METAL FORMING

Interrelation Between Theory
and Practice

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METAL FORMING

Interrelation Between Theory and Practice

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and Practice of Metal Forming, held in Cleveland, Ohio, in October, 1970

Edited by

A. L. Hoffmanner

Principal Engineer

Materials Technology

Equipment Group of TRW, Inc.

Cleveland, Ohio

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METAL FORMING: THE INTERRELATION BETWEEN THEORY AND PRACTICE

A Memorial Volume Dedicated to the Memory of Professor Horace Polakowski

It is infrequent that a man rises in the technical community to successfully contribute to both basic science and commercial technology. Horace Polakowski was one of those rare individuals destined by both ability and desire to significantly contribute to both.

This man not only attained eminence in the world of science as well as the world of technology, but literally spanned the globe in his work experience. He was fluent in English, German, Polish, and Russian and had a working knowledge of French and Italian.

He was born on December 4, 1914, in Poland, where in 1938, he obtained a diploma in engineering (mechanical engineering) from the Technical University of Lvov, Poland. His first technical experience was in industrial operations in Poland, a Mannesmann steel tube mill, a stamping and pressing shop, an alloy foundry, large military vehicle repair shops, and in a gray iron foundry. In 1939 he was awarded a fellowship to study at the University of Swansea but was unable to join the Metallurgical Engineering Department until after World War II. In 1948, he joined the University of Swansea and in 1952 was granted a Ph.D. in metallurgy. In 1950 he was awarded the Andrew Carnegie Silver Medal by the Iron and Steel Institute in London.

As a stateless person, Dr. Polakowski came to the United States to join the Armzen Company as Development Manager in 1953. Subsequently he joined La Salle Steel Company where he worked prior to becoming a member of the staff of Illinois Institute of Technology. He was appointed a full Professor at IIT in 1958. He published prolifically in many technical areas. In 1965 the University of Wales recognized his important technical contributions and conferred upon Dr. Polakowski a Doctor of Science.

In recent years his interest turned more and more to commercial applications of his extensive background in metalworking. As he so aptly put it he became "a consultant to the world." Equip-

ment designed according to his patents have found worldwide acceptance in the roller leveling of strip.

Truly, Dr. Natalis Horace Polakowski made unique contributions to metalworking science and technology. A recitation of his accomplishments unfortunately cannot truly do justice to the flavor of this man who could galvanize an audience, convulse his listeners with laughter, and at the same time bring to bear an incisive and inquiring mind on important technical problems.

This volume is indeed a fitting memorial. Horace Polakowski may have been a stateless person when he landed in the United States on December 28, 1953, but he was an illustrious citizen of the world when he died while returning after delivering a lecture series in Argentina in 1970.

Elliot S. Nachtman

January, 1971

FOREWORD

On October 21 and 22, 1970, the Shaping and Forming Committee, Institute of Metals Division, The Metallurgical Society of AIME, held a Conference on "The Relation Between Theory and Practice in Metal Forming" at the Sheraton-Cleveland Hotel during the Fall Meeting of AIME in Cleveland, Ohio. This conference was devoted to recent applications of theory to metal forming to establish a milestone in the current ability to predict phenomena during deformation processing and, thereby, demonstrate the utility of theory for process design. The papers were selected by first requesting presentations of relevant recent work from 68 recognized authorities in metal forming which resulted in 17 papers. A subsequent call for papers resulted in the submission of 19 abstracts from which 4 papers were selected. The selection criteria required that the paper coupled theory with practice, and that the work was recent, unpublished and worthy of permanent record. The selection was performed by the Conference Chairman.

The papers in this volume have been organized in accordance with the following subjects:

Extrusion
Drawing and Sheet Metal Forming
Forming Loads and Friction
Workability

These papers appear to assess the salient recent applications of mechanics to the deformation processing of alloys at the present time, i.e., circa 1970.

A. L. Hoffmanner
Conference Chairman

May, 1970

LIST OF CONTRIBUTORS

Taylan Altan, Metalworking Division, Columbus Laboratories,
Battelle Memorial Institute, Columbus, Ohio

W. A. Anderson, Physical Metallurgy Division, Alcoa Research
Laboratories, New Kensington, Pennsylvania

Betzalel Avitzur, Professor of Metallurgy and Materials Science,
Lehigh University, Bethlehem, Pennsylvania

C. Baker, Reynolds Metals Company, Richmond, Virginia

John T. Berry, Department of Mechanical Engineering, University
of Vermont, Burlington, Vermont

J. H. Brophy, Paul D. Merica Research Laboratory, The
International Nickel Company, Incorporated

T. Chandra, Department of Metallurgical Engineering, McGill
University, Montreal, Canada

H. Darlington, Homer Research Laboratories, Bethlehem Steel
Corporation, Bethlehem, Pennsylvania

Vincent DePierre, Air Force Materials Laboratory, MAMN, Wright
Patterson Air Force Base, Ohio

M. L. Devenpeck, Edgar C. Bain Laboratory for Fundamental Research,
United States Steel Corporation, Monroeville, Pennsylvania

R. W. Dunlap, Carnegie Mellon University, Pittsburgh, Pennsylvania

R. C. Gibson, Paul D. Merica Research Laboratory, The International
Nickel Company, Incorporated

H. W. Hayden, Paul D. Merica Research Laboratory, The International
Nickel Company, Incorporated

- D. O. Hobson, Metals and Ceramics Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee
- A. L. Hoffmanner, T R W Incorporated, Cleveland, Ohio
- J. J. Jonas, Department of Metallurgical Engineering, McGill University, Montreal, Canada
- L. J. Kashar, United States Steel Corporation, Monroeville, Pennsylvania
- Shiro Kobayashi, Department of Mechanical Engineering, Division of Mechanical Design, University of California, Berkeley, California
- E. H. Kottcamp, Jr., Homer Research Laboratories, Bethlehem Steel Corporation, Bethlehem, Pennsylvania
- S. A. Levy, Reynolds Metals Company, Richmond, Virginia
- Alan T. Male, Westinghouse Astronuclear Laboratories, Pittsburgh, Pennsylvania
- H. J. McQueen, Mechanical Engineering, Sir George Williams University, Montreal, Canada
- James A. Mullendore, Chemical and Metallurgical Division, Sylvania Electric Products, Incorporated, Towanda, Pennsylvania
- T. E. O'Connell, Carnegie Mellon University, Pittsburgh, Pennsylvania
- Malcolm H. Pope, Department of Mechanical Engineering, University of Vermont, Burlington, Vermont
- H. C. Rogers, Department of Metallurgical Engineering, Drexel University, Philadelphia, Pennsylvania
- R. W. Rogers, Jr., Physical Metallurgy Division, Alcoa Research Laboratories, New Kensington, Pennsylvania
- George Saul, Air Force Materials Laboratory, MAMN, Wright Patterson Air Force Base, Ohio
- John A. Schey, Department of Materials Engineering, University of Illinois, Chicago Circle, Chicago, Illinois
- Aly H. Shabaik, Assistant Professor of Engineering, University of California, Los Angeles, California

LIST OF CONTRIBUTORS

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Oleg D. Sherby, Department of Materials Science, Stanford University, Stanford, California

Conrad M. Young, Department of Materials Science, Stanford University, Stanford, California

Z. Zimmerman, Homer Research Laboratories, Bethlehem Steel Corporation, Bethlehem, Pennsylvania

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