

Abstract: Industrial Tooling: Failure Mode of Aluminum Extrusion Dies and Die Casting Dies.

Author: Jack Kalucki, NITREX

English Abstract:

Aluminum extrusion and injection are growing in popularity with the quest of lighter vehicles and decarbonization. Yet efficient manufacturing relies on extending the die life of industrial tooling used in either of the processes.

Hot work tool steels like H13 require proper through hardening while avoiding decarburization, and multiple tempers to ensure stability at extrusion or injection temperatures. Aluminum extrusion dies undergo a series recurring surface treatment to restore their hardness. Die casting dies require very different treatments, as they may be used “as nitrided” or with additional surface coatings on top of the nitrided layer

Ideally, the process should produce a perfect nitrided case with each cycle, with a compressive stress distribution aimed at maximizing die life and productivity.

This paper will offer proper heat-treatment guidelines and explain methods to detect and avoid costly defects to achieve the best die life and performance.