SYMPOSIUM ON SHEAR AND TORSION TESTING

INTRODUCTION

By Raymond W. Fenn, Jr.[1]

Subcommittee 25 on Shear and Torsion Tests of ASTM Committee E-1 on Methods of Testing sponsored this symposium with the intention of providing a comprehensive review of shear and torsion test methods and developing information which would be useful to the subcommittee in establishing tentative recommended shear and torsion test practices. Specifically the objectives of the symposium were: (1) to present detailed descriptions of new or existing shear and torsion test methods as used on a wide variety of materials; (2) to determine the test variables in these test methods and to evaluate the effect of these variables on the test results; (3) to compare test results using different test techniques or conditions; and (4) to describe the advantages and disadvantages of the various test techniques.

In past years considerable effort has been spent by certain product committees in developing standard shear test methods for adhesives, elastomeric vulcanizates, plastics, plywood, wood rubber cements, soil and road surfacing materials. However, little standardization between shear methods on various materials has been accomplished. Considerable work in the metals field has led to the development of several shear test methods but none seems to have gained universal acceptance. Consequently, the writing of recommended shear test practices under the sponsorship of ASTM Committee E-1 has been delayed.

Several methods of measuring shear strength have been devised which will rank materials. However, it is difficult to find a test which will give the pure shear strength of a material because of the complex stressing usually encountered in shear testing. Four of the papers deal with the measurement of shear stress. F. Zandman presents a basic method of measuring shear stress while C. S. Yen and E. J. Zapel show the stress distributions in single shear and double shear sheet specimens respectively. N. A. Freytag presents a similar study on spot-welded steel. L. R. Lunsford and R. S. Shane discuss the problems of surface preparation and shear testing of adhesive-bonded metal-to-metal joints. E. W. Kuenzi and W. G. Youngquist give a comprehensive review of the shear and torsion test methods used to evaluate forest products. C. E. Waller and M. L. Stehsel show how conventional torsion testing techniques can be applied to exceptionally high temperature. Two papers were not presented orally with the

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other symposium papers but are included in the symposium volume, namely a paper by Mr. E. L. Bryan on photoelastic study of the shear stress distribution in the panel shear test for plywood and a paper by Messrs. M. E. Raville, W. B. Bickford and D. A. Huber on a dynamic test for determining the shear modulus of sandwich core materials. R. B. Clapper has summarized the important contributions of the symposium authors and has made an excellent review of the state of the art in shear testing today.