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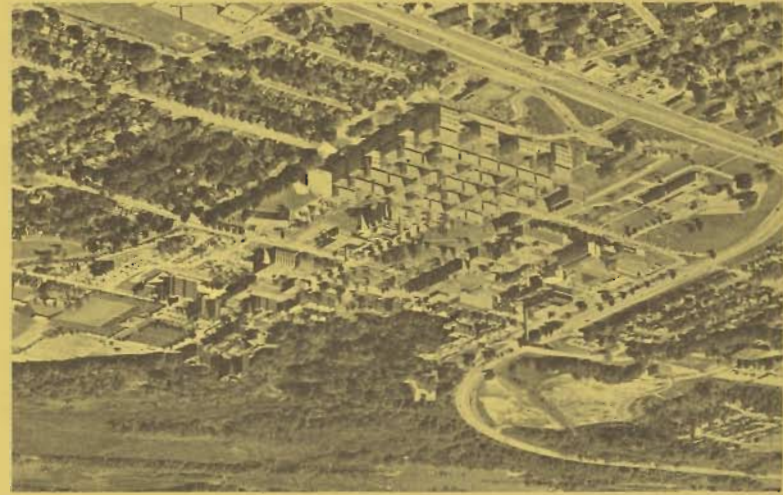
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McMaster University • Hamilton, Ontario, Canada



**TENTH
NORTH AMERICAN
MANUFACTURING
RESEARCH
CONFERENCE and
ANNUAL MEETING
MAY 24, 25, 1982**

North American Manufacturing
Research Institution of SME announces...



North American Manufacturing Research Institution of SME
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NAMRC-X

May 24, 25, 1982
McMaster University
Hamilton, Ontario, Canada

GENERAL AND REGISTRATION INFORMATION

REGISTRATION

Advance registration is important to the organization 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 advance registration form and return it to us by *April 15, 1982*. All registrations will be acknowledged and further information will be sent including campus maps, parking permits, travel information, etc.

Final registration will be conducted:

Monday, *May 24th 8:00-10:30 a.m.*—

Ewart Angus Lobby Area

McMaster University Medical Centre

FEE

The registration fee of \$200.00 Canadian per person includes two lunches, the Monday banquet, coffee breaks and a hardbound copy of the NAMRC-X Proceedings. There will be no one-day registration fees.

The registration fee must be paid by cash or cheque. The cheque should be payable to McMaster University. A refund will be made if notification of cancellation is received two weeks prior to the start of the conference. Substitutions will be accepted anytime.

LOCATION

The program sessions will be held in the McMaster Medical Centre on the campus of McMaster University, Hamilton, Ontario, Canada. The McMaster Campus is situated at the west end of the city.

Hamilton can be reached:

By Car: Hamilton is 40 miles southwest of Toronto—accessible from QEW and 403 Highways.

By Air: Toronto International Airport is served by all major airlines and an airline bus service is available to downtown Hamilton.

VISIT TO LABORATORIES AND CIM

The laboratories of the Mechanical Engineering Department and of the Canadian Institute for Metalworking will be open for visits at times which will be posted in the conference lobby.

LODGING

A block of rooms for the conference has been reserved at the following:

1. THE ROYAL CONNAUGHT HOTEL, 112 King St. East, Hamilton, Ontario, L8N 1A8—Telephone (416) 527-5071.

Special McMaster group rate \$44.00 single or twin. Block reservations will be held until May 1, 1982.

of interest in Hamilton including the Botanical Gardens could also be arranged. The actual program will be established depending on the number of ladies interested in the tours.

The charge will be determined when we know the number of ladies interested. Please indicate your interest on the registration form.

PROCEEDINGS

All participants in the conference paying the registration fee will receive one hardbound copy of the NAMRC-X Proceedings. Those who wish additional copies at \$60.00 (Canadian) may order them in advance or at the Conference. After May 25, 1982, copies will be available by mail order through the Society of Manufacturing Engineers, One SME Drive, P.O. Box 930, Dearborn, Michigan 48128, U.S.A. at \$55.00 (U.S.) for NAMRI/SME and SME members and \$65.00 (U.S.) for nonmembers.

CONFERENCE ORGANIZATION

The North American Manufacturing Research Conferences were created by a group of researchers dedicated to further knowledge, its dissemination and application in the field of materials processing. Presently the Conference is part of the activities of the North American Manufacturing Research Institution of SME.

