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Poster  Oral

A decisão final será do Comitê Técnico.

## The corrosion behavior on AA2050-T84 and AA7050-T7451 welded and non-welded by FSW

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### Abstract

In this work, the corrosion resistance of the AA2050-T84 and AA7050-T7451 alloys welded by FSW and non-welded was investigated using chloride solutions. The corrosion resistance, microstructure and microhardness were studied. Microhardness measurements at the cross section and at the top surface of the weld identified significant differences between the various zones resulting from FSW. Characterization of the corrosion resistance was carried out by electrochemical and immersion tests. Localized electrochemical techniques were used in this work, specifically scanning vibrating electrode technique (SVET) and scanning ion-selective electrode technique (SIET). The results showed that the most electrochemically active zone at of the welded alloys was the thermomechanically affected zone (TMAZ). This zone corresponds to the transition between the two alloys. In the top surface of the welded alloys, besides the TMAZ, the heat affected zone (HAZ) was also highly active corresponding to the transition between zones of the AA7050. This was due to the formation of hardening precipitates in the HAZ of the AA7050. In the cross-section, the high activity related to the TMAZ was due to the galvanic coupling between the two alloys where the AA7050 alloy acted as anodic zones, and the AA2050, as the cathodic ones. When the two alloys, AA2050 and AA7050, were exposed separately to 0.005 mol.L<sup>-1</sup> NaCl or 3.5 (wt%) NaCl solutions, the AA2050 alloy showed higher electrochemical activity compared to the AA7050 alloy which was due to the higher content of active micrometric precipitates in the AA2050 alloy relatively to the AA7050. However, when the alloys were coupled, the AA2050 was cathodically protected by the AA7050 alloy.

**Keywords:** corrosion, aluminum alloys, friction stir welding.

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