

## Séminaire commun LaMCoS-Ecole Doctorale MEGA Mécanique, Energétique, Génie Civil, Acoustique

# Grease Lubrication of Rolling Element Bearings – Fundamental Mechanisms and Predictive Models

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Greases form an extremely important, although scientifically neglected, group of lubricants. Over 90% of rolling element bearings are grease lubricated yet little is known of the basic lubrication mechanisms involved. The primary role of the grease is to form a lubricating film, which separates the rubbing surfaces thus reducing friction and wear, and preventing failure. The performance and life of the bearing is essentially determined by the lubricant film thickness in the raceway/roller contact. However in contrast to fluid film lubrication it is impossible to predict this value from basic grease properties and bearing operating conditions. Thus it is impossible to make an informed choice of grease for a particular application or to determine bearing safe-operational limits.

The talk will describe recent research, which has concentrated on the development of physical models to describe lubrication processes in a bearing. This includes an understanding of the basic lubrication mechanisms and the influence of bearing operation and design parameters. The most important factor determining film thickness in the roller/raceway contact is the lubricant supply and replenishment of the rolled track. Grease lubricated bearings often operate under starved or semi-starved conditions and the film thickness can be significantly less than the full-flooded value. The effect of lubricant properties and bearing design and operation on the lubricant supply to the raceway will be examined. The talk will conclude with an overview of the most recent work to develop a predictive model for grease lubrication.