



***EVALUATION  
OF  
WEAR TESTING***

 **STP 446**

**American Society for Testing and Materials**

# EVALUATION OF WEAR TESTING

A symposium  
presented at the  
Seventy-first Annual Meeting  
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## Foreword

The Symposium on Evaluation of Wear Testing was given at the Seventy-first Annual Meeting of ASTM held in San Francisco, Calif., 23-28 June 1968. The sponsor of this symposium was the Committee on Simulated Service Testing. R. E. Peterson, Westinghouse Research Labs., presided as symposium chairman.

## **Related ASTM Publications**

Relation of Testing and Service Performance, STP 423  
(1967), \$7.50

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# Introduction

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This symposium was sponsored by the Committee on Simulated Service for two reasons: (1) the subject is of major engineering significance, and (2) it is believed that ASTM has an important role in the development of test methods and procedures and in evaluating their relation to service performance.

The number of millions of dollars spent annually for replacement parts cannot be stated exactly, but it is, in any event, an enormous cost; in addition there are additional "consequential" costs. A representative of a manufacturer of earthmoving equipment states that from a material applications standpoint, there are essentially two problems—wear and fatigue. Fatigue is technically well in hand, but wear has not been brought to the same degree of rationalization.

Professor Lipson, who conducts Summer Conferences on Wear at the University of Michigan, states:<sup>1</sup>

Wear occurs in a wide variety of operations, and in some industries the annual cost of replacing worn parts is a major expense. Wear is important in engineering practice; it is often the major factor limiting the life and the performance of machine components. For example, a completely worn 5 ton truck often weighs five pounds less than it did when new.

Wear varies from thousandths of an inch in pistons and other machine parts, to tenths of an inch in railway wheels (as discussed by Ishii in a paper in this volume), to inches in the cement industry and in mining and ore reduction equipment (as discussed by Norman and Hall in a paper in this volume).

The field of wear has received consistent attention in Europe, owing possibly to a tradition of more careful conservation of resources. The international journal *Wear*, published in Holland (in English), is now in its eleventh year; its editors, G. Salomon and A. W. J. deGee, head of Tribology Department, Metal Research Institute, TNO, Delft, have co-authored a paper in this volume. In an editorial<sup>2</sup> Salomon points out that the number of Russian papers on wear more than doubled in a seven year period, with practical attention to wear in farm machinery, rails, locomotives, tractors, pumps, propeller blades, chains, brake blocks, and similar items.

<sup>1</sup> Lipson, C., *Wear Considerations in Design*, Prentice-Hall, Englewood Cliffs, N. J., 1967, p. 1.

<sup>2</sup> Salomon, G. "Trends in Research on Wear," *Wear*, Elsevier, Amsterdam, Vol. 6, 1963, p. 1, 3.

From the standpoint of test equipment the following viewpoint<sup>2</sup> is of interest.

Only fifteen years ago friction and wear machines were frequently hybrids, useful neither for research nor for testing. . . . We have reached a stage when metallurgists, polymer chemists, and physicists have machines at their disposal that yield *significant figures* and therefore become powerful tools in the search for better materials and improved surfaces.

It is hoped that this symposium will be the initial step in developing an activity in ASTM in wear test methods and their evaluation in relation to service performance.

*R. E. Peterson*

Consultant, Westinghouse Research  
Labs., Pittsburgh, Pa. 15235;  
symposium chairman.

