



GENERAL ENGINEERING NEWSLETTER

Department of General Engineering, University of Illinois at Urbana-Champaign

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FALL 1971

ALUMNI MEETING DEFERRED

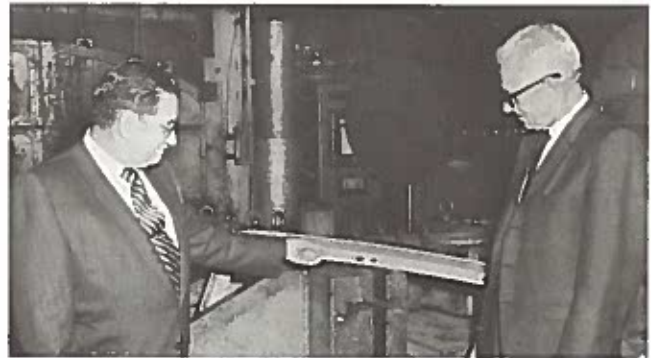
Difficult times spawn difficulties. The human-factor discussions scheduled tentatively for this fall seemed to pose problems for our loyal alumni members. Perhaps these were caused by rising costs, perhaps by a non-lustrous football record, or just by multiplied pressures generally. While continued alumni support is appreciated, it has seemed wiser to defer this specific meeting to a more propitious time.

You alumni can be helpful, therefore, in planning realistically for the future. Specifically you can tell us what types of meetings if any, where, when, and on what topics, would be of most interest and help to you. Should we defer further week-ends until conditions improve nationally? Is spring better than fall? Should we look for an athletic or non-athletic combination?

What topics if any would be useful to you? For example, would cooperative project-research or development (as in 242 senior design or equivalent graduate-level courses) with your companies have value as a departmental or university service? Are companies (Is industry) willing to recognize and reward contributions of students or staff in exploring preliminary design potentials, options, and preferred alternatives?

Directions in which the Department has been moving most rapidly and strongly include 1) 242 and graduate project-design programs, 2) computer-simulation and familiarization for students, with emphasis on small and economical hybrid machines and their use in engineering, 3) significance of technological history and evolution for assistance to emerging nations, 4) environmental studies and improvement as bases for sound decisions, judgments, and administrative actions or regulations, 5) no-fault and painless learning of native-language function and structure to improve communication and prepare for study of foreign languages, and 6) practical studies, using career and occupational prospects as motivation for pupils in both early and later schools—a sound and sophisticated approach to vocational-technical learning and career development.

Would any of these be of interest to you, or do you suggest other directions for effort and development? Please send any comments to the *Newsletter* or to Bob Jewett, chairman of the Alumni Committee.



Charles Gebhardt (left), Staff Engineer and Paul Benner (right), Chief Engineer, Decatur Plant Caterpillar Tractor Co., discussing problems involved in cold-forming curved structured shapes.

242 DESIGN PROJECT AGAIN PLACES IN LINCOLN ARC WELDING NATIONAL CONTEST

For the third time, a senior team from General Engineering 242 has placed in nation-wide competition. According to informal word received by Prof. Bernt Larson, the fourth project entered by the Department (see story pages 4 and 5), "Elastic Springback in Rolled Sections Cold Formed in a Die," is to receive a high award in the Lincoln Arc Welding Design Contest. Further details must await publication and distribution of the official award brochure by the Lincoln Arc Welding Foundation.

The problem-solution thus honored is an example of industry-Department cooperation in realistic, production-applicable, practical design experience for undergraduate students. Need for the computer-simulation program and TAM investigation was formulated by Mr. Charles Gebhardt, visiting staff member from Caterpillar Tractor Co. in Decatur. Other faculty advisers were Professor O.M. Sidebottom of TAM and Professor Morris S. Scheinman of G.E. Team members were Charles W. Fellman, Ronald R. Rutger, and John A. Turner. (For further project details, see page 6.)

FACULTY NEWS

Professor JERRY S. DOBROVOLNY has recently been elected Vice-President of the Illinois Society of Professional Engineers. Jerry has been extremely active as a member of the *National and State Advisory Council on Vocational Education*. He also directed the Summer Institute funded here by the National Science Foundation and planned to upgrade teachers in engineering technology.

Edstrom in Africa—Sprenkel In India

CARL EDSTROM has returned to the Department after two years' stay in the Congo. Carl worked at the Free University of the Congo at Kisangani where he was resident architect involved with physical plant planning as well as research for his doctoral dissertation on vocational technical education. The last six months of his stay were at Kinshasa, the capital of the Congo.

Carl reports that the Congo has experienced economic growth, but considerable academic unrest. This resulted in the nationalization of the three Congo universities and the induction of all Congo university students into the Army. Since 1967, Carl has been associated with long-range planning for the Free University. At present David A. Crane and Associates of Philadelphia are designing seven buildings for the University, to accommodate the expansion of the enrollment from the present 800 students to 5,000 by 1985.

During the summer Professor HERBERT J. SPRENGEL spent more than 2 months in Poona, India, where he acted as a consultant for ELPRO International, Ltd. (a licensee of General Electric), a medical equipment-manufacturing plant. Herb's effort was in organizing and training a design section responsible for X-ray and operating-room equipment. Before the summer ended, his group had completed plans for a fluoroscope and were well along in the design of a diagnostic X-ray table. As a part of his trip, Herb made a complete circle around the globe. He flew west via San Francisco, Tokyo, Singapore, and Bombay and returned via Athens, Brussels, and New York.

Ruhl and Pleck Present Papers

Dr. ROLAND L. RUHL and Dr. MICHAEL H. PLECK both presented papers at the Vibrations Conference and the International Design Automation Conference—The Design Engineering Division of the American Society of Mechanical Engineers—held in Toronto, Canada, September 8–10, 1971.

The paper Mike presented was written by Mike and Rolly and was entitled "Graphical Display of Computer Simulated Unbalanced Rotor Responses."

Rolly presented a companion paper entitled "A Finite Element Model for Distributed Parameter Turborotor Systems." Rolly and Professor J. F. Booker, Associate Professor of Mechanical Engineering at Cornell University, were authors.

Promotion For Streeter

HARRISON STREETER was promoted this summer to the rank of Associate Professor. Besides teaching two law courses (G.E. 290, Contracts and Specifications, and G.E. 292, Engineering Law), Harry is teaching a course entitled "Principles of Ergonomics," which is cross-listed in the timetable as I.E. 305 and Physiology 305. Ergonomics defines a broad area of endeavor involving people of varied backgrounds and interests, including psychologists, physiolo-

gists, physicians, anthropologists, and engineers. Other names for this field are Human Factors, Human Engineering, and Biomechanics. Basically, there are two main goals: one, to design things for effective use by man, be it tools, space capsules, recreation equipment or furniture. The second is to create environments suitable for human work and habitation. Harry is also continuing his involvement with the Institute of Aviation in the design of a ground-based trainer for student pilots. Harry received his Ph.D. in Industrial and Management Engineering from the University of Iowa in 1967.

Pearson Environmental Coordinator

Professor JOHN E. PEARSON has been appointed Associate Director of the new Environmental Studies Program of the University. As the name implies, this center coordinates various campus projects related to environmental studies. It is being proposed that this studies program develop into an Institute conducting independent research. John's specific work at present is coordination with the various state agencies involved with pollution control—Illinois Pollution Control Board, Illinois Environmental Protection Agency, Institute for Environmental Quality—as well as the three state surveys—Geological, Natural History, and Water—located on the campus. In addition he serves as liaison officer with the State Legislature on environmental matters. The program also has a NSF grant to study distribution and effects of lead and heavy metals in the environment.

O'Bryant Assists Peace Corps In Kenya

Dr. DAVID C. O'BRYANT left the campus on October 30, for Kenya, Africa, to help train 18 Peace Corps volunteers for teaching positions in Kenyan universities and technical institutes. These Peace Corps teachers will replace an equal number of Kenyan teachers who will pursue advanced studies in Canada for two years. Dave's wife, Joan, and daughter will remain in Champaign-Urbana. Dave expects to return by the end of December.

Professors BOB BORRI and DAVE O'BRYANT attended the annual ASEE meeting held at the U.S. Naval Academy at Annapolis, Maryland.

PEORIA REGIONAL OFFICE

The College of Engineering has joined with the College of Commerce and Business Administration, the Cooperative Extension Service of the College of Agriculture, and the Extension Division of the University in an experimental program to establish a University regional office in Peoria. Hopefully this pilot project will set standards for a statewide system of extension and public service centers. Professor BERNT O. LARSON has been selected as the College of Engineering's Liaison Officer for Peoria. Currently the effort to give Peoria the University's services more regional focus and coordination has been concentrated on analyzing the needs of the three-county region and general receptivity for services that the University and the College of Engineering can share.

NEW FACULTY MEMBERS

ROBERT L. TRENT, Visiting Professor, received his B.S. and M.S. in EE from Columbia University in 1941 and 1946, respectively, and his Ph.D. in Public Administration at Boston College in 1969.

From 1941 to 1957 he was a member of the technical staff and supervisor in solid-state circuit and systems development at Bell Telephone Laboratories, Murray Hill, New Jersey.

Later he served with Texas Instruments of Dallas from 1957 to 1960; Fairchild Semi-conductor Corporation of Mountainview, California, 1960-61; National Semiconductor Corporation, Danbury, Connecticut, 1961-64; as Vice-President of CTS Microelectronics, Inc., Ridgefield, Connecticut, 1964-65; as Vice-President and General Manager of and with NASA Electronics Research Center from 1965 to 1970. With NASA he was chief of the Qualifications and Standards Laboratory at Cambridge, Massachusetts.

Bob has published eight papers and holds 28 patents in his field of electronics. He is married; Bob and Dorothy have four children.



Robert L. Trent



Thomas F. Conry

THOMAS F. CONRY, Assistant Professor, was graduated from Pennsylvania State University with a B.S. in M.E. in 1963. He obtained his M.S. in 1967 and his Ph.D. in 1970 from the University of Wisconsin.

From 1963 to 1966 Tom worked as a mechanical design engineer in the Delco Electronics Division of General Motors Corporation at Milwaukee. After completing his graduate work at Wisconsin he worked as a research engineer for the Detroit Diesel Allison Division of General Motors Corporation, Indianapolis. Tom's major research experience has been in the areas of gear design, contact stresses, design of surfaces for uniform load distribution, turborotor dynamics, and hydrodynamic bearing design.

Tom is also married. He and his wife Sharon have one daughter.

ILLINOIS GRAPHICS COMPUTING SYSTEM

This is the first known attempt to build a high-performance, stand-alone, hard-copy computing system for under \$50,000. It represents a research and development program involving the faculty and students of the Departments of General Engineering and of Computer Science. Two specific hardware components have been combined: a high-performance disk-oriented minicomputer, plus a high-speed electrostatic printer plotter. Usual assemblers and compilers (BASIC, FORTRAN) will be included, together with a plotting package as effective as, but less costly than, the digital incremental line plotters.

Currently, two user-oriented languages are being developed. First is a drafting language (ADL) for use in engineering graphics. Second is the Illinois Simulation Language (ILLISIM), which will allow digital simulation and display of systems represented by differential and algebraic equations. This numerical package offers superior performance for handling these mixed systems. Low cost, high speed, graphic output available through the basic plotting package and a drafting language will allow ILLISIM to provide rapid turn-around with graphical hard copy output of the student's design simulation.

Potential system output speed for standard-character printing is five times that of standard line-printers: 4800 vs 1100 lpm. Plotting speed is approximately one 8½" x 11" page per second. While this figure can't be compared directly to those for standard digital incremental line printers, this new G.E. system plots roughly 100 to 1,000 times as fast.

Potential applications of the system would appear to be limited only by imagination. Any instructional environment with moderate computing needs and a desire for copious and fast hard-copy output could find the system attractive. Initial uses in General Engineering will center on two areas: automated graphics instruction in G.E. 103, and advanced problem-solving in design sequence, with special emphasis on G.E. 241.

G.E. 103 HONORS SECTION INTERIM REPORT

Beginning last fall, Dr. MICHAEL H. PLECK and Dr. LOUIS WOZNIAK introduced a revised format for the G.E. 103 Honors sections, man-to-man and man-to-machine communication. In the man-machine domain, projects were carried out in both computer-graphics and computer-simulation. Course content was adapted from Professor Ruhl's work at Cornell and is directed toward introducing the student to engineering methodology with special emphasis on problems and methods of communication.

Traditional descriptive geometry is not being abandoned in the new course. Solutions for certain problems are often more quickly found through descriptive geometry than by analytic means or a computer solution for which an extensive program would have to be written. Skills learned are on a need-to-know basis, not for their own sake, and only after a use for them has been clearly demonstrated.

G.E.242 AWARD PROJECT DESIGN

CALCULATION OF DIE RADIUS TO COLD-FORM ROLLED SHAPES

January 13, 1971

TEAM

JOHN TURNER
CHUCK FELLMAN
RONALD RUTGER

ADVISORS

CHARLES GEBHARDT CATERPILLAR REPRESENTATIVE
PROF. M. SCHEINMAN GENERAL ENGINEERING DEPT.
PROF. O. SIDEBOTTOM T.A.M. DEPT.

13.83

PROBLEM

The trial and error method to form rolled shapes by cold forming in a die is an expensive procedure. The purpose of this project is to develop a computer program to calculate the die radius necessary to obtain a desired radius in cold formed shapes.

- The depth of the section is assumed to remain constant when strained. Hence all of the cross-strain due to Poisson's ratio will affect the width of the section. In the elastic range, no change in width of elements is made.

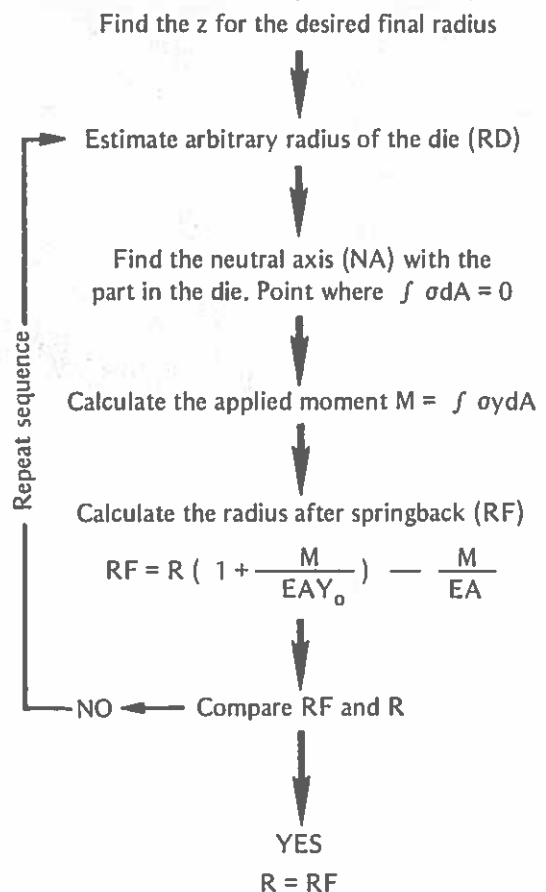
CONSIDERATIONS

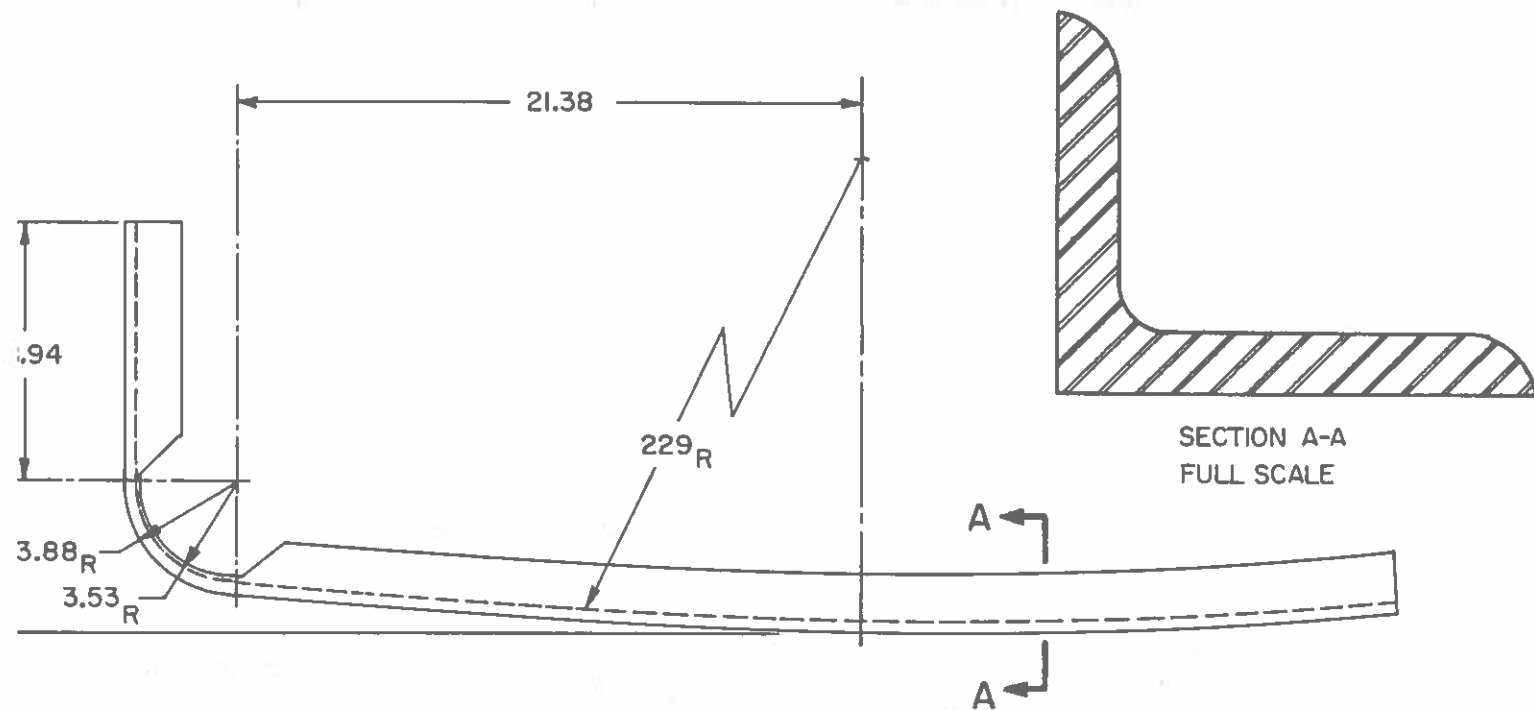
The shapes under investigation are limited to angles, channels and tees. Plate is excluded, as good approximations exist by C. A. Queener and R. J. Angelis. Problem simplification is accomplished through use of assumptions.

ASSUMPTIONS

- Plane sections before deformation remain plane after deformation.
- The shear and radial stresses may be neglected.
- The circumferential stress and strain in the curved beam have the same relationship as that determined from tension and compression tests.
- The neutral surface for the plastic analysis is at a location different from that of the elastic analysis. (Actually a fact, but is sometimes neglected.)
- Shear deflections are neglected because in large plastic deflections the shear components become negligible.
- The moment is constant through the entire length of the bend. (Therefore we need to analyze only one cross section.)
- Residual stresses are neglected due to the Baushinger effect.
- Angles, channels and tees are considered acting alike because the shapes are supported in the die.
- In the plastic range, the width change is equal to the tensile or compressive change because the volume is constant and the height is assumed to remain constant.

Procedure Diagram For Determining Part Radius (R)





Caterpillar Tractor Co. Part No. 7D 6447

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PAGE 06 1/13/71 11:26 PM CALCULATES DIE RADIUS FOR BENDING SPRINGBACK
0001 SURROUTINE STRESS ( EPSLON , R , DELTA , SIGMA , AREA )
0002 AREA = R * DELTA
0003 IF ( EPSLON .GE. 0 ) GO TO 10
0004 C
0005 C STRAIN IS (-), SELECT COMPRESSION STRESS-STRAIN CURVE, COMPUTE
0006 C AREA OF ELEMENT ( AREA ) AND STRESS ON ELEMENT ( SIGMA )
0007 C
0008 IF ( EPSLON .LT. -0.0014 ) AREA = AREA * (1.0-1EPSLON+0.0014)
0009 SIGMA = 30.0E4 * EPSLON
0010 IF ( EPSLON .LE. -0.0014 .AND. EPSLON .GT. -0.0035 )
0011 SIGMA = 2105261.0 * EPSLON - 38900.0
0012 IF ( EPSLON .LE. -0.0035 .AND. EPSLON .GT. -0.010 )
0013 SIGMA = 14.0E4 * EPSLON - 45300.0
0014 IF ( EPSLON .LE. -0.010 .AND. EPSLON .GT. -0.0265 )
0015 SIGMA = 751429.0 * EPSLON - 39686.0
0016 IF ( EPSLON .LE. -0.0265 .AND. EPSLON .GT. -0.0565 )
0017 SIGMA = 496666.0 * EPSLON - 46733.0
0018 IF ( EPSLON .LE. -0.0565 )
0019 SIGMA = 247000.0 * EPSLON - 59130.0
0020 RETURN
0021 C
0022 C STRAIN IS (+), SELECT TENSION STRESS-STRAIN CURVE, COMPUTE AREA
0023 C OF ELEMENT ( AREA ) AND STRESS ON ELEMