摩擦攪拌銲接攪拌桿探針幾何設計最佳化研究

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摘 要

摩擦攪拌銲接之攪拌桿探針與銲接參數選擇易產生問題， 導致攪拌桿壽命及摩擦攪拌銲接銲塊品質優劣受到影響，所以本研究擬研究摩擦攪拌銲接攪拌桿探針設計最佳化。實驗材料 以AZ61鎂合金和AZ80鎂合金為主，探討攪拌桿探針設計和材質 對摩擦攪拌銲接之影響。以攪拌桿探針的外觀和重量之變化、 黏著及去除材料之難易以及磨耗，尋求最佳攪拌桿探針設計和 壽命。實驗的攪拌桿參數有圓柱形狀、錐度形狀、螺紋形狀、 不同材質，加上摩擦攪拌銲接參數的旋轉速度、進給率、攪拌 桿傾斜角度等對攪拌桿壽命之影響，並比較不同鎂合金對攪拌 桿壽命之影響。 摩擦攪拌銲接與傳統銲接比較，雖其銲接後之銲件機械性 質有明顯提昇，但仍有缺陷產生，幾乎是來自於銲塊組織中的 孔洞及銲後效果，而攪拌後黏著材料即材料損失，代表試片重 量相對的損失，本研究發現經摩擦攪拌銲接之材料損失與銲塊 缺陷和機械性質非常密切關連，而材料損失來自於攪拌桿探針 上黏著材料、試片毛邊溢出料，和摩擦攪拌銲接過程產生的微 屑，在整個研究中，發現攪拌桿探針最好的設計為螺紋探針。

關鍵詞 : 摩擦攪拌銲接，攪拌桿，鎂合金

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