Isothermal Forging on Upgraded Open-die Forging Press for Aerospace Applications

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Abstract

Isothermal forging process is certainly more costly compared to conventional closed-die forging process, but it provides several benefits including as a lower forming load and the capacity to obtain a more homogenous grain size on the final forged component.

Wepuko Pahnke proposes a solution to their long-term customer Midhani to implement an isothermal closed die forging process on their existing 60MN open-die press for the production of turbine discs. The modification and upgrade of the existing press system allows flexible conversion of the open-die forging press into a closed die forging press for isothermal closed die forging and vice versa within a short time frame. This upgrade is at the same time a very cost-effective solution to implement the capability for isothermal closed die forging compared to the investment for a new closed die press.

This presentation introduces the isothermal forging of an aero-engine disc and aims at demonstrating the process feasibility. Wepuko Pahnke and their German partner for inductive heating systems Marx, asked Transvalor to carry out necessary detailed simulations with FORGE® focusing on: - effectiveness of the inductive heating, - thermal behavior of the complete die stack setup, - simulation of actual forging process for a reference part, including analysis of the expected grain microstructure.

Speaker

Oliver Buck

Studies: Oliver Buck is head of the design department for hydraulic forging presses at Wepuko Pahnke and has a degree in mechanical engineering.

Working experience: He joined Wepuko Pahnke in 2013 as mechanical engineer and has since then carried out different modernization projects of hydraulic forging presses.

Nadine El Kosseifi

Studies: Nadine El-Kosseifi holds a Ph.D. in Numerical Mechanics.

Working experience: She joined Transvalor in 2015 as a Simulation Software Trainer in Customer Service Department.