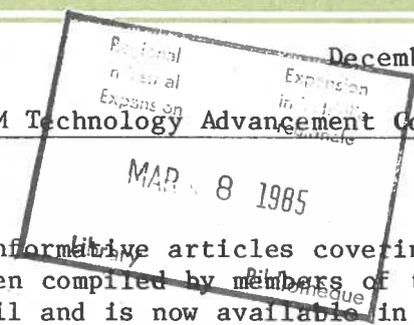




CAD/CAM

NEWSLETTER



Information Compiled by the CAD/CAM Technology Advancement Council*

1. CAD/CAM Reprint Available

A reprint of introductory and informative articles covering many aspects of CAD/CAM Technology has been compiled by members of the CAD/CAM Technology Advancement Council and is now available in reprint form on a complimentary basis from the Department of Regional Industrial Expansion.

This reprint number three is similar to reprints number one and two, which were publications available from the Department of Industry, Trade and Commerce in 1977 and 1981 respectively, but reprint number three provides new and more comprehensive coverage. Approximately thirty articles, chosen from many journals and conference publications, are included which cover:

- General introductions to CAD/CAM
- Computer Aided Design and Drafting (CADD)
- Computer Aided Engineering, Group Technology, Computer Aided Process Planning and Database Design
- Numerical Control
- Industrial Robots
- Flexible Manufacturing Systems
- Industry Applications
- Data Transfer and Control Standards.

Readers who wish to obtain this publication for tutorial, instructional or reference purposes should complete and return the supplementary form enclosed with this newsletter to the Department of Regional Industrial Expansion.

2. Reference Guide to CAD/CAM and Robotics Centres

A "Reference Guide to CAD/CAM and Robotics Centres" is in preparation and is planned to be available in publication form from the National Research Council about May 1985. The publication will provide an index and guide for managers and technical personnel in industry to the CAD/CAM and Robotics development and information centres in Canada, and to some similar centres in the U.S.A. on a selected basis. The publication will also be useful for the coordination of activities between the various centres in Canada. The Canadian centres, mostly established for regional delivery of information on CAD/CAM technology,

including robotics, have both similarities and differences in their abilities and approach. Three coordination meetings, well attended by representatives of the various centres have been held in the past two to three years, and a fourth coordination meeting, to be held about May 1985 is being organized by the CAD/CAM Technology Advancement Council.

3. Reference Listing of Abstracts from 1983 CAD/CAM Newsletter

A limited number of copies are available, on a first come first served basis, to a report in photocopy form which contains the 240 abstracts listed previously in the 1983 CAD/CAM Newsletter. The report copies, which were prepared to assist authors of the CAD/CAM monographs (see newsletter Aug. 1984), contain the full abstracts as normally provided in the monthly newsletter, but sorted by subject category (NC, Robotics, Systems Design etc.) in the same manner as the proposed CAD/CAM monographs.

Contact: 1983 Abstracts
Editor, CAD/CAM Newsletter
Building M-16
National Research Council
Ottawa, K1A 0R6

4. Newsletter Circulation

Many positive comments are received on the content and utility of the CAD/CAM Newsletter which is now distributed monthly to approximately three thousand persons who have requested receipt on a regular basis. It is appropriate to raise the question "Is this CAD/CAM information being adequately distributed within your company or organization?" Readers are encouraged to copy and/or circulate the newsletter within their company or organization. Those who have not followed this practice in the past may wish to consider doing so.

5. "CAD/CAM Association CAO/FAO Conference"

A successful conference and exhibition was held Nov. 27-29 at the Palais des Congrès in Montreal.

In the luncheon address, presented on behalf of the Honourable Sinclair Stevens, federal minister of Regional Industrial Expansion, reference was made to Canada having been slow to recognize the importance of advanced manufacturing technologies "not only must we do more R&D -- as well as acquire and build upon technologies from abroad -- but we must also focus on accelerating the diffusion of these powerful new processes". Reference was made to the CAD/CAM Technology Advancement Council, one of the conference sponsors, which was established by the federal government in 1978 and also to the National Manufacturing Technology Information Centre which is expected to be announced soon as a result of proposals received in September 1984.

