

# Surface induction hardening of a hot work tool steel for aircraft applications

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Gears designed for power transmission in aircraft require increased surface hardness while maintaining the integrity of their core properties. This is typically achieved through conventional thermochemical treatments like case hardening or nitriding. However, these methods can be time-consuming and generate significant CO2 emissions, prompting the search for new processes to meet modern industrial needs.

Induction hardening emerges as a promising alternative, offering shorter processing times, improved control over distortion, and a reduced environmental impact. Hot work tool steels are known for their excellent mechanical properties. These high carbon steels have a strong hardening potential which makes them ideal candidates for surface induction treatments.

This collaborative research between Safran and IRT M2P aims to develop induction hardening for hot work tool steel in gearing applications. Our first experimental results demonstrate that this induction treatment can achieve surface hardness levels exceeding 750 HV.

The presentation will show how using simulation, the induction parameters can be adjusted to reach optimized microstructure, residual stress profile, and hardness profile. Additionally, the core heat treatment prior to induction is also being refined to achieve the best possible balance in mechanical strength, impact toughness, and grain size.

## Speaker Country

France

## Are you interested in publishing the paper in a Steel Research International special issue?

No

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