



# HANDBOOK OF FATIGUE TESTING

Sponsored by ASTM Committee E-9  
on Fatigue

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S. Roy Swanson, Editor

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## Foreword

In 1949 Committee E-9 on Fatigue published *ASTM STP 91, Manual of Fatigue Testing*. The project leading to *STP 91* involved the specific writing of eight members of E-9 and the discussions and criticisms of members of the main committee over a period of three years. *STP 91* was a modest effort and succeeded in presenting what was then considered to be the current practice and views of E-9 members.

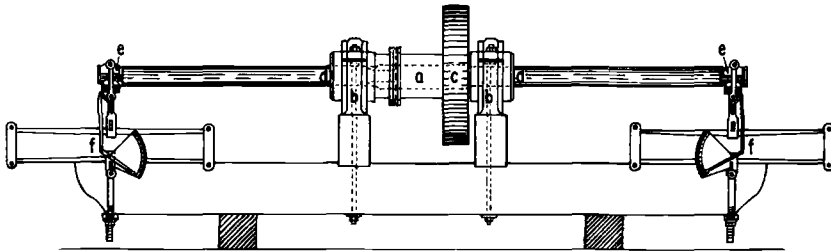
The present *Handbook of Fatigue Testing* is the culmination of an extensive attempt to survey and document the broad facets of fatigue testing. Subject matter was provided by a large number of E-9 members to an editorial group initially headed by Foster B. Stulen and Professor S. M. Marco, both of whom are now deceased. Consolidation of this input has been completed under the editorship of Dr. S. Roy Swanson, with some major changes in emphasis. The reader will find a definite attempt to discuss fatigue machines, test techniques, and associated equipment that can satisfy the requirements of a modern research person or test engineer. More often than not, their needs reflect the desire to test material, components, and structures under conditions that clearly simulate service loading and environments.

As Chairman of Committee E-9, I am grateful for the time and effort that Dr. Swanson put into completing this handbook. I am also grateful to those individuals specifically cited in the Editor's brief Preface.

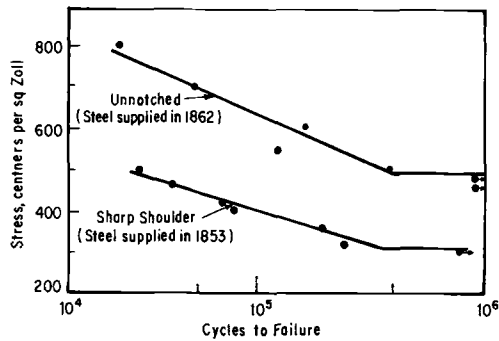
W. S. Hyler, Chairman  
ASTM Committee E-9 on Fatigue

Zeitschr. f. Bauwesen 1860

Apparat zum Probiren der Widerstandsfähigkeit  
von Wagen-Achsen gegen wiederholte Biegungen.



*Wöhler's machine for fatigue testing of railway axles.*



*Wöhler's S-N curves for Krupp axle steel.*

## Preface

This handbook contains contributions from a large number of ASTM Committee E-9 members. My task has been to take this information and distill it into a unified theme. Because of my background and interests, the unified theme embraces fatigue testing under simulated loading conditions. For this reason, there is considerable emphasis on servocontrolled fatigue test systems and allied equipment. This concentration on modern equipment appears to be particularly important for the young research worker or test engineer, since it is this sort of equipment to which he will be introduced.

I should like to recognize with special gratitude those individuals who have spent long hours reviewing and criticizing the various drafts. Specifically, I would like to thank John Bennett, Ron Broderick, Horace Grover, Herbert Hardrath, Walter Hyler, Harold Reemsnyder, and Dick Thurston. These gentlemen formed the review board which has guided my efforts over the past few years.

S. Roy Swanson  
Editor

## **Related ASTM Publications**

**Manual on Low Cycle Fatigue Testing, STP 465 (1970), \$12.50,  
04-465000-30**

**Cyclic Stress-Strain Behavior—Analysis, Experimentation, and  
Fatigue Prediction, STP 519 (1973), \$28.00, 04-519000-30**

**Fatigue at Elevated Temperatures, STP 520 (1973), \$45.50,  
04-520000-30**

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