It is planned that the CAD/CAM Association will organize and hold a similar conference and exhibition in Montreal in November 1985.

6. Manufacturing Technology Information Analysis Center

A contract to establish a Department of Defense Manufacturing Technology Information Analysis Center (MTIAC) was awarded to Case and Company, Incorporated, along with the IIT Research Institute as a major subcontractor, on 4 June 1984. The objective of MTIAC's operation is to support the DOD Manufacturing Technology Program (MTP) in achieving its goal to improving the productivity and responsiveness of the Defense industrial base. The MTIAC will also support other U.S. Government Agencies, and their contractors. The MTIAC will provide technical and administrative support to the DOD Manufacturing Technology Advisory Group (MTAG) and support the private sector in accordance with security and other limitations on information.

The MTIAC will be oriented toward areas of manufacturing technology including metals, nonmetals, computer aided manufacturing, test and inspection, electronics, and munitions. Attention will be concentrated on defense related fields of: machine tools and manufacturing equipment; robots and special machines; material handling equipment; controls, software and databases; communication lines and networks; sensors and inspection or checkout procedures; signal processing; materials and materials treatments; production processes; and, the specific defense-related products being produced.

The MTIAC will establish and maintain databases and will be responsible for collecting, reviewing, analyzing, appraising, and summarizing available manufacturing technology data and information within its scope. (Reprinted from Manufacturing Productivity Frontiers, Sept. 1984)

Contact: Thomas Turner
MTIAC Director
Case and Company
Telephone: (312) 567-4730 or 861-0994.

7. CAD/CAM Information Available

- SME Video Magazine Now Available

The Society of Manufacturing Engineers now has a video magazine "Manufacturing Insights" available on a regular subscription basis. Each issue is a 35 minute videotape featuring a close-up study of four or five installations utilizing the methods and equipment under study. The videotape format is designed for convenient viewing by management teams without costly and time-consuming travel. Questions are answered as if the viewers themselves were present on the shop floor.

The first issue is now available and addresses FMS, while the second issue will examine robotic assembly and packaging. Future issues, to be issued quarterly, will include adaptive control, robotic welding/painting, simulation and other topics.

Subscription price is \$450 (U.S.) per year and \$500 (U.S.) for non-members, starting in 1985. Trial subscriptions, which include the first two issues only, are \$225 (U.S.) and \$250 (U.S.) respectively.

Contact: Steve Bollinger
SME Headquarters
One SME Drive, P.O. Box 930
Dearborn, Michigan, 48121 U.S.A.
Telephone: (313) 271-1500 ext. 402

- "Computerized Manufacturing Automation - Employment, Education and the Workplace"

A report with the above title has been prepared by the Congressional Office of Technology Assessment in the U.S.A. Some of the conclusions of the report are that computer based automation can improve manufacturing productivity, product quality and working conditions. It will aggravate regional unemployment and types of jobs available. It will not, however, generate massive nationwide unemployment over the next decade. Report price is \$14 (U.S.). Stock Number 052-003-00949-8.

Contact: U.S. Government Printing Office
Superintendent of Documents
Washington, D.C. 20402, U.S.A.

"Manufacturing Productivity Frontiers"

A publication "Manufacturing Productivity Frontiers" is issued on a regular monthly basis by the Manufacturing Productivity Center of the Illinois Institute of Technology (IIT). The Manufacturing Productivity Centre (MPC) is dedicated to helping United States industry increase its productivity. While productivity is the responsibility of individual companies - they succeed or fail based on their own efforts - the MPC provides participants with information and motivation to help direct their efforts toward productivity gains.

