NAMRC — IX

Ninth
NORTH AMERICAN
MANUFACTURING
RESEARCH CONFERENCE

May 19-22, 1981

The Pennsylvania State University
University Park, Pennsylvania

a continuing education service of
The Pennsylvania State University
College of Engineering
NAMRC-IX — Ninth North American Manufacturing Research Conference
May 19-22, 1981

TECHNICAL SESSIONS AND PROGRAM
Tuesday, May 19
6:00-8:00 p.m.
REGISTRATION — Main Lobby, Sheraton Inn, State College
Cocktail Hour — Sheraton Inn

Wednesday, May 20
9:00-9:05 a.m.
REGISTRATION — Main Lobby, Kern Building

9:00-11:00
OPENING SESSION — Auditorium, Kern Building
Chairman: J. Thuey, Chairman, Scientific Committee of NAMRC, Mechanical Engineering Department, McMaster University, Hamilton, Ontario, Canada
Speaker: Welcoming Address: Dr. John W. Dewald, President, The Pennsylvania State University
Opening Address: J. Thuey, Chairman, Scientific Committee of NAMRC
Announcements: Inviting Ram, Chairman of NAMRC-VK Organizing Committee, Department of Industrial and Management Systems Engineering, The Pennsylvania State University

10:00-10:05
Coffee Break — Multi-purpose Room, Keller Building

10:30-12:00 noon
SESSION 1 — Room 303, Keller Building
Chairman: A. L. Hoffmann, Battelle's Columbus Laboratories, Columbus, Ohio
L. Kolaj, McGill University, Montreal, Quebec, Canada

Authors:

"PIM Forging of Wear-Resistant Materials," G. W. Haldim and J. S. Horschorn, University of Wisconsin-Madison, Madison, Wisconsin


10:30-12:00 noon
SESSION 2 — Room 312, Keller Building
Chairman: B. F. van Turkovich, University of Vermont, Burlington, Vermont
J. T. Black, Ohio State University, Columbus, Ohio

Authors:

"Chip Compression Relationships in Metal Cutting," L. DeCirulis and T. Washeim, Technische Universitat of Denmark, Lyngby, Denmark

"A Metallurgical Investigation of Chip Morphology in Machining an AISI 1045 Steel at Various Speeds up to 10,000 SFM; R. Komanduri and J. Hazir, General Electric Company, Schenectady, New York

SESSION 3 — Room 305, Keller Building
Chairman: W. B. Lille, Co-Chairman of NAMRC-IX Organizing Committee
Luncheon Speaker: Professor William Rice, President of the Canadian Society of Mechanical Engineers, and Queens University, Canada

SESSION 4 — Room 303, Keller Building
Chairman: B. G. Thomas, University of California, Berkeley, California
R. P. McDermott, Michigan Screw Products, Center Line, Michigan

Authors:
"ALFID-A General Purpose FEM Program for Metal Forming," G. I. Ch, B. G. Landi, and T. Allen, Battelle Columbus Laboratories, Columbus, Ohio

"Machining With a Round-Nosed Form Tool," C. Berwanger, Campbell Fitting Co., Boyertown, Pennsylvania

"Identification and Evaluation of Sliding Joint Dynamics by Simplified Block-Model Models," M. Yoochim, Kyodo University, Kyoto, Japan
SESSION 11 — Room 312, Keller Building

Co-Chairmen:
W. B. Rice, Queen’s University, Kingston, Ontario, Canada
M. F. Dukov, University of Wisconsin, Madison, Wisconsin

Authors:
"Effect of Thermal Cycling on Tool Wear in Milling." J. Tushy and E. Orsolya, McMaster University, Hamilton, Ontario, Canada
A Study of Wear of Cemented Tungsten Carbide Tool." B. J. Ronganhart and C. V. Venkataram, Indian Institute of Technology, Madras, India

SESSION 12 — Room 365, Keller Building

Chairmen:
A. F. Gould, Lehigh University, Bethlehem, Pennsylvania
B. W. Niebel, The Pennsylvania State University, University Park, Pennsylvania

Authors:
"Automated Coding and Process Selection—ACAPIS." C. Emerson, V. Bend, and I. Ham, The Pennsylvania State University, University Park, Pennsylvania
"Group Technology Applications for Machine Loading Under Multi-Resource Constraints." K. Hirose, Kyoto University, Kyoto, Japan, and I. Ham, The Pennsylvania State University, University Park, Pennsylvania

