Pendulum Impact Machines

Procedures and Specimens

T. Siewert, M. Manahan, C. McCowan, Editors

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Pendulum Impact Machines: Procedures and Specimens

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Foreword

This publication consists primarily of the papers presented at the Second Symposium on Pendulum Impact Machines: Procedures and Specimens, sponsored by ASTM Committee E28 on Mechanical Testing and its Subcommittee E28.07 on Impact Testing. The Symposium was held on November 10, 2004 in Washington, D.C., in conjunction with the standards development meetings of Committee E-28. The Symposium was organized to commemorate the development of and rapid advancement of instrumented impact testing about 100 years ago, and to discuss some current issues.

This book includes the nine papers presented at the Symposium and another one submitted only for the proceedings (with lead author Vigliotti). The papers are organized into four sections by topic: Historical Developments in Impact Testing, Impact Test Procedures and Machine Effects, Reference Specimens, and Issues with Instrumented Strikers. The symposium was chaired jointly by Tom Siewert and Chris McCowan, of the National Institute of Standards and Technology, and Michael P. Manahan, Sr., of MPM Technologies, Inc.

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SESSION IV: ISSUES WITH INSTRUMENTED STRIKERS

Overview

In the past, ASTM Subcommittee E28.07 (and its predecessor, E-1.7) has sponsored seven symposia on impact testing, published in Proceedings of the Twenty-Fifth Annual Meeting (1922), Proceedings of the Forty-First Annual Meeting (1938), STP 176 (1956), STP 466 (1970), STP 1072 (1990), STP 1248 (1995), and STP 1380 (1999). These symposia covered a broad range of topics and occurred rather infrequently, at least until 1990. The period before 1990 might be characterized as one in which the Charpy test procedure became broadly accepted and then changed very slowly. However, the last three symposia, "Charpy Impact Test: Factors and Variables", "Pendulum Impact Machines: Procedures and Specimens for Verification", and "Pendulum Impact Testing: A Century of Progress", were driven by new forces: a recognition within ISO Technical Committee 164 - Subcommittee 4 (Pendulum Impact) of some shortcomings in the procedure, and a growing interest in instrumented impact testing. These STPs (1072, 1248 and 1380), proved to be of interest to many general users of the test, but were of particular interest to the members of ASTM Subcommittee E28.07 (the subcommittee responsible for Standard E-23 on the Charpy test). During the past 15 years, the data presented at those Symposia have been the single most important factor in determining whether to change various requirements in Standard E-23. The data have also been useful in supporting tolerances and procedural details during the reballoting of ISO Standard 442 (now ISO 148-1) on Charpy testing, and in the refinement of instrumented impact test procedures.

Several years ago, the E28 Subcommittee on Symposia suggested that it was time to schedule another symposium on Charpy impact testing. Once again, we would bring together impact test researchers from around the world to share their latest discoveries and to provide input for further improvements in the test standards. We also discovered that instrumented impact testing was near its Centenary, and including a summary of the history seemed appropriate. In fact, the first paper reviews the very beginnings of instrumented impact testing, reported by Dunn in 1897 (an indirect method using a tuning fork, a light beam, optical film on a disk, and a "crusher gage") and a significant advance by Gargarin in 1912 (the direct and simultaneous measurement of force and displacement by use of a light beam, a low-mass mirror, and a spinning disk covered with optical film). Another paper on history traces the developments of impact test procedures over the past century. As noted in STP 1380, it seems as though the period of a century ago marked a time of the most rapid discovery and innovation in impact testing.

As in many of the previous symposia, the 2004 symposium was successful in attracting contributions from many countries. Because of its focus on measurement issues, the majority of the authors were from national measurement institutes and standardization societies.

The future of pendulum impact testing appears bright, as it continues to be specified in many construction codes and standards.

Acknowledgments

We appreciate the assistance of Committee E28, including both its Chairman, Earl Ruth, and its members, many of whom helped by chairing the sessions and recruiting abstracts.

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