



DOTTORATO DI RICERCA IN INGEGNERIA MECCANICA

DIPARTIMENTO DI INGEGNERIA MECCANICA, NUCLEARE E DELLA PRODUZIONE
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AVVISO DI CONFERENZA

Lunedì 28 maggio 2007
Aula Piano Terra DIMNP
Ore 15.30 ÷ 16.30

SCUFFING AND MICROPITTING FAILURES OF GEAR TOOTH CONTACTS: THE ROLE OF LUBRICATION.

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Scuffing and micro-pitting are important failure modes of power transmission gears, and are not well understood. Both are related to the lubrication mechanism in terms of:

- the ability of the lubricant film to separate the tooth surfaces,
- the extreme surface loading caused by interaction of surface asperity features.

The problem of elastohydrodynamic lubrication (EHL) of rough surfaces will be discussed and the formulation of a coupled approach to enable transient numerical solutions to the problem to be obtained will be presented. Results of analyses will be given examining the correlation of lubricant film breakdown as calculated by analysis with experimental occurrence of scuffing failure in rolling/sliding contacts. Use of the calculated transient pressure and shear stress fields occurring in such contacts as a basis for a surface fatigue evaluation of the contacting bodies will be discussed and results presented comparing Critical Plane and Damage Accumulation models applied to a typical gear tooth roughness profile.

Keywords: Elastohydrodynamic Lubrication, rough surfaces, scuffing, micropitting, heat partition, gears.

Pwt Evans is a Professor of Mechanical Engineering at Cardiff University. He studied Mathematics at Exeter University at undergraduate and doctoral level before embarking on a research career at Cardiff University in Mechanical Engineering. He has researched Elastohydrodynamic Lubrication problems with a particular emphasis on numerical analysis of the topic. The main applications with which he has been concerned are in gearing in both naval, automotive, and aerospace applications. He has been a Faculty Member at Cardiff University since 1983 acting as Director of Studies for Mechanical Engineering from 1998 to 2003. He was awarded a DSc in 2003 and has published some 100 technical papers, mainly in the field of EHL. Since 2002 he has been the Editor of *The Journal of Engineering Tribology*, which is one of the constituent parts of the Proceedings of the Institution of Mechanical Engineers.