SESSION 13 — Room 303, Keller Building

Chairmen:
B. Avizour, Lehigh University, Bethlehem, Pennsylvania
R. A. Kohars, University of Missouri-Rolla, Rolla, Missouri

Authors:
"Openning of Aluminum Rings During Ring Com- pression Test." D. Bhatnakhir, University of Auckland, New Zealand

SESSION 14 — Room 312, Keller Building

Co-Chairman:
M. C. Shaw, Arizona State University, Tempe, Arizona

Authors:
"Application of the Regeneration Spectrum Method to Workpiece Generative Chatter in Grinding." K. Sinnavan, Ohio State University, Columbus, Ohio

SESSION 15 — Room 305, Keller Building

Chairmen:
J. Harnar, General Electric Company, Warren, Michigan
E. R. DeVries, University of Illinois, Urbana, Illinois

Authors:
"Noise Control in Rotating Production Machine Inst- allations." J. Bollinger and J. Yerges, University of Wisconsin, Madison, Wisconsin

LUNCHEON — Colonial Room, Kitano Lion Inn (Sponsored by the Society of Manufacturing Ing- eeners)

Chairman:
Mark Sabol, Co-Chairman of NAMIC (DF Organiz- ing Committee)

Lunchroom Speaker:
Dr. M. E. March, Director of Research Planning, Cincinnati Milcor, Inc.

SESSION 16 — Room 303, Keller Building

Chairmen:
S. Kalpesh, Illinois Institute of Technology, Chicago, Illinois
A. T. Moos, Wensington Research and Develop- ment Center, Pittsburgh, Pennsylvania

Authors:
 SESSION 17 — Room 512, Keller Building
Convenor: S. Ramalingam, Georgia Institute of Technology, Atlanta, Georgia
G. F. Wilson, General Electric Co., Worthington, Ohio
Authors:
"Machinability of Cast Aluminum Alloys with Cubicle and Diamond Cutting Tools," J. G. Miller and S. E. DeVeau, Reynolds Metals Company, Richmond, Virginia

 SESSION 18 — Room 305, Keller Building
Convenor: N. P. Sier, Massachusetts Institute of Technology, Cambridge, Massachusetts
W. Lata, Burley Aircraft, Stratford, Connecticut
Authors:
"Investigation on the Effect of Geometry on the Limit Diameter in Sheet Metal Stretching," A. A. Ali-Gumbal and A. J. Bresnan, C.T.A., Sao Jose Campus, Sao Paulo, Brazil

 SESSION 19 — Room 303, Keller Building
Convenor: K. K. Wang, Cornell University, Ithaca, New York
G. D. Stobbe, ALOCA, Altoon Center, Pennsylvania
Authors:
"An Experimental Study of Some Problems on the Rotary Forging Technology," Wang Zhenhao, Henan Institute of Technology, Henan, People's Republic of China

 SESSION 20 — Room 306, Keller Building
Convenor: D. S. Feurer, University of Wisconsin, Madison, Wisconsin
R. L. King, Lackheed Missiles & Space Company, Los Angeles, California
Authors:
"Optimization Analysis of Automated Transfer-Type Multi-Item Manufacturing Systems," K. Kinomi and K. Yuta, Kyoto University, Kyoto, Japan

 Friday, May 22
 8:30 — 10:00 a.m.
 SESSION 21 — Room 305, Keller Building
Convenor: J. T. Barry, Georgia Institute of Technology, Atlanta, Georgia
G. D. Haggsel, University of Illinois, Urbana, Illinois
Authors:
"A Comparison of Hydrostatic Extrusion Versus Drawing As a Method of Producing Nialn Superconducting Wires," Y. T. Chou, B. A. Avitzur, V. Thapar, and T. S. Leonard, Lehigh University, Bethlehem, Pennsylvania
"A Theoretical and Experimental Investigation in Mutual Extrusion Forging," S. S. Sinha, P. C. Pasley, and S. Datta, University of Rochester, Rochester, India
SESSION 23 — Room 312, Keler Building

M. Field, Mettco Research Associates, Inc., Cincinnati, Ohio

Authors:

