

THE CHARACTERISTICS OF FRETTING WEAR

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The characteristics of fretting wear are reviewed. Fretting damage depends on slip amplitude and classified into three groups: (1) an annular damage according to Mindlin's analysis at microslip region, (2) strong adhesive deformation without loose wear particles at the intermediate region, and (3) formation of fine oxide particles at the gross slip region. The critical slip amplitude of fretting is the boundary between (2) and (3). The boundary slip amplitude depends on normal load. The wear rate increases and saturates with increasing slip amplitude. But it is constant by considering the critical amplitude. The role of oxide particles are discussed. Three different actions are noted: accelerating wear, preventing wear and insignificant effect. The oxide shows two opposing effect depends on normal load and slip amplitude. This is related to the removal rate from the interface (abrasive action) and compaction rate at the interface to form a protective layer. The effect of oxidation is significant to determine the wear and friction. The diffusion of oxygen is restricted at the small amplitude. As a result, crack formation at the boundary is a predominant damage, related to fretting fatigue damage.

(This talk will be modified from the presentation at Int. Symp. Main Engineering, Yokohama, 1995. It will take me 45 minutes to talk using OHP, and I would like to introduce the activity of CCRD, Iwate Univ. and in Japan for 5minutes.)