Investigations around thermal and tribological contributions on Carbon/Carbon composite's wear

H. Bergère [a,b,c]; A. Saulot [a *]; J-P. Noyel [b]; C. Changenet [b]; V. Ripard [c]

*aurelien.saulot@insa-lyon.fr

[a] INSA Lyon, CNRS, LaMCoS, UMR 5259, 69621 Villeurbanne, France

[b] Univ Lyon, ECAM LaSalle, LabECAM, 69005 Lyon, France

[c] Safran Landing Systems, 69100 Villeurbanne, France

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ABSTRACT

Investigations around Carbon/Carbon (C/C) have known a growing interest as the industrial applications are significant. Those composites are commonly used in high performance break disks systems, notably in the aeronautical field.

As this material presents a low density and a stability of its mechanical and thermal properties at very high temperatures, it appears as the best candidate to assure the efficiency of breaking operations.

Many studies have been led to understand wear mechanisms of C/C composites. Gouider [1] investigated the physicochemical reactions occurring during the brutal transition of friction coefficient. Kasem *et al*. [2] shown the correlation between the wear mechanism, the detachment of particles and the CO_2 production. Thermal aspects are also significant as it impacts the wear rate.

To simulate the mechanical aspects of C/C friction, different strategies have been adopted. Both Finite Elements Method (FEM) and Discrete Elements Method (DEM) have been used through different studies. The first describes the mechanical behaviour of the material heterogeneities and the second presents the damages on the first-bodies and the creation of the third body. Thermal approaches are needed to complete those simulations.

The objective of this study is to introduce a strong thermal and mechanical coupling in a FEM model aiming to explain the behaviour of C/C composites under tribological conditions.

Numerical simulations and experiments on a pin/disk tribometer will be led simultaneously, and the measurements will either validate the model's coherence or reveal its limits.

REFERENCES

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