Preliminary Results with Ion Implanted Tools,
Synthetic Polyoxoxide Diamond (POD) Tools for Milling of Al-Alloys with High Silicon Content,
H. T. Koensloot and G. Chrysopolis, Cambridge, Massachusetts
Process Parameter Considerations in the Cutting Performance of TC6-Synthesized Carbide Cutting Tools,
N. G. Oldey, University of Rhode Island, Kingston, Rhode Island, and J. Ham, The Pennsylvania State University, University Park, Pennsylvania

SESSION 24 — Room 305, Keler Building

D. Heywood, University of Massachusetts Amherst, Massachusetts
W. Penland, Approx Corporation, Cincinnati, Ohio

Authors:

A TRS-I-Based CAD Program for Mold Design,
T. T. Kaya and K. K. Wang, University of Illinois, Urbana, New York
Ductile Fracture of Copper Produced in Continuous-Casting Process,
R. Godify, F. D. Neugier and G. T. Thomsen, University of California, Berkeley, California
Computer-Aided Analysis and Experimental Evaluation of a Bolt-Pass Schedule for Rolling of Round Bars,
P. C. Cohen, G. D. Lohdi, and T. Allan, Battelle-Columbus Laboratories, Columbus, Ohio

SESSION 25 — Room 303, Keler Building

F. W. Blau, Battelle-Columbus Laboratory, Columbus, Ohio
J. M. Hardy, John Deere & Company, Moline, Illinois

Authors:

Viscoelastic Analysis of Solid Phase Forging of Ultra-High Molecular Weight Polyethylene,
G. W. Blau, University of Wisconsin-Madison, Madison, Wisconsin
Meso-Finest Forging of Glass Fiber-EPoxy Laminate Using a Vibrated Punching Technique,
T. Okabe and Y. Koye, University of Tokyo, Tokyo, Japan

SESSION 26 — Room 312, Keler Building

E. Clark, Standard Steel, Birmham, Pennsylvania
G. H. Elbing, University of Colorado, Boulder, Colorado

Authors:

Surface Treatment of Cermeat Titanium Carbide,
P. D. Hancock and B. M. Kramer, Massachusetts Institute of Technology, Cambridge, Massachusetts
Application of PID Controller to Design of a Machine Tool Control System,
H. S. Cho, J. W. Lee, and C. S. Hong, Advanced Institute of Science, Seoul, Korea
Shear Angle Relationship in Cutting with Self-Propelled Rotary Tools,
A. A. Radwan, Cairo University, Cairo, Egypt

SESSION 27 — Room 305, Keler Building

D. L. Bunk, International Harvester Company, improvements
S. Hart, U.S. Army Armament R & D Command, Dover, New Jersey

Authors:

Optimizing Turning Operations With a Programmable Pocket Calculator,
J. Dalsko and R. Krachudden, University of Michigan, Ann Arbor, Michigan
An Investigation on Optimum Control of Metal Cutting Processes Based on Modern Control Theory,
K. N. Chen and H. H. Yang, Xian Jiaotong University, Xian, Shanghai, People's Republic of China
Multidegree Optimization of a Multi-Stage Production System,
S. Takehara, The Nippon Steel University, University Park, Pennsylvania, and K. Hiroi, Kyoto University, Kyoto, Japan

ENERGY CONSERVATION ASPECTS OF NEAR NET-SHAPE MANUFACTURING PROCESSES.
S. Rajapakse, I.I.T. Research Institute, Chicago, Illinois

LOCATION

Program sessions will be on the campus of the Pennsylvania State University in the town of State College, Pennsylvania, near the geographical center of the state on Route 32 and 322 and near Interstate 80. USAir/Allegheny Commuter Airlines provides numerous daily flights into State College Airport via Pittsburgh, Philadelphia, and Baltimore/Washington. The State College Airport is located five miles from campus with taxi and van service (on call) available at all times. Please check with your travel agent for current schedules. Private or charter aircraft may fly into State College Airport (I4): 359-5611. Aircraft can be accommodated overnight at the airport with fuel and maintenance services available. The reservations airport computer symbol is SCE.
REGISTRATION
Advance registration is important to the organizer of the conference, as adequate facilities and meeting space may be arranged only when the size of the group is known in advance. Please complete the attached advanced registration form and return by Monday, May 11, 1981. All registrations will be acknowledged and further information will be sent including campus maps, parking permits, travel information, etc.

Final registration will be conducted at the times and locations given below.

Tuesday, May 19, 6:00-8:00 p.m. — Lobby of the Sheraton Penn State Inn.