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-X Organizing Committee, McMaster University, Hamilton, Ontario.

CONFERENCE PROSPECTUS

The Tenth North American Manufacturing Research Conference (NAMRC-X) is designed to provide a forum for the presentation and informed critical discussion of results of basic and applied research in metalworking and related manufacturing. The format of the Conference is similar to that of NAMRC-I (McMaster University, 1973), NAMRC-II (University of Wisconsin, 1974), 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, 1979), NAMRC-VIII (University of Missouri, 1980), NAMRC-IX (The Pennsylvania State University).

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 and represent work conducted in many renowned metalworking research centers throughout the world.

2. HOLIDAY INN, 150 King St. East, Hamilton, Ontario, Canada, L8N 1B2
Telephone (416) 528-3451
Special McMaster group rates: \$41.00 Single \$48.00 Twin.

3. Block reservations will be held until May 9th.
Residence Rooms—Commons Bldg., McMaster University Campus.
\$14.00 per person Double occupancy
\$19.00 per person Single occupancy

This fee includes parking, maid service, each day. These rooms will be available right up to the day of the conference.

For accommodation in Residence please write to: Mrs. J. Gowland, Room 101B, Commons Bldg., McMaster University, L8S 4K1. State the name of the conference and the evenings required and whether single or double and they will look after your request.

4. MOUNTAIN VIEW MOTEL, 1870 Main St. W., Hamilton, Ontario, Canada L8S 1H7.
Telephone (416) 528-7521
Single \$20-\$22 or 24.00 Double.
Rooms will be held until May 1st.

Be sure to state you are attending the NAMRC-X Conference at McMaster University when making your reservation.

PLEASE MAKE YOUR OWN RESERVATION.

SHUTTLE BUS SERVICE

A bus service will be arranged to bring the participants to the campus each day and back. The pickup point will be at the Connaught Hotel and the Mountain View Motel for going and outside the Ewart Angus Centre for returning.

8:00 a.m.—Monday, May 24th

9:00 p.m.—(After the Dinner)

8:00 a.m.—Tuesday, May 25th

5:15 p.m.—Tuesday, May 25th

PARKING

For those who drive to campus, free parking is available in Zone 3, Psychology Building and Engineering Building. A special parking permit will be mailed upon receipt of the advance registration form.

For those who are staying in the residence rooms on campus, the parking permit will be distributed to you upon registration at the Commons Building and you will be reimbursed for parking paid when entering the campus.

LADIES PROGRAM

A bus trip to Niagara Falls is available as well as a shopping trip to Toronto. Visits to the various places

TENTH NORTH AMERICAN MANUFACTURING RESEARCH CONFERENCE MAY 24-25, 1982

TECHNICAL SESSIONS AND PROGRAM



MONDAY, MAY 24

8:00-10:30 a.m.

REGISTRATION

Ewart Angus Centre Lobby, McMaster Medical Centre

9:00-10:00 a.m.

OPENING SESSION

Welcoming Address: *Dr. J.H.T. Wade*, Chairman, Dept. of Mech. Engineering, McMaster University.

Opening Address: *Dr. J. Tlusty*, President, North American Manufacturing Research Institution of SME.

Charles F. Carter, Jr., President, Society of Manufacturing Engineers.

10:00-10:30 a.m.

COFFEE BREAK—Ewart Angus Centre Lobby

10:30-12:00

SESSION 1

A. "Performance Analysis of Drilling by Minicomputer", *C.H. Kahng*, and *P.F. Ostwald*, University of Colorado, Boulder, Colorado.

"The Mechanics of Drilling Small Holes", *M.W. Burnham*, Rockwell International, Golden, Colorado.

"High-Speed Drilling of Aluminum Alloys and Aluminum Graphite Epoxy Sandwich Structures", *R. I. King*, Lockheed Missiles and Space Company, Inc., Sunnyvale, California.

B. "Deep Drawing by Contoured Die", *Z.J. Luo*, Northwestern Polytechnical University, The People's Republic of China. *B. Avitzur*, Lehigh University, Bethlehem, Pennsylvania.

"Deep Drawing", *B. Avitzur*, Lehigh University, Bethlehem, Pennsylvania.

"On the Wrinkling of Sheet Metal During Deep Drawing", *J.S. Gunasekera*, *P.F. Thomson*, Monash University, Australia.

C. "Development of a Group Technology Scheme by Modifying a Publicly Available System", *Cai Jianguo* and *I. Ham*, The Pennsylvania State University, University Park, Pennsylvania.

"Computer Aided Design for Assembly: A Micro-computer System", *P. Dewhurst* and *G. Boothroyd*, University of Massachusetts, Amherst, Massachusetts.

"Semi-Automated Handling System for Aircraft Panel Assembly", *M.L. Bailey*, Northrop Corporation, Hawthorne, California.

12:00-1:30 p.m.

LUNCHEON—Blue & Green Dining Rooms, McMaster Medical Centre

1:30-3:00 p.m.

SESSION 2

A. "An Investigation of the Wear Process of Ceramic Tools in the Machining of Nickel-Based Alloys", *J.F. Huet* and *B.M. Kramer*, Massachusetts Institute of Technology, Cambridge, Massachusetts.

"Fundamental Studies of Tool Wear Via Acoustic Emission Analysis", *M.S. Lan* and *D.A. Dornfeld*, University of California, Berkeley, California.

"Optimization of the Drill Life: Part 1: Influence of Cutting Condition on Tool Wear", *R.K. Podder* and *N. Fabris*, California State University, Los Angeles, California.

B. "Forming of Vessels from Sheet Metal Using Spinning-Elastomer Techniques", *H.A. Al-Qureshi*, Instituto Tecnológico De Aeronautica, Brasil.

"Tribological Conditions in Cold Metal Forming: Influence of Normal Stress and Relative Velocity on the Coefficient of Friction", *Th. Grabener* and *K. Lange*, Institut für Urformtechnik, Stuttgart, Federal Republic of Germany.

"Application of Stripwound Tools to Large Reduction Cold Forging Processes", *J. Gronbaek*, Technical University of Denmark, Lyngby, Denmark.

C. "Economic Evaluation of Transfer Line Efficiency by the Aggregate Dynamic Model", *A. Villa*, *S. Rossetto*, *E. Canuto*, Politecnico di Torino, Torino, Italy. *A. Zompi*, Università di Firenze, Firenze, Italy.

"Computer Aided Manufacturing Engineering: (C.A.M.E.)", *R.A. Bouvier*, Harris GSG, Melbourne, Florida.

"Computer Modelling of Machining Processes", *H.A. ElMaraghy* and *M. Ryc*, McMaster University, Hamilton, Ontario.

3:00-3:30 p.m.

COFFEE BREAK—Ewart Angus Centre Lobby

3:30-5:00 p.m.

SESSION 3

A. "Analysis of Cutting Forces in Face Milling of High Silicon Casting Aluminum Alloys", *P.C. Subbarao*, Ingersoll Milling Machine Co., Rockford, Illinois.

S.G. Kapoor, *R.E. DeVor* and *H.J. Fu*, University of Illinois, Urbana, Illinois.

"Frequency Decomposition of Cutting Forces in End Milling", *S.M. Pandit* and *A. Balkuvar*, Michigan Technological University, Houghton, Michigan.

10:00-10:30 a.m.

COFFEE BREAK—Ewart Angus Centre Lobby

10:30-12:00

SESSION 5

A. "Re-observation of the Chatter Vibration in Chud Works—Effects of Jaw Number on the Appearance of a Scale-like Chatter Mark", *M. Doi*, *M. Masuko*, Musashi Institute of Technology, Tokyo, Japan. *Y. Ito*, Tokyo Institute of Technology, Tokyo, Japan.

"Relationship between the Behavior of the Static Hysteresisloop and the Vibration Damping Capacity in a Contact Surface", *J. Kaizumi*, Tokyo Institute of Technology, Tokyo, Japan.

"Modal Analysis of Mechanical Structures by Time Series Approach", *K.J. Kim*, *K.F. Eman* and *S.M. Wu*, University of Wisconsin-Madison, Madison, Wisconsin.

B. "The Design of a Sensor for Measuring Normal Pressure and Friction Stress in the Roll Gap During Cold Rolling", *J. Jeswiet* and *W.B. Rice*, Queen's University, Kingston, Ontario.

"A Refined Analytical Model for the Prediction of Side Spread in the Rolling of Flat Products", *K.F. Kennedy* and *W.R.D. Wilson*, Battelle Columbus Laboratories, Columbus, Ohio.

C. "Design and Simulation of Flexible Manufacturing Cells and Systems", *H.A. ElMaraghy*, *P. Tang*, McMaster University, Hamilton, Ontario.

"Development of a Building-up Concept for a Manufacturing System for the Production of Rotational Parts", *H.K. Tonshoff*, *J. Bubmann*, Technische Universität, Hannover, Federal Republic of Germany.

"Investigations of the Demands of the Workpieces in the Development of a Manufacturing System for the Production of Rotational Parts", *H.K. Tonshoff*, *A. Granow*, Technische Universität, Hannover, Federal Republic of Germany.

D. "Surface Roughness Characteristics for Turning 380 and 390 Aluminum Casting Alloys", *J.C. Miller*, Reynolds Metal Company, Richmond, Virginia, *R.E. DeVor* and *J.C. Sutherland*, University of Illinois, Urbana-Champaign, Illinois.

"Embrittling Effect of McS in Free-Machining Steel", *E. Usui*, *T. Obikawa* and *T. Shirakashi*, Tokyo Institute of Technology, Tokyo, Japan.

12:00-1:30 p.m.

LUNCHEON

Blue & Green Dining Rooms, McMaster Medical Centre

1:30-3:00 p.m.

SESSION 6

A. "A New Method to Increase Frequency Resolution in Shock Excitation Testing", *T. Moriwaki* and *K. Iwata*, Kobe University, Kobe, Japan.

"Identification of Cutting Dynamics from Double Modulation Data", *T.Y. Ahn*, *R.C. Gart*, *S.M. Wu*, The University of Wisconsin-Madison, Madison, Wisconsin.

"Theoretical Background for Machining Tests of Machining Centers and of Turning Centers", *J. Tlusty*, *F. Ismail*, McMaster University, Hamilton, Ontario. *B.S. Rao*, Battelle Columbus Laboratories, Columbus, Ohio.

Advanced Registration Form NAMRC-X, May 24-25th, 1982

NAME _____
HOME ADDRESS _____ ZIP _____ TELEPHONE _____
NAME OF COMPANY _____ TITLE _____
OFFICE ADDRESS _____ ZIP _____ TELEPHONE _____

Enclosed is a cheque made payable to McMaster University @ \$200.00 (Canadian) per person.
 Additional copies of Proceedings @ \$ 60.00 (Canadian) a copy.
 Send me a parking permit.
 Accompanied by wife: _____

NAME _____

MAIL TO: Dr. J. Tlusty

Interested in Tours

- Niagara Falls Shopping Trip to Toronto
 Walking Tour of Downtown Hamilton Botanical Gardens

Additional banquet tickets @ \$15.00 (Canadian)

Department of Mechanical Engineering
McMaster University
Hamilton, Ontario, Canada.
L8S 4L7.
Phone: (416) 525-9140

- Weinmann and D.A. Koss, Michigan Technological University, Houghton, Michigan.
"Analytical Solutions for Plane Strain Plastic Flow Through Flat Dies with Die-Wall Friction", S. Ramalingam, University of Minnesota, Minneapolis, Minnesota.
"Alternate Manufacturing Technologies for the Production of Multifilamentary Superconducting Wire", B. Avitzur, Lehigh University, Bethlehem, Pennsylvania.
C. "Solid State Bonding of a Cobalt Hard Facing Alloy to Stainless Steel", C.S. Cook and A.T. Male, Westinghouse R&D Center, Pittsburgh, Pennsylvania.
"Pattern Recognition as it Applies to Manufacturing Process Monitoring", E. Kanpatay-Asibu, Jr., General Motors Institute, Flint, Michigan.

6:30 p.m. — **COCKTAILS**

7:00 p.m. — **BANQUET**

Blue & Green Dining Rooms, McMaster Medical Centre

TUESDAY, MAY 25

8:30-10:00 a.m.

SESSION 4

- A. "A Review of Computerized Machinability Data Base Systems", M.F. DeVries, P. Balakrishnan, University of Wisconsin-Madison, Madison, Wisconsin.
"An Integrated Machining Data Selection System", J. Lindberg, S. Nakamura and Wm. Zdeblick, Metcut Research Associates Inc., Cincinnati, Ohio.
"Optimum Spindle Speeds for High Production Turning", A.M. Janotik and J.E. Mayer, Jr., Ford Motor Company, Dearborn, Michigan.
B. "Gear Tooth Geometry Calculations for Close Tolerance Forging of Spiral Bevel Gears", A. Badawy, T. Schultes, M. Baxter and T. Altan, Battelle Columbus Laboratories, Columbus, Ohio.
"The Production of High Quality Billets by Cropping", S.D. El Wakil, Bradley University, Peoria, Illinois.
C. "Microprocessor Control of E.D.M. Process", M.F. El-Menshaw, University of Warwick, Coventry, U.K.
"Predictions of Metal Removal Rate and Surface Roughness in Electrical Discharge Machining", K.P. Rajurkar, S.M. Pandit, Michigan Technological University, Houghton, Michigan.
"An Investigation into EDM Fine Hole Drilling", S.J. Ebeid, Ain Shams University, Cairo, Egypt.
D. "Active and Passive Methods for Improving the Thermal Behavior of Machine Tool Structures by Using Heat Pipes", N. Nishiwaki, H. Takeyama and S. Hori, Tokyo University of Agriculture and Technology, Tokyo, Japan.
"Upgrading the Capabilities of Existing Machine Tools for Precision Machining", W.E. Barkman, Union Carbide, United States Dept. of Energy, Oak Ridge, Tennessee
"Automatic Contour Measurement for Two-Dimensional Geometry", K. Lau, J. Bollinger and N. Duffie, University of Wisconsin-Madison, Madison, Wisconsin.

Finite Element Method", S.F. Or, S.D. Lanon and T. Altan, Battelle Columbus Laboratories, Columbus, Ohio.

"Reverse Can Extrusion of Aluminum Using a Conical Fluid Extension on a Flat Punch", R.W. Kauppila, K.J. Weinmann, Michigan Technological University, Houghton, Michigan. D.J. Agnew, Ford Motor Company, Dearborn, Michigan.

"Warm Forging of Stainless Steels—Tests on Forward and Backward Extrusion", Jens. O.R. Hintz, The Technical University of Denmark, Lyngby, Denmark.

- C. "A Heuristic Algorithm for Multi-Stage Group Scheduling Problem to Minimize Total Tardiness", K.K. Cho and I. Ham, The Pennsylvania State University, University Park, Pennsylvania.

"Automated Parts Layout Planning in Garment Industry by Using Group Technology", M. Nakajima, Kyoto Industrial and Textile University, Sakyo-ku, Kyoto-shi, Japan.

"An Economic Analysis in Group Technology", R.M. Sundaram, Tennessee Technical University, Cookeville, Tennessee.

"A Group Scheduling Algorithm for Job Shops that Utilize Group Technology Manufacturing Concept", R.M. Sundaram, Tennessee Technical University, Cookeville, Tennessee.

- D. "Improved Wear Resistance by Ion Implantation", R.A. Kohser, E.B. Hale, University of Missouri-Rolla, Rolla, Missouri.

"An Investigation into Cutting Performance and Failure Mechanism of Multiple-Phase Coated Cutting Tools", N.G. Odrey and A.M. Zaman, West Virginia University, Morgantown, West Virginia.

3:00-3:30 p.m.

COFFEE BREAK

--Ewart Angus Lobby—McMaster Medical Centre

3:30-5:00 p.m.

SESSION 7

- A. "An Automatically Adjustable Boring Bar System", R.B. Harlan, The Charles Stark Draper Laboratory, Inc., Cambridge, Massachusetts.
"Essential Criteria of a Lathe for High-Speed Turning", K. Tuffentsammer, G. Icks, Universitat Stuttgart, Stuttgart, Federal Republic of Germany.
B. "Possibilities of Application and Limitations of Closed-Die Forging of Steel and Aluminum at Room Temperature (cold-closed-die-forging)", Kh. Hoang-Vu and K. Lange, University of Stuttgart, Stuttgart, Federal Republic of Germany.
"Flow and Fracture of Some Ductile Metals", E.G. Thompson, University of California, Berkeley, California.
C. "Influence of Friction on the Shear Plane Angle in Machining", P.K. Wright, Carnegie-Mellon University, Pittsburgh, Pennsylvania.
"Ultra-High Speed Machining Experiments", J.P. Kottenstette, R.F. Recht, Denver Research Institute, Denver, Colorado.
"A Comparison of Cutting and Grinding Data", R.P. Lindsay, Norton Company, Worcester, Massachusetts.

6:30 p.m.

DINNER AND ANNUAL ASSEMBLY OF NAMRI/SME

Green Dining Room, McMaster Medical Centre