

Characterization of the Worn Surfaces of Brake Discs and Friction Materials after Dynobench Tests

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Abstract : Automotive braking systems must convert kinetic into thermal energy by friction. Nowadays, the disc brake system is the most widespread configuration on the automotive market, which its specific configuration provides a very efficient heat dissipation. At the same time, both discs and pads wear out. Different wear mechanisms can act during the braking, which makes the understanding of the phenomenon essential for the strategies to be applied when an increased lifetime of the components is required. In this study, a specific characterization approach was conducted to analyze the worn surfaces of commercial pad friction materials and its conterface cast iron disc after dynobench tests. Scanning electronic microscope (SEM), confocal microscope, and focus ion beam microscope (FIB) were used as the main tools of the analysis, and they allowed imaging of the footprint of the different wear mechanisms presenting on the worn surfaces. Aspects such as the temperature and specific ingredients of the pad friction materials are discussed since they play an important role in the wear mechanisms.

Keywords : wear mechanism, surface characterization, brake tests, friction materials, disc brake

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