

Wire Ropes

Klaus Feyrer

Wire Ropes

Tension, Endurance, Reliability

With 178 Figures and 51 Tables

Second Edition

 Springer

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Preface

The present book *Wire Ropes* is again dedicated mainly to all users of wire ropes—construction engineers, operators and supervisors of machines and installations with wire ropes. It has been the main concern of this book to present the methods used to calculate the most important rope quantities (rope geometry, wire stresses in the rope under tension, bending and twist, rope elasticity module, torque, rope efficiency, the bearable number of load cycles or bending cycles and the discard number of wire breaks, etc.) as well as to explain how they are applied by means of a large number of example calculations.

Since 2007, after the first edition of the book *Wire Ropes* was presented, a row of research works in the field of wire ropes has been conducted. Important examples are the wire rope twist and the size effect. The results of these works are introduced in the book by discussing their influence on the existing knowledge. The practical calculation work will be assisted by mentioning the right Excel program.

It would not have been possible to revise the book after my retirement so simply without the support and encouragement of Professor Dr.-Ing., Dr. hc. K.-H. Wehking, the head of the Institut für Fördertechnik und Logistik, Universität Stuttgart. I am extremely grateful to Professor Wehking for his advice and support and for being able to use the infrastructure of the institute. There have also been many enlightening discussions held with Prof. em. Dr. techn. Prof. E.h. Franz Beisteiner, the former head of the institute. I would like to thank him very much indeed for his constant readiness to have a discussion and for his sound advice which helped to clarify many a point in question. In the same way, I would also like to thank all members of staff at the institute for their readiness to discuss details and especially for their willingness to help promptly in solving any computer problems that arose.

From the first edition remains the polishing of my English by Mrs. Meryll Zepf with a great deal of understanding for the project. I am extremely grateful for all her efforts. The English polishing of my corrections to the second edition comes from Springer Verlag. For that and the pleasant cooperation all my thanks go to Dr. Christoph Baumann, Almas Schimmel, and the staff of Springer Verlag.

Putting together the compilation of what we know about wire ropes today—even though there are probably some gaps—was certainly made easier by the Organisation pour L'Étude de L'Endurance des Cables (OIPEEC). During the past

few decades, the OIPEEC has developed into the most important forum for discussing questions in connection with wire ropes. I am very grateful to my colleagues at the OIPEEC for their very stimulating discussions. The same is true for the members of the DRAHTSEIL-VEREINIGUNG e.V. (Wire Rope Association, Germany). Furthermore, I would also like to thank the wire rope manufacturers who have been interested in and supportive of the wire rope research from the very beginning and have helped enormously by donating nearly all the wire ropes the Institut für Fördertechnik Stuttgart ever tested.

Even though extreme care is always taken, it is hardly possible to print a book that has absolutely no errors. This is true for this book as well. Because of this a list has been created where any printing errors or inaccuracies can be entered. The latest version of this list of corrections can be found in the Internet under: <http://www.uni-stuttgart.de/ift/update.roke>

For complicated calculations there are again Excel programs that can be downloaded free of charge from the address:

<http://www.uni-stuttgart.de/ift/forschung/berechnungsprogramme>

To make the list of corrections as comprehensive as possible, I would like to ask all readers for their assistance to report any mistakes found to the following address:

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