

**NAMRI** SME <sup>TM</sup>

File NAMEC  
XIII

*North American Manufacturing Research Institution of SME announces*  
**THIRTEENTH NORTH AMERICAN MANUFACTURING  
RESEARCH CONFERENCE AND ANNUAL MEETING**



**May 20-22, 1985 • University of California • Berkeley, California, USA**

# REGISTRATION AND GENERAL INFORMATION

## CONFERENCE PROSPECTUS

The Thirteenth North American Manufacturing Research Conference (NAMRC XIII) is designed to provide a forum for the presentation and critical discussion of results of basic and applied research in metalworking and related manufacturing and manufacturing automation. The format of the conference is similar to that of NAMRC XII at Michigan Technological University in Houghton. The papers presented at this conference will describe work in the field of metal forming, metal cutting, machine tools and manufacturing systems and controls. All papers presented at the conference are contained in the bound conference proceedings and represent work conducted in many of the renowned metalworking and manufacturing research centers throughout the world.

The conference sessions will be conducted in an atmosphere that encourages discussion. We urge you to attend and contribute actively.

## CONFERENCE CENTER LOCATION

Stephen D. Bechtel Engineering Center,

University of California (UC), Berkeley. Registration/Information desk is in Lobby on Level 2. *Please note:* A registration and reception will be held at the Hotel Durant in Berkeley on Sunday evening, May 19 from 5-8 pm.

## FEE

\$220 (U.S.) advance registration fee; \$245 (U.S.) at-door registration fee on May 19 and 20. Fee includes two lunches, the conference banquet, refreshments, and a bound copy of the NAMRC XIII proceedings. There will be no one-day registration fee nor any reduced fee for authors or session chairs.

*Advance registration will be confirmed in writing. Retain this program as your guide to conference arrangements.*

## TO REGISTER

**BY MAIL**—Complete and return the UC form provided. You may pay by VISA, MasterCard, or check. Make check payable to the UC Regents.

**BY TELEPHONE**—You may register by phone if you use VISA or MasterCard; call (415) 642-4111.

## CANCELLATIONS

If you register and then cannot attend the conference, a refund will be granted if requested prior to May 10. No refunds can be granted after May 10. Substitutions will be accepted at any time.

## LODGING

Blocks of rooms for conference participants have been reserved at the following two hotels. Attendees must make their own reservations prior to April 15 to assure accommodations. To receive the special conference rates, be sure to state that you are attending the NAMRC XIII Conference at UC Berkeley. Because these hotels are within walking distance of the campus, no special arrangements for daily transportation from hotels to the conference have been made.

### Hotel Durant

2600 Durant Ave.  
Berkeley, CA 94704  
(415) 854-8981

Rates: \$55 single/\$65 double,  
plus tax

**Shattuck Hotel**

2086 Allston Way at Shattuck  
Avenue  
Berkeley, CA 94704  
(415) 845-7300  
Rates: \$44 single/\$50 double,  
plus tax

We recommend the following two hotels for conference participants who wish resort accommodations. No room blocks at these hotels have been specially reserved. City buses run frequently from the Marriott Inn to the campus; the Claremont Hotel is only convenient to campus by car.

**Marriott Inn**

Berkeley Marina  
Berkeley, CA 94710  
(415) 548-7920  
Rates: \$88-\$114, plus tax

**Claremont Resort Hotel &  
Tennis Club**

Ashby and Domingo Avenues  
Oakland, CA 94628  
(415) 843-3000  
Rates: \$86-\$105, plus tax;  
UC rate

**AIRPORT TRANSPORTATION**

San Francisco and Oakland International Airports are convenient to Berkeley. From San Francisco, the Airport Connection runs mini-van service to Berkeley. Reservations can be made through your travel agent or by calling (415) 841-0150. A one-hour taxi ride costs about \$35. From Oakland, rapid transit (BART) and buses provide service to Berkeley. A 30-minute taxi ride costs about \$20. Major car rental agencies are available at both airports.

