

Advances in Industrial Tribology

Proceedings of the International
Conference on Industrial Tribology
December 2-5, 1997, Calcutta, India

Editor
J Bhatia



Twenty five years of
tribology in India



TRIBOLOGY SOCIETY OF INDIA

Advances in
INDUSTRIAL TRIBOLOGY

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Editor

J. BHATIA

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Foreword

Publication of this important volume of proceedings of ICIT 97 marks the completion of twenty-five eventful years of tribology in India. It is indeed a privilege to be associated with this work, which represents state-of-the-art theoretical and experimental studies being carried out in the inter-disciplinary field of industrial tribology in different parts of the globe. The response to the call for papers for ICIT 97 was overwhelming and the task of selecting a final compendium a daunting responsibility. Fortunately, I was able to draw upon the resources of a highly experienced editorial team, each member of which was a specialist in the chosen field, thereby reducing my personal effort to that of supporting the section editors for maximum synergy (and minimum friction!). This volume has also benefitted from contributions from a number of internationally renowned tribologists and professional technocrats who readily came forward with their special papers on our request. More than anything else, this is all a fitting tribute to the silver jubilee year of an applied science which is beginning to find its justifiable place on the industrial map of our developing country.

On behalf of the editorial committee, I take this opportunity to thank all our contributors, including those whose papers could not be accommodated, for enriching our level of awareness and understanding of this complex science. It is to be hoped that the reader of this compendium will also find it an equally rewarding and enriching experience.

J. BHATIA

Editor & Chairman of the Technical Committee

From the Organising Secretary

The World Conference on Industrial Tribology held in New Delhi in 1972 marked a significant milestone in the development of the Science of Tribology in India. Since then, National level conferences have been held every alternate year to provide a forum for exchanging new ideas and sharing valuable experiences with a view to maximising the benefits from the advances in Tribology to industry as well as research and academic institutions. The pioneering efforts, starting with the 1972 Conference, resulted in the formation of the Tribology Society of India (TSI). The Tribology Society of India is now celebrating 25 years of Tribology in India with the International Conference on Industrial Tribology (ICIT-97) being held at Calcutta.

The theme of the Conference—*War Against Wear*—was chosen considering its particular relevance to the stage of economic and technological development that our part of the world is in today. It is hoped that the theme would underline the gravity and urgency of the need to adopt sound tribological principles and practices.

ICIT-97 is being organised by Balmer Lawrie & Co. Ltd. and Balmer Lawrie -Fuchs Ltd. under the aegis of TSI. On behalf of the organisers I thank the Executive Committee of TSI for granting us the privilege and opportunity.

ICIT-97 is the result of inspired team effort. Apart from numerous colleagues from Balmer Lawrie, Balmer Lawrie - Fuchs and the Executive Committee of TSI, I am grateful to tribologists and other professionals who have contributed to this venture. I would like to thank the Patrons and the Advisory Committee members for their valuable encouragement and guidance, as also the sponsors, donors and others who have contributed to support the Conference.

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