Wednesday, May 20, 8:00-9:30 a.m. — Lobby of the Kern Graduate Building, 8:30-11 a.m. — Lobby of the Conference Center.
Thursday, May 21, 8:00 a.m.—noon — Lobby of the Conference Center.

FEE
The registration fee of $200 per person includes two lunches, a bento box, coffee breaks, and hardbound copy of the NAMRC-IX Proceedings. There will be no on-site registration fees. The registration fee may be paid by cash, check, money order, or by a credit card through the Pennsylvania State University. Visa or MasterCard are accepted. Payment for registration fees must be made by check or credit card prior to the start of the conference. Substitutions will be accepted anytime.

 LODGING
A block of rooms for the conference has been reserved at the Sheraton Penn State Inn. Reservations should be made directly with the Sheraton by calling (814) 334-8454 or writing: Sheraton Penn State Inn, 240 South Pugh Street, State College, PA 16801. Be sure to state that you will be attending NAMRC IX. Free shuttle bus service will be provided between the Sheraton and all conference sessions.

A list of other area hotels and motels, provided by the State College Chamber of Commerce, is available upon request (indicate on the advance registration form).

 PARKING
For those who drive to campus, free parking is available in the visitors lot adjacent to the Conference Center. A special parking permit will be mailed upon receipt of the advance registration form.

LADIES PROGRAM
A tour of Penn State's campus, the only publically accessible water-filled cavern in America, and a special guided tour of The Pennsylvania State University's Art Museum and Galley have been included.

In addition to these activities, there are a variety of other interesting things to do at the University and in the State College area. University athletic facilities are available, and downtown State College offers many delightful shops and dining establishments.

TAX DEDUCTION OF EXPENSES
An income tax deduction is allowed for expenses of education (including registration fees, travel, meals, and lodging) undertaken to maintain and improve professional skills (see Treat. Reg. 1 162 S).

PROCEDINGS
All participants in the conference paying the registration fee will receive one hardbound copy of the NAMRC-IX Proceedings. Those who wish additional copies, at $30 each, may order them in advance or at the conference. After May 22, 1981, copies will be available by mail order through Sun South Manufacturing Engineers One SIME Drive, P.O. Box 699, Dearborn, Michigan 48121, USA (at a somewhat higher rate to be set by SIME).

FOR FURTHER INFORMATION
Regarding papers, proceedings, sessions, etc.: Dr. Mark Fugloka (814) 863-2386 or Dr. W. E. Wilkie (814) 865-7601 Department of Industrial and Management Systems Engineering The Pennsylvania State University 207 Hammond Building University Park, PA 16802
Regarding registration, housing, etc.: Ron Austin The Pennsylvania State University 410 Keller Building University Park, PA 16802 (814) 865-0313 — TWX 510-670-3532

CONFERENCE ORGANIZATION
The North American Manufacturing Research Conference was created by a group of researchers dedicated to furthering knowledge, its dissemination and application in the field of manufacturing research. The papers presented at this conference have been selected by the Scientific Committee of NAMRC from a large number of submitted abstracts. Conference arrangements are the responsibility of NAMRC-IX Organizing Committee and the Conference Center at the Pennsylvania State University.

CONFERENCE PROSPECTOR
The Ninth North American Manufacturing Research Conference (NAMRC-IX) is designed to provide a forum for the presentation and interchange of discussion of results of basic and applied research in manufacturing and related manufacturing. The format of the Conference is similar to that of NAMRC-I (McMaster University, 1973) NAMRC-II (University of Wisconsin, 1976), NAMRC-III (Carnegie- Mellon University, 1975), NAMRC-IV (Battelle Columbus Laboratories and Ohio State University, 1976), NAMRC-V (University of Massachusetts, 1977), NAMRC-VI (University of Florida, 1978), NAMRC-VII (University of Michigan, 1978), NAMRC-VIII (University of Missouri, 1980), and previous NAMRC conferences.

The papers presented at this conference will describe work in the fields of metal forming, metal cutting, machine tools, and manufacturing systems and controls. All papers presented at the conference are contained in the hardbound Conference Proceedings (which will be part of the SME Manufacturing Engineering Transactions) and represent work conducted in many renowned manufacturing research centers throughout the world.

SCIENTIFIC COMMITTEE
T. Allen
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Lehigh University
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University of Wisconsin