The monthly publication, typically of 50-60 pages contains feature articles, reviews and previews of meetings such as CAD/CAM and robotics conferences, short articles, book and journal reviews, abstracts of current literature and a meetings calendar. Annual subscription rate to points outside the U.S.A. is \$150 (U.S.) for the first subscription and \$100 (U.S.) for each additional subscription to the same address.

Contact: Manufacturing Productivity Frontiers
Manufacturing Productivity Center
IIT Center, 10 West 35th Street
Chicago, Illinois, 60616, U.S.A.
Telephone: (312) 567-4808

- Industrial Robot Videotape Series

An instructional videotape series on industrial robots was introduced at Robots 8 by GMI Engineering and Management Institute (Flint, MI). The four videotapes in the series include: Fundamentals and Terminology (54 min.), Safety Considerations (37 min.), Applications in a Manufacturing Environment (30 min.), and Evaluation and Implementation (52 min.).

Contact: GMI Continuing Education Dept.
1700 W. Third Avenue
Flint, Michigan, 48502-2276, U.S.A.
Telephone: (313) 762-9866

- "A Glossary of Terms for Computer Integrated Manufacturing"
Compiled by T.V. Sobczak, 98 pp, soft cover, 1984.

A new reference guide to over 3000 terms relating to CAD, CAM, NC, MRP, CAPP compiled by exhaustive search through computer-related publications. Covers terms ranging from "absolute system" to "zero-offset". Price \$8.95 (U.S.) for members of SME and its affiliates, \$9.95 (U.S.) to non-members plus \$1.25 per book in each case for postage and handling.

Contact: Publication Sales
Society of Manufacturing Engineers
One SME Drive, P.O. Box 930
Dearborn, Michigan, 48121, U.S.A.

- "Interfaces in Computing"

A quarterly journal with an international advisory board publishes papers in English, French or German on topics concerning interfaces in computing. For example, material already covered has dealt with CAMAC, Ethernet, the Cambridge Ring and it is possible that papers on Factory Area Networks (FAN's) such as the General Motors Manufacturing Automation Protocol (MAP) and other CAD/CAM interface topics could be of future interest. Subscription rate is approximately \$85.75 (U.S.). Free sample copy available on request.

Contact: Journal Information Center
Elsevier Science Publishers
52 Vanderbilt Avenue
New York, N.Y., 10017, U.S.A.
Telephone: (212) 867-9040

- "Proceedings of the 14th International Symposium on Industrial Robots"

Proceedings are available for the 14th International Symposium on Industrial Robots held in Gothenburg, Sweden, October 2-4, 1984. Approximately 700 pages containing 60 technical papers selected from 270 abstracts from 28 countries. Price \$98 (U.S.).

Contact: (North-Holland)
Elsevier Science Publishing Co., Inc.
P.O. Box 1663, Grand Central Station
New York, N.Y., 10163

- AUTOFACT 6 Conference Proceedings Available

As of mid-December 1984 a limited supply of proceedings for the 1984 AUTOFACT Conference held October 1-4 in Anaheim, California were still available. A total of 1,832 conference registrants attended, plus 15,900 exhibition attendees, making it highly successful. Conference proceedings contain 91 technical papers in 1,280 pages under the conference theme "CIM: Manufacturing in the Information Age". Price \$63 (U.S.) for members and \$68 (U.S.) for non-members.

Contact: Publication Sales
Society of Manufacturing Engineers (SME)
One SME Drive, P.O. Box 930
Dearborn, Michigan 48121, U.S.A.
Telephone: (313) 271-1500 ext. 418 or 419

8. Books and Directories Available on CAD/CAM Technology

- "Group Technology at Work" Ed. by N.L. Hyer
254 pages, hard cover, 1984

Introduces the reader to the use of Group Technology (GT) in manufacturing to reduce lead times, machine set-up costs and unnecessary designs. Explains GT systems relative to machine cell concepts, integrated CAD/CAM systems and inventory control. Price \$27 (U.S.) to SME members, \$32 (U.S.) non-members.

Contact: SME (as above)

- "Flexible Manufacturing Systems" Edited by J.R. Holland
277 pages, hard cover 1984

Covers key elements in Flexible Manufacturing Systems (FMS), such as Robots, Sensors, Databases, Communications, Programmable Controllers, Economic Payback, NC, Systems Engineering and Simulation. Price \$34 (U.S.) to members of SME and its associations, \$39 (U.S.) for non-members, plus \$1.25 (U.S.) postage and handling per book in each case.

Contact: SME (as above)

- "Industrial Robotics Handbook" D. Hunt
352 pages, hard cover, 1983

Studies critical applications and procedures for selection, computer programming, systems integration, safety, economic justification and other factors. Price \$29.50 (U.S.) to members of SME and its associations, \$32 (U.S.) for non-members.

Contact: SME (as above)

- "Systems and Technology for Advanced Manufacturing" Edited by K. Gardiner, 270 pages, hard cover, 1983

Addresses key questions on the integration of CAD/CAM. Chapters cover Organization for Manufacturing, Design in Electronics, Systems Implementation, Pattern Generation, Laser Applications, Robotics etc. Price \$27 (U.S.) to members of SME and its associations, \$32 (U.S.) for non-members, plus \$1.25 (U.S.) postage and handling per book in each case.

Contact: SME (as above)

- "CAD/CAM Productivity Equipment Series"
785 pages, soft cover, 1983

Eight sections provide catalog sheets on equipment, software and accessories from over 70 producers of CAD/CAM products. Sections cover Computer Aided Design and Drafting Systems, NC Tape Preparation Systems, Software Packages, CRT's, Workstations, Recording Systems, Plotters, Printers and Digitizers. Price \$41 (U.S.) to members of SME and its associations, \$46 (U.S.) for non-members plus \$1.25 (U.S.) postage and handling per book in each case.

Contact: SME (as above)

- "Flexible Manufacturing Systems Handbook"

A 392 page handbook in four main sections which describe FMS systems and their implementation. An FMS system is defined as a "computer-controlled configuration of semi-independent work stations and a material handling system designed to efficiently manufacture more than one part number at low to medium volumes". The four handbook sections include an executive summary, description of the technology, Buyer/User's Guide and appendices with case studies and glossary of FMS terms. Price \$64 plus \$2 for shipping and handling.

Contact: Business Books
Box 734
Lindsay, Ontario
K9V 4J9

- "Tutorial: Robotics" C.S.G. Lee, R.C. Gonzales, K.S. Fu
IEEE Computer Society Press, 1983, 730 pages. Members \$24 (U.S.),
non-members \$39 (U.S.) plus \$5 (U.S.) for shipping and handling.

A tutorial text summarizing fundamentals and theory of robotics
nine chapters cover robot arm kinematics, dynamics, control,
trajectory planning, sensors, robot vision, robot control languages
and machine intelligence.

Contact: IEEE Computer Society Order Department
P.O. Box 80452
Worldway Postal Center
Los Angeles, CA. 90080, U.S.A.

- "CAD/CAM: Computer Aided Design and Manufacturing"
E.W. Zimmers, Jr., book, 1984, 489 pages. Prentice-Hall
- "Robotics: Applications and Social Implications" R. Ayers,
S. Miller, Ballinger Press, Cambridge, Mass., U.S.A., 338 pages.

The authors contend that robot replacement of humans is the
most far reaching change in manufacturing since mass production, but
are not convinced that the long-term effect will be a net increase
in unemployment. For a more detailed review, see Financial Times of
Canada, Nov. 19, 1984.

- "Industrial Robotics Handbook" V.D. Hunt, Industrial Press, Inc.,
200 Madison Ave., New York, N.Y., 10016; 1983; 352 pages \$32.50
(in U.S.A.).

A comprehensive treatment covering applications, selection
criteria, programming, system integration, safety and other
factors.

- "Robot Technology, Volume 1: Modelling and Control" P. Coiffet,
Prentice-Hall, Inc., Englewood Cliffs, N.J., 07632; 1983, 160 pages,
\$44 (in U.S.A.).

The first of a series of seven on robot technology, the subject
volume deals with robot modeling and dynamic control, primarily as
articulated kinematic mechanical systems.

- "Robot Vision" Edited by A. Pugh, Springer-Verlag, 175 Fifth Ave.,
New York, N.Y., 10010; 360 pages, 1983; \$47.50 (in U.S.A.).

This book is a collection of 28 recently published papers and is intended as the first of a series of six books on international trends and manufacturing technology.

- "Robots at Work" J. Hartley, 1983, 192 pages.

A practical guide for engineers and managers by an author who assesses the international scene from his base in Japan. Chapters cover introduction to robots, cost effectiveness and application areas such as spot welding, handling, arc welding, spraying and assembling. \$39 (U.S.).

Contact: (North-Holland)
Elsevier Science Publishing Co. Inc.
P.O. Box 1663, Grand Central Station
New York, N.Y., 10163

- "The International Robotics Industry Directory" Edited by P.C. Flora, 1984, 386 pages.

Includes comparison and detailed data on models, specifications, price, warranty etc. from robot manufacturers plus robot components, peripherals and a list of consultants. Price approximately \$60 (U.S.).

Contact: T.D.B.C.
P.O. Box 720
Conroe, Texas, 77305

- "A Tutorial Guide to CAD/CAM, CAE Systems"

A survey and buyer's guide to turnkey CAD/CAM computer graphics in these volumes as follows:

Part 1 - "CAD/CAM, CAE: The Contemporary Technology". 252 pages, 1984, \$127 (U.S.). Describes Workstations, displays, plotters etc.

Part 2 - "CAD/CAM, CAE: Evaluating Today's Systems". 120 pages, 1984, \$99 (U.S.). Describes system justification, training, purchasing.

Part 3 - "CAD/CAM, CAE: Survey, Review and Buyer's Guide". 540 pages, 1984, \$368 (U.S.). Provides comparative tables and charts of market statistics and description of vendor companies.

Contact: Daratech, Inc.,
P.O. Box 410
Cambridge, MA., U.S.A.
Telephone: (617) 354-2339

9. CAD/CAM Conferences, Exhibitions, Seminars and Courses

- "Computer Assisted Drafting"
12 weeks commencing Wed., Jan. 9, 1985. Halifax, Nova Scotia.

The CAD/CAM Centre at the Technical University of Nova Scotia will present a course covering the basic concepts and capabilities of the CD/2000 interactive graphics system. The course will consist of twelve weekly lectures of three hours duration each, commencing Wednesday evening, January 9. Registration will be limited to 20 persons. Fee \$825.

Contact: Continuing Education Division
Technical University of Nova Scotia
P.O. Box 1000
Halifax, Nova Scotia B3J 2X4
Telephone: (902) 429-8300 ext. 363.

- "Microcomputer Based Computer Aided Design/Drafting (CADD)
Date - to be announced. Humber College, Rexdale, Ontario.

An intensive two day workshop on microcomputer based CADD to be presented by the Ontario CAD/CAM Centre. Attendees will learn how to select and purchase a Micro Based CADD system in the \$20,000 - \$100,000 price range, what software packages are available and how the system should be managed. Fee \$200.

Contact: Walter Taran
Professional Services
Humber College
205 Humber College Blvd
Rexdale, Ontario M9W 5L7
Telephone: (416) 675-5055

- "FMS '85"
March 11-13, 1985 Dallas, Texas

A conference and exposition for potential users of Flexible Manufacturing Systems (FMS), sponsored by the SME and the Computer and Automated Systems Association (CASA/SME) which will examine both new and proven systems. Focus will be on FMS for mid-volume, mid-variety batch production and the factory of the future. Projected attendance is 1,000 persons.

Contact: Expositions Dept.
Society of Manufacturing Engineers
One SME Drive, P.O. Box 930
Dearborn, Michigan 48121, U.S.A.
Telephone: (313) 271-1500 ext. 334.

- "Advanced Manufacturing Summit '85"
May 14-17, 1985 Birmingham, England.

Contact: IFS (Conferences) Ltd. U.K.
35-39 High Street
Kempston, Bedford MK 427 B.T. U.K.
Telephone: (0234) 853-605
Telex: 825489

- "4th Canadian CAD/CAM and Robotics Conference and Exhibition"
June 18-20, International Convention Center, Toronto.

The above conference will be held in 1985 as indicated. The call for papers, which closed Dec. 15, 1984, indicates the following subject areas. This conference and exhibition, now entering its fourth year, is widely recognized as the largest annual CAD/CAM and Robotics conference in Canada, typically attracting several hundred conference attendees and several thousand attendees to the exhibits section.

Future Software Developments	Computer Aided Scheduling
Future Hardware Developments	Training for CAD/CAM and Robotics
Computer Integrated Manufacturing	Computer Aided Learning
Robotic Research	Robotics for Hostile Environments
Computer Aided Design (CAD)	Robotics for Welding
Computer Aided Engineering	Robot Vision Systems
Design Simulation	Robotics for Material Handling
Design Analysis	Robotics for Assembly
Computer Aided Drafting	NC/CNC/DNC
Computer Aided Manufacturing (CAM)	Justification of New Equipment
Computer Aided Inspection	Flexible Manufacturing Systems.

Contact: Canadian CAD/CAM and Robotics
c/o Canadian Institute of Metalworking
1276 Sandhill Drive
P.O. Box 7317
Ancaster, Ontario L9G 3N6
Telephone: (416) 648-5011.

10. CAD/CAM Articles of Recent Interest

- "CIM and the Education For It" C. Denis Hall
Engineering Dimensions, Nov./Dec. 1984, pp, 17-20

The author, who is managing director of the Centre for Advanced Technology Education at Ryerson Polytechnical Institute and a senior vice president of Northern Telecom Limited, foresees a large educational need in industry to harness the potential of computer integrated manufacturing. To achieve this, in a rapid and timely manner, the author advocates priority for short hands-on training courses for senior employees who are the decision makers in business today, as compared to the slower and more lengthy process whereby those who are conversant with the new technologies eventually reach this level.

- "Computer Integrated Manufacturing: Database Aspects" F. Vernadat
Computer World Canada September 1984 pp, 36-37

The author, with the National Research Council Canada, reviews the many information handling functions such as master production scheduling, computer aided design and engineering, material requirements planning, operation scheduling and shop loading and shop floor control which are essential to successful implementation of Computer Integrated Manufacturing Systems. The role and design of the CIM database containing administrative, design and manufacturing data is stressed.

- "Computer-Aided Process and Operation Planning" W.J. Zdeblick
Commline Sept.-Oct., 1984, pp, 12-16

Describes the two approaches to process planning; the variant approach and the generative approach. Under the variant approach a process plan, and the more detailed operation plan, is created by modifying an existing plan for a similar part as identified using group technology methods. The variant approach commonly uses standard plans for part families. It is the easiest to implement but requires a large historical database and may not keep up-to-date with new technology or capabilities. The generative technique seeks to generate process plans by first capturing all the basic rules using an artificial intelligence approach. It has been demonstrated for small part families but is currently prohibitive from a cost point of view. Author is with Metcut, whose CAPP system uses both the variant and generative techniques in a hybrid system.

11. This newsletter may be reproduced in whole or in part. Reprinting in other Canadian publications is encouraged. Acknowledgement to the CAD/CAM Technology Advancement Council would be appreciated.

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Please note that requests for additions, deletions or changes to the newsletter distribution list should normally be directed to the secretariat.