

Research Fund for Coal and Steel



**Gears with top in-service performance
developed for hybrid and electric vehicles**

Deliverable D5.1: Fatigue tests on specimens to reproduce the stresses supported by gears loaded in both teeth sides

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1 PUBLISHABLE SUMMARY

The project seeks to enhance the fatigue performance of automotive components designed for Hybrid and Electric Vehicles by optimizing and innovating the heat treatment process according to the specific steel used for each component. Specifically, the TOPGEAR project focuses on key rotating transmission parts, such as gears, as over 25% of vehicle component failures are linked to these elements.

This deliverable 5.2 summarizes the fatigue behavior of the specimens, WP5 is about the fabrication of prototype gears with the selected configuration and their evaluation on the test bench. This deliverable follows the work done in WP4, where the tribological and fatigue behavior of the specimens produced with the various configurations has been summarized. WP1 is related to the fabrication and characterization of the steel. WP3 is linked to WP4 for the application of different heat treatments to the tribological and fatigue specimens and the selection of the best conditions.

WP5 selects the most suitable steel and surface hardening technique for the fatigue test, on the specimens, to reproduce the working conditions of the gears loaded on both sides of the teeth. The analyzed material configuration is expected to lead to a better fatigue life. Considering that HEV/EV gears can be loaded on both sides of the teeth, the stresses they support will be reproduced by performing some fatigue tests, considering a load ratio of $R = -1$ instead of $R = 0$.