowest tensile strength was 127.9 MPa at traverse speed of 30 mm/min and shoulder diameter of 6 mm. The size of the diameter of the shoulder affects width the macrostructure as well as the result of the joint.

Keywords: galvanized and stainless joint, micro friction stir welding, lap welding, traverse speed, diameter shoulder