Surface Treatment VI

Computer Methods and Experimental Measurements for Surface Treatment Effects

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Preface

This book contains some of the papers presented at the Sixth International Conference on Surface Treatment that was held on the island of Crete (Greece) in March 2003. The conference was organized by the Wessex Institute of Technology of the UK. Previous conferences in the series have been held in Southampton (1993), Milan (1995), Oxford (1997), Assisi (1999) and Seville (2001).

The aim of the Surface Treatment conference series is to encourage international cooperation amongst scientist and engineers and to exchange new ideas. The book deals with fundamental and applied concepts in the interdisciplinary field of surface engineering, in particular focusing on the interplay between applied physics, materials science and engineering, computational mechanics and mechanical engineering.

About two decades ago the emergence of the subject 'surface treatment' had been greatly driven by the realization that the surface is usually the most important part of any engineering component. Structural components fail by wear, corrosion, high cycle fatigue etc., that is to say affected and initiated by the surface conditions. Consequently, an appropriate approach is to modify the surface layer of a base- material or coat it, so as to provide an enhanced performance. However, in many cases it is the combination of effects, e.g. of wear and corrosion, that is causing the damage and as a result this complexity makes the field of surface engineering so challenging. For instance, a thin protective layer against corrosion could be easily removed in a wearing situation, which requires a different approach when corrosion and wear properties are separately of importance. Unfortunately, there exists an almost bewildering choice of surface treatments that cover a wide range of thickness. The choice has to be such that the surface treatment does not impair too much the properties of the substrate for which it was originally chosen, that is to say it should not significantly reduce, for instance, its load carrying capabilities. This aspect of the substrate has been frequently overlooked in surface engineering with too much of an emphasis on the protective coating itself. The aforementioned aspects are reported and discussed in this book.

In particular, the focal point in this book is on surface coating, damage mechanics, residual stress effects, laser surface treatment and mechanical surface treatment. Special emphasis was given to the application of advanced theoretical and experimental approaches.

Thanks are due to the authors for their interesting contributions. The editors are also grateful to the members of the International Scientific Advisory Committee, who have helped to review the abstracts and the scientific papers to ensure the quality of the conference and this book.

The Editors,
Crete, 2003

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