



acoustic microscopy

Fatigue cracks in a bearing alloy

The early stages of metal fatigue are dominated by the formation and growth of short fatigue cracks, not more than a few grain diameter in size. Since at these lengths the cracks grow very slowly this regime can dominate the fatigue life; indeed these cracks can stop growing altogether and so prove benign. Their behaviour cannot be described by fracture mechanics, and therefore it is vital to be able to study and measure their growth.

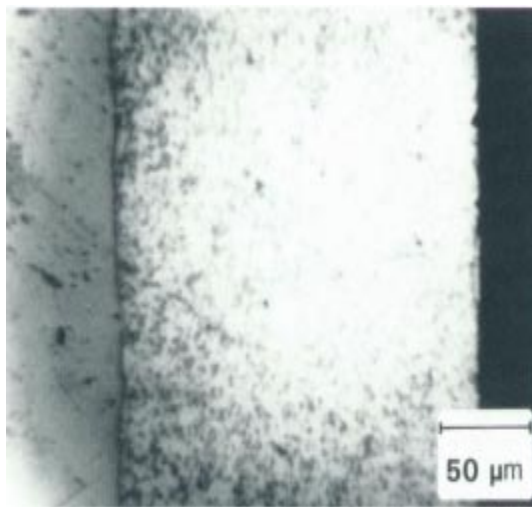


Fig. a: Optical image

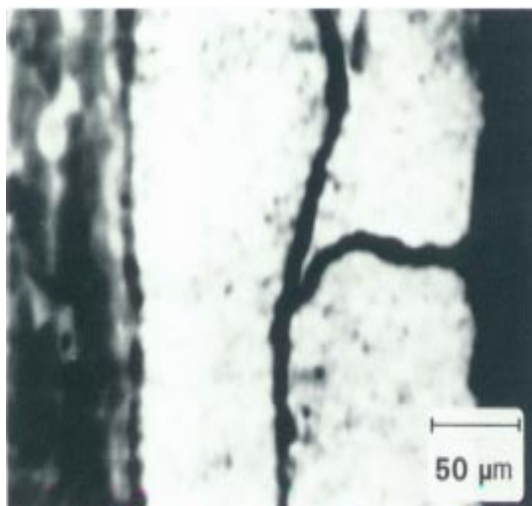


Fig. b: Acoustic image

Courtesy of Oxford University

This bearing alloys was made of Al-20% Si, and had been tested for fatigue resistance. The fatigue cracks are quite difficult to see in the optical image, but in the acoustic image they are revealed rather more clearly