**CAMPUS SHUTTLE**

A free shuttle bus, Humphrey Go-BART, leaves from the corner of Center and Shattuck Streets (across from the Berkeley BART station, in front of the Bank of America) and circles through the campus; stops are marked on the campus map in this brochure. Shuttles operate every 10 minutes from 7 am - 7 pm.

**PARKING**

Conference parking is available for 75¢ in Parking Structure A, entrance on Scenic Ave. and in Parking Structure H, entrance on Ridge Rd. Enter Student and Staff "Fee" lot section with dispenser machine (machine accepts only quarters); no other permit is required.

**WEATHER/CLOTHING**

Early summer weather in the Bay Area is unpredictable. Temperatures can range from 80°F (31°C) to 55°F (13°C); a warm coat is recommended for evening wear. Conferees may dress casually on campus.

**WINE COUNTRY TOUR AND  
VISITOR'S PROGRAM**

Start your visit to the Bay Area on Sunday, May 19 with an all-day trip to the famous Napa Valley wine country. This special tour, at \$25 per person, includes transportation, private tastings at three wineries and a picnic lunch. You will return in time for the pre-conference reception at the Hotel Durant. Group size is limited; payment is required by May 10. Please use the registration form in this brochure.

To assist your spouse or guest in combining a vacation with your attendance at this meeting, additional information about Berkeley, San Francisco and local Bay Area excursions will be available at the Conference Center Information desk.



# TECHNICAL SESSIONS AND PROGRAM

Thirteenth North American Manufacturing Research Conference and Annual Meeting • May 20-22, 1985

## Sunday, May 19

5:00-8:00 pm

### Registration and Reception

Lobby, Hotel Durant, 2600 Durant Ave., Berkeley

## Monday, May 20

8:00-9:00 am

### Registration

Lobby, Bechtel Center  
(Donuts and coffee served)

9:00-10:00 am

### GENERAL SESSION

Sibley Auditorium, Bechtel Center

#### Welcoming Address:

*K.S. Pister*

Dean, College of Engineering  
University of California, Berkeley

#### Introductory Remarks:

**S. Kalpakjian**

President, NAMRI/SME  
Department of Mechanical Engineering  
Illinois Institute of Technology, Chicago

#### Opening Address:

**"Research on Information Systems for Design and Manufacturing,"** *D.A. Hodges*, Professor,  
Department of Electrical Engineering and Computer  
Sciences, University of California, Berkeley

10:00-10:30 am

### Coffee Break

Lobby, Bechtel Center

10:30-12:00

### SESSION 1

**A.** Sibley Auditorium, Bechtel Center

#### Co-chairmen:

*S. Kobayashi*, University of California, Berkeley, and  
*J.M. Story*, Alcoa Technical Center, Pennsylvania

- 1. Role of Process Parameters on the Interfacial Shear Strength of Clad Extrusions,** *N.C. Iyer*, and *A.T. Male* Westinghouse R&D Center, Pittsburgh, Pennsylvania, and *C.S. Hartley*, Louisiana State University, Baton Rouge

- 2. Optical Lubricant Film Thickness Measurements in Stretch Forming,** *L.G. Hector* and *W.R.D. Wilson*, Northwestern University, Evanston, Illinois

- 3. A Friction Model Based on the Upper-bound Approach to the Ridge and Sublayer Deformations-Update,** *B. Avitzur*, Lehigh University, Bethlehem, Pennsylvania, and *Y.D. Zhu*, Xian Aero-Engine Factory, China

- 4. A Friction Test for Extrusion Based on Combined Forward/Backward Flow,** *L.R. Sanchez* and *K.J. Weinmann*, Michigan Technological University, Houghton, and *J.M. Story*, Alcoa Technical Center, Pennsylvania

**B.** Room 120 B-C, Bechtel Center

#### Co-chairmen:

*B.F. von Turkovich*, University of Vermont, Burlington, and *R.I. King*, Lockheed Missiles and Space Co., Sunnyvale, California

- 1. Chatter, Resonant Vibration and Accuracy in High Speed Milling,** *J.T.S. Smith*, University of Florida, Gainesville

- 2. Some Design Aspects for High Speed Milling Machines,** *F.J. McGee*, LTV Aerospace & Defense Co., Dallas, Texas

- 3. Force and Temperature Effects When Machining Titanium,** *C.J. Brown* and *B.K. Hinds*, The Queen's University of Belfast, Northern Ireland

**C.** Room 225 A-B, Bechtel Center

#### Co-chairmen:

*I. Ham*, The Pennsylvania State University, University Park, and *G. Horne*, Cimtec, Berkeley, California

- 1. Expert Systems for Manufacturing: Manufacturability and Process Planning and Analysis Tools,** *S. Ramalingam*, University of Minnesota, Minneapolis

- 2. Investigation on the Engineer's Thinking Flow in the Process Planning of Machine Tool Manufacture,** *M.-F. Chen* and *Y. Ito*, Tokyo Institute of Technology, Japan

- 3. A New Optimization Model Structure for Scheduled Tool Replacement,** *S.B. Billatos* and *L.A. Kendall*, Washington State University, Pullman

- 4. A Programmable Orienting System for Flat Parts,** *M. Mani* and *W.R.D. Wilson*, Northwestern University, Evanston, Illinois

12:00-1:30 pm

### Luncheon

The Faculty Club

*Mach Tool & Systems  
Mach & Removal  
& Hy Forming*

*3x9=27*

1:30-3:00 pm

**SESSION 2**

A. Sibley Auditorium, Bechtel Center

**Co-chairmen:**

A. Agogino, University of California, Berkeley, and  
M.C. Tang, IBM, San Jose, California

1. **A Consultive Expert System for Finite Element Modeling of Strip Drawing**, S.C.-Y. Lu, University of Illinois at Urbana-Champaign
2. **DIFO-2—A User-oriented FEM Program for Die Forging**, G.J. Li, X.G. Pan and Y.J. Huang, University of Fuzhou, China
3. **The Application of Expert Systems to Automatic Forging Design**, J.P. Tang, S.I. Oh and T. Altan, Battelle Columbus Laboratories, Ohio
4. **ALPIDT: A General Purpose FEM Code for Simulation of Non-isothermal Forming Processes**, W.T. Wu and S.I. Oh, Battelle Columbus Laboratories, Ohio

B. Room 120 B-C, Bechtel Center

**Co-chairmen:**

W.B. Rice, Queen's University, Kingston, Ontario, Canada, and F.E. Hauser, University of California, Berkeley

1. **Effect of Cold Working on Machinability of Low-carbon Lead Free-machining Steel**, H. Yaguchi, Inland Steel Co., East Chicago, Indiana
2. **The Effect of Forming Process Variables on Cavitation in the Superplastic Forming of 7475 Aluminum**, J.M. Story, J.I. Petit, D.J. Lege and B.L. Hazard, Alcoa Technical Center, Pennsylvania
3. **Evaluation and Application of a Ductile Fracture Constant**, F.D. Negrón and E.G. Thomsen, University of California, Berkeley

4. **Effect of Material Parameters on Stretch Formability in Uniaxial Tension in 3003-0 Al Alloy**, A.F. Bayoumi, Washington State University, Pullman, and H. Conrad, North Carolina State University, Raleigh

C. Room 225 A-B, Bechtel Center

**Co-chairmen:**

J. Frisch, University of California, Berkeley, and  
D. Bray, Ingersoll Milling Machine Co., Rockford, Illinois

1. **Dynamometer and Machine Tool Calibration from Impulse Test Response**, S.M. Pandit and G. Lin, Michigan Technological University, Houghton
2. **The Static Behavior of Turret Head with Curvic Coupling**, S. Hazem, M. Tsutsumi and Y. Ito, Tokyo Institute of Technology, Japan
3. **Construction and Performances of a Lathe with Epoxy Resin Bed**, A. De Filippi, U. Gennuso, and L. Borsati, Politecnico di Torino, Italy
4. **Quasistatics—An Examination Technique to Determine Static Weak Construction Points of Mechanical Structures**, M. Weck and R. Eckstein, Technical University of Aachen, West Germany

3:00-3:30 pm

**Coffee Break**

Lobby, Bechtel Center

3:30-5:00 pm

**SESSION 3**

A. Sibley Auditorium, Bechtel Center

**Co-chairmen:**

E.G. Thomsen, University of California, Berkeley, and S.I. Oh, Battelle Columbus Laboratories, Ohio

1. **Ceramic Extrusion Dies - Analysis and Application**, K. Lange and W. Nester, University of Stuttgart, West Germany
2. **Plasticine Modeling of Defect Formation in Metal Working Processes**, D.R. Durham and J.L. Brown, University of Vermont, Burlington
3. **Modeling of Trapezoidal Ribs for Forming Performance and Optimal Design**, A.B. Trageser, Alcoa Technical Center, Pennsylvania
4. **Model Material Technique Applied in the Analysis of Extrusion**, J. Danckert, Technical University of Denmark, Lyngby

B. Room 120 B-C, Bechtel Center

**Co-chairmen:**

S. Kalpakjian, Illinois Institute of Technology, Chicago, and J. Mayer, Kennametal, Latrobe, Pennsylvania

1. **An Experimental Analysis of the Gear Shaving Process**, S.B. Rao and R.W. Schwartz, National Broach and Machine, Mt. Clemens, Michigan
2. **Determination of Chip Forming States Using a Linear Discriminant Function Technique with Acoustic Emission**, D. Dornfeld and C.-S. Pan, University of California, Berkeley
3. **Drill-up, an Alternative for On-line Determination of End Mill Wear**, K.W. Yee and L. Evans, National Bureau of Standards, Gaithersburg, Maryland
4. **Application of Acoustic Emission Monitoring in Machining**, M.-S. Lan and Y. Naerheim, Rockwell International Science Center, Thousand Oaks, California

C. Room 225 A-B, Bechtel Center

**Co-chairmen:**

*W.R. DeVries*, Rensselaer Polytechnic Institute, Troy, New York, and *F.J. McGee*, LTV Aerospace & Defense Co., Dallas, Texas.

**1. Microcomputer Controlled Compression Test Facility with Data Analysis for High**

**Temperature, High Strain Rate Processing Applications**, *D.R. Barker* and *S.M. Doraivelu*, Universal Energy Systems, Inc., Dayton, Ohio, and *H.L. Gegel*, *Y.V.R.K. Prasad* and *K.A. Lark*, Wright-Patterson Air Force Base, Dayton, Ohio

**2. Monitoring and Control of the Electro-discharge Texturing Process for Steel Cold Mill Work Rolls**, *M.F. El-Menshawy* and *M.S. Ahmed*, Transfer Technology Limited, Birmingham, England

**3. Transfer Function of Cutting Dynamics in Three Dimensional Cutting**, *I.N. Tansel* and *K.F. Eman*, University of Wisconsin, Madison

**4. Microcomputer Applications in Direct Numerical Control of Automated Machine Tools**, *D.V. Hutton* and *R.T. Keller*, Washington State University, Pullman

6:00 pm

Cocktails

Dinosaur Lounge, Lawrence Hall of Science

7:00-8:30 pm.

**Conference Banquet**

The Galaxy, Lawrence Hall of Science

The Lawrence Hall of Science is located in the Berkeley Hills, overlooking the campus and San Francisco Bay. Transportation will be provided from the campus and nearby hotels to the reception and banquet at the Hall. Schedules and stops for the shuttle, as well as a map giving directions for drivers, will be included in conference registration packets.

## Tuesday, May 21

8:00-8:30 am

Donuts and Coffee

Lobby, Bechtel Center

8:30-10:00 am

SESSION 4

A. Sibley Auditorium, Bechtel Center

**Co-Chairmen:**

*K. Lange*, University of Stuttgart, West Germany, and *N. Rebello*, MARC, Palo Alto, California

**1. An Empirical Formula for Workability Limits in Cold Upsetting and Bolt Heading**, *J.J. Shah*, Arizona State University, Tempe, and *H.A. Kuhn*, University of Pittsburgh, Pennsylvania

**2. Forging Flash Design with UBET**, *M.I. Ghobrial*, *F.H. Osman* and *A.N. Bramley*, The University of Leeds, England

**3. Computer Simulation of Residual Stresses in Extrusion**, *R. Srinivasan* and *C.S. Hartley*, Wright-Patterson Air Force Base, Dayton, Ohio

**4. Finite Element Modeling of Near-Net Shape Forming Process for Bearing Components**, *P.K. Kropp* and *G.D. Lahoti*, The Timken Co., Canton, Ohio

B. Room 120 B-C, Bechtel Center

**Co-chairmen:**

*W.R.D. Wilson*, Northwestern University, Evanston, Illinois, and *M.S. Lan*, Rockwell International Science Center, Thousand Oaks, California

**1. Computer-Aided Design and Production of Plate Cam Contours**, *J. Frisch*, University of California, Berkeley, and *R.Y. Fei*, Beijing Polytechnic University, China

**2. Computer-Aided Design and Analysis of MFD's**, *J.S. Hsiam* and *S.M. Wu*, University of Wisconsin, Madison

**3. Computer-Aided Analysis of Self-Adjusting Restrictor-Compensated Hydrostatic Bearings for Machine Tools**, *C.K. Singh*, *R. Sinhasan* and *D.V. Singh*, University of Roorkee, India

C. Room 225 A-B, Bechtel Center

**Co-Chairmen:**

*D. Blomquist*, National Bureau of Standards, Gaithersburg, Maryland, and *S. Ramalingam*, University of Minnesota, Minneapolis

**1. Computer-Aided Material Selection and Process Planning**, *K. Lai* and *W.R.D. Wilson*, Northwestern University, Evanston, Illinois

**2. Estimation of Robotic Work Cell Production Rate Using Queuing and Simulation Models**, *H. Yanagi* and *D. Medeiros*, The Pennsylvania State University, University Park

**3. A Dynamic Repair Model in a Transfer Line with Robots and Limited Repair Capability**, *H.M. Rho*, *J. Chandra* and *I. Ham*, The Pennsylvania State University, University Park

**4. Efficiency Analysis of Part-Flow-Routing and Station-Service-Control Strategy for a Flexible Manufacturing Cell**, *A. Villa*, *G. Murari*, and *F. Lombardi*, Politecnico di Torino, Italy

10:00-10:30 am

Coffee Break

Lobby, Bechtel Center

10:30-12:00

SESSION 5

A. Sibley Auditorium, Bechtel Center

**Co-chairmen:**

*B. Avitzur*, Lehigh University, Bethlehem, Pennsylvania, and *C.H. Shen*, General Motors Technical Center, Warren, Michigan

**1. The Determination of Strain in Finite Homogeneous Deformation Processes,** *E. Chu*, Michigan Technological University, Houghton

**2. Cold Extrusion Processes Combined with Radial Extrusion,** *K. Lange* and *W. Osen*, University of Stuttgart, West Germany

**3. An Experimental-Numerical Study of Cylindrical Extrusion Using Moiré Technique,** *F.P. Chiang* and *T.V. Hareesh*, State University of New York at Stony Brook

**4. Fabrication of Toroidal Vessel Section Using Elastomer Mandrel,** *E.M. Bello* and *H.A. Al-Qureshi*, Instituto Tecnológico de Aeronautica, Sao Jose dos Campos, Brazil

**B. Room 120 B-C, Bechtel Center**

**Co-chairmen:**

*I. Finnie*, University of California, Berkeley, and *R. Komanduri*, General Electric Corporate R&D, Schneckstadt, New York

**1. Fracture and Abrasive Wear Rates in Grinding by Data Dependent Systems,** *G. Sathyanarayanan*, Lehigh University, Bethlehem, Pennsylvania, and *S.M. Pandit*, Michigan Technological University, Houghton

**2. Analysis of Coated Abrasive Surfaces with a "Broad Probe" Profilometer,** *J.J. Gagliardi*, *I.S. Hong*, and *E.J. Duwell*, 3M, St. Paul, Minnesota

**3. Simulation of Plane Surface Lapping Kinematics,** *G. Spur* and *D. Simplendorfer*, Technical University of Berlin, West Germany

**4. Influence of Chemically Active Water Base Grinding Fluids on the Dynamics of Grinding,** *E.J. Duwell*, *R.J. Cosmano*, and *G.R. Abrahamson*, 3M, St. Paul, Minnesota

**C. Room 225 A-B, Bechtel Center**

**Co-chairmen:**

*K. Srinivasan*, The Ohio State University, Columbus, and *B. Keramati*, General Electric Corporate R&D Schneckstadt, New York

**1. Flexible Servo System for Mechatronic Controller with a Supermicrocontroller,** *K. Yamazaki*, *H. Suzuki* and *S. Hirose*, Toyohashi University of Technology, Japan, and *I. Holden*, Intel Corporation, Chandler, Arizona

**2. Automatic Contour Measurement for Three-Dimensional Geometry,** *K. Lau*, *N. Duffie* and *J. Bollinger*, University of Wisconsin, Madison

**3. A Microcomputer Mediated Robot Vision Technique,** *Z. Katz* and *A. Greef*, University of Natal, Durban, South Africa

**4. Dynamic Assessment of the Trajectory Error for Robots,** *S.H. Lee*, *B.T. Wu* and *K.F. Eman*, University of Wisconsin, Madison

12:00-1:30 pm  
**NAMRI/SME Luncheon**  
The Faculty Club

1:30-3:00 pm  
**SESSION 6**

**A. Sibley Auditorium, Bechtel Center**

**Co-chairmen:**

*K. Weinmann*, Michigan Technological University, Houghton, and *A. A. Tseng*, RCA Laboratories, Princeton, New Jersey

**1. Computer-Aided Analysis of Plastic Working Process in Interaction with Forging Equipment,** *Y.A. Bocharov*, *A.V. Wasov* and *N.G. Rabin*, Bauman Higher Institute of Technology, Moscow, USSR

**2. Research on Distribution of Stresses on a Workpiece During Rotary Forging without any Kinetic Constraint,** *P.X. Hua* and *Q.C. Ji*, Harbin Institute of Technology, China

**3. On the Ball-Drop Forming of Metals,** *A.G. Mamalis*, *G.C. Vosniakos* and *S. Diplaris*, National Technical University of Athens, Greece

**4. Quasi-Static Heading of Cylindrical Rods of Ductile Materials with Preshaped Cylindrical Cavities: Some Experimental Results,** *N.R. Chitkara* and *I. Botler*, The University of Manchester Institute of Science & Technology, England

**B. Room 120 B-C, Bechtel Center**

**Co-chairmen:**

*B.E. Klamecki*, University of New Mexico, Albuquerque, and *E.J. Duwell*, 3M, St. Paul, Minnesota

**1. Comparison of CBN and Conventional Grinding Processes,** *E. Salje* and *H. Heidenfelder*, Institute for Machine Tools and Production Engineering, Braunschweig, West Germany

**2. Proposals of Ultraprecision Diamond Grinding Technology for Brittle Materials,** *J. Yoshioka*, *F. Hashimoto* and *K. Koizumi*, Tokyo Metropolitan College of Aeronautical Engineering; *M. Miyashita*, Consultant; *A. Kanai*, Tokyo Metropolitan University; and *M. Daito* and *T. Hasebe*, Nissin Machine Works Co., Tokyo, Japan

**3. The Effect of Operating Conditions Upon Flatness and Parallelism When Coated Abrasive Belt Surface Grinding,** *S.K. Bhattacharyya* and *K. Harrison*, University of Warwick, Coventry, England



C. Room 225 A-B, Bechtel Center

**Co-chairmen:**

*K. Eman*, University of Wisconsin, Madison, and  
*D.A. Dornfeld*, University of California, Berkeley

1. **A Time-varying Parameter Model for the Stability Analysis of Intermittent Turning Processes**, *S.G. Kapoor*, *F. Ding*, *G.M. Zhang* and *R.E. DeVor*, University of Illinois at Urbana-Champaign
2. **Cross Coupled Compensators for Contouring Control of Multi-axis Machine Tools**, *P.K. Kulkarni* and *K. Srinivasan*, The Ohio State University, Columbus
3. **Study of a Control System with Varying Spindle Speed in Face Milling**, *R.J. Olbrich*, *H.J. Fu* and *R.E. DeVor*, University of Illinois at Urbana-Champaign, and *D. Bray*, The Ingersoll Milling Machine Co., Rockford, Illinois
4. **Modeling of Metal Cutting Processes for Digital Control**, *M. Tomizuka*, *S-Q. Shang*, *J-H. Oh* and *M-S. Chen*, University of California, Berkeley

3:00-3:30 pm

**Coffee Break**

Room 3110, Etcheverry Hall

3:30-4:30 pm

**Tours of Manufacturing/Mechanical Engineering Laboratories**

Room 3110, Etcheverry Hall

4:30 pm

**ASME/PED Board Meeting**

The Faculty Club

5:00-6:00 pm

**Department of Mechanical Engineering Wine and Cheese Reception**

The Faculty Club

6:00 pm

**NAMRI Membership Meeting**

The Faculty Club

## Wednesday, May 22

8:00-8:30 am

**Donuts and Coffee**

Lobby, Bechtel Center

8:30-10:00 am

**SESSION 7**

A. Sibley Auditorium, Bechtel Center

**Co-chairmen:**

*A. Shabaik*, University of California, Los Angeles, and *T. Altan*, Battelle Columbus Laboratories, Ohio

1. **High Accuracy Three-Roll Bending of Channel Bars Using an Elastic-Plastic Analysis Together With Iteration Technique**, *K. Kawaguchi* and *A. Yoshida*, Mitsubishi Electric Corporation, Amagasaki, Japan
2. **Hole Flanging of Hot-Roll Bonded Composite Metallic Plates, the Influence of Plastic Anisotropy on Lip Thickness and Fracture**, *N.R. Chitkara* and *M.K. Wong*, The University of Manchester Institute of Science & Technology, England
3. **An On-Line Bending Model of Rolling**, *A.A. Tseng*, RCA Laboratories, Princeton, New Jersey
4. **Rolling a Square Bar Between Flat, Parallel Rolls—an Upper Bound Analysis**, *Z. Zimmerman*, Bethlehem Steel Corporation, Bethlehem, Pennsylvania

B. Room 120 B-C, Bechtel Center

**Co-chairmen:**

*N. Duffy*, University of Wisconsin, Madison, and  
*Y. Naerheim*, Rockwell International Science Center, Thousand Oaks, California

1. **A Model for End Milled Surface Topography**, *T.S. Babin*, *J.M. Lee*, *J.W. Sutherland* and *S.G. Kapoor*, University of Illinois at Urbana-Champaign
2. **Process Models in Grinding Based on a Three-Dimensional Description of the Grinding Wheel Topomorphy**, *K.-D. Bouzakis* and *C. Karachaliou*, Aristoteles University, Thessaloniki, Greece
3. **An Analysis of the Metal Cutting Process in Terms of Yield Surface Topology**, *B.E. Klamecki*, University of New Mexico, Albuquerque

C. Room 225 A-B, Bechtel Center

**Co-chairmen:**

*C.K.H. Dharan*, University of California, Berkeley, and *G. Lahoti*, The Timken Co, Canton, Ohio

1. **Surface Damage and Shock Waves in EDM**, *K.P. Rajurkar*, University of Nebraska, Lincoln
2. **Development of Hard Cutting Tool Edges by Laser Processing**, *H.S. Rajasekhara* and *P.A. Molian*, Iowa State University, Ames
3. **Heat Flow Patterns in Superhard Tools When Cutting Superalloys**, *A.E. Focke*, *F.E. Westermann*, *J. Kemphaus*, *W.T. Shih* and *M. Hoch*, University of Cincinnati, Ohio
4. **Hot Pressed Si<sub>3</sub>N<sub>4</sub> as a High Performance Cutting Tool Material**, *S. Samanta*, Ford Motor Co., Dearborn, Michigan, and *K. Subramanian*, Norton Co., Worcester, Massachusetts

10:00 am

**CONFERENCE ENDS**

## BOARD OF DIRECTORS

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## NAMRC XIII ORGANIZING COMMITTEE

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# REGISTRATION FORM

NAMRC XIII • May 20-22, 1985

Name \_\_\_\_\_  
Last First Middle

Company/University Name \_\_\_\_\_

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