
REVIEWED BY RICHARD C. ROSENBERG

This, the first book devoted exclusively to the subject of fretting corrosion, is a welcome addition to the literature. In the past, discussion of this subject has been limited to either a single chapter in corrosion books or to the subject of a symposium.

Fretting is encountered in machine elements which experience either relative motion or vibration. Bearings, couplings, seals, and wire ropes are among the most commonly affected parts. This book treats the subject for engineers who are trying to prevent fretting, and for scientists who are trying to understand the mechanism of fretting.

The author, a frequent contributor to the literature in this field, is well qualified to write such a book. Currently, a Reader in Metallurgy at the University of Nottingham, he has spent more than 20 years studying fretting corrosion. His background in both tribology and metallurgy provide him with the unique qualifications needed to write this book.

The Introduction tends to be confusing because after stating the definitions for fretting and fretting corrosion as described by the Organization for Economic Cooperation and Development, the author disagrees with these definitions and then provides his own. Following the Introduction, the author covers the theoretical aspects of contact and the experimental methods of investigating surfaces and surface contacts. While the coverage of the mechanical aspects of surface contact is adequate, the influence of surface films (such as oxides) could have received more attention.

Practical examples of fretting are dealt with in the next chapter. These examples range from the fretting fatigue observed in riveted joints to the fretting of nuclear reactor fuel elements.

Chapter 5 deals with the experimental methods used to study fretting corrosion. In this chapter, the author shows 15 different experimental devices which have been used to produce fretting corrosion. More space than necessary is probably devoted to these apparatuses, considering their limited interest to the potential audience. The characteristics of fretting damage and the effects of variables on fretting are discussed in the next two chapters. The influence of fretting on the initiation of fatigue cracks is covered in the following chapter. Next the author covers the influence of fretting on the adhesive behavior of metals, followed by an interesting chapter on the electrochemical and corrosion aspects of fretting. Methods of preventing fretting damage are dealt with next. Some of the material contained in the last chapter, on the mechanics of fretting, could have been covered earlier in the book.

As the first book in this field, the author has done a remarkable job of providing the reader with current information about fretting corrosion. The 265 references will be valuable to anyone wishing to explore this subject further. This book can be recommended for engineers who are faced with problems in fretting and fretting corrosion. For these people, it provides a large number of solutions to fretting problems and explanations as to why these solutions work. This is not an easy task since the prevention of fretting often involves two apparently conflicting solutions. In some cases, relative motion between the surfaces is increased to prevent damage while in other cases motion must be eliminated. Researchers in the field will find the book of interest because the author has compared the works of different investigators and drawn the results of these investigations into concise conclusions.

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INTRODUCTION: The following paper is intended to inform on the subject at hand and is based on years of laboratory observations. Fretting motion, fretting wear, fretting corrosion: what does it all mean and can it be prevented or at least mitigated? What is fretting? Photo courtesy of Samtec. Evaluation techniques for fretting corrosion properties of metallic biomaterials in air and in pseudo-body fluid and the representative results are reviewed. Two-stage fatigue test, consisting of the initial fretting fatigue test and the subsequent pure fatigue test, was adopted to investigate whether crack initiation or propagation dominates for femoral heads. Conference Paper. Full-text available. Corrosion and Fretting Corrosion. A Glossary. Results Fretting and corrosion scores were lower for the stems in the ceramic head cohort (p = 0.03). Stem alloy (p = 0.004) and lower stem flexural rigidity (Spearman’s rho = -0.32, p = 0.02) predicted stem fretting and corrosion damage in the ceramic head cohort but not in the metal head cohort. The mechanism of mechanically assisted crevice corrosion was similar in both cohorts although in the case of ceramic femoral heads, only one of.