IMPACT OF THE SURFACE FINISH ON GEAR TOOTH FRICTION

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ABSTRACT
In mechanical transmissions, gear tooth friction is a significant source of power loss. The contact of gear teeth under load leads to sliding, which generates frictional power losses that dissipate heat at the contact area. It is essential to assess this loss when designing a mechanical system.

The Instantaneous power loss resulting from tooth friction depends on the sliding speed, the coefficient of friction and the normal load along the line of action. Various formulations exist to evaluate the friction coefficient. For example, ISO TR 14179-2 [1] presents an average friction law, while the Benedict-Kelley's [2] and Diab's [3] models present a local friction law.

Optimising tooth friction is crucial to meet the growing demands of the industry. In this context, this research aims to determine the effect of surface finishing on reducing the friction coefficient and, consequently, reducing the power losses.

To investigate the impact of surface finish on gear friction, Diab's model, developed from experiments using LaMCoS MBDHP (Machine Bi-Disques Haute Performance) twin-disc machine, was used. Discs with different surface finishes were tested. A model illustrating the observed variations is presented.

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