Aluminium Heat Treatments Simulation Solutions with FORGE®

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ABSTRACT

Aluminium is light and durable and easy to cast, however it is only through heat treatment that it obtains the necessary mechanical properties for industrial purposes. The present work reviews the fundamental models - the QFA [1], and the Shercliff Ashby [2] models – that were introduced into the finite elements simulation software FORGE® in order to simulate two heat treatment processes: the quenching and the aging of aluminium.

These models predict the local physical and mechanical properties in aluminium components in response to precipitation-hardening on well-known Al-alloys of the 2xxx, 6xxx and 7xxx series. We will also present numerical studies that have been carried in order to validate the present model, by comparing simulation results against experimental data, proceed on industrial components that were treated according standard heat treatment protocols.