عنوان مقاله:

Microstructural investigations and fracture analysis of a crashed aircraft sample

محل انتشار:

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خلاصه مقاله:

In this paper, the failure analysis was performed on a crashed airplane trunk sample. Received sample was composed of five different layers; Al 2024 as outer layer, a nearly pure Al clad, an anodized layer, an isolating material and the alloy 413 as interior layer. Macro and micro-cracks in the sample were mostly initiated from the areas close to or around the rivets. These cracks initiated in anodized layer, got through the cladding and entered into the outer Al 2024. Few corrosion sites similar to crevice were also observed behind the rivets and between isolating and cladding layers. It was found that the crevice corrosion and fatigue were responsible to form micro-cracks at these sites. Microstructural observations of Al 2024 layer showed that the micro-cracks were mostly initiated form inside out then they progressed through the interfaces of second phase particles and the matrix. It was found that larger particles were in favor of crack propagation along their interfaces. Second phase large particles are attributed to over-aging of trunk sample which was subjected to excessive heat from the engines.

کلمات کلیدی:

Aluminum 2024, Aging; Fractography, Crevice corrosion, Fatigue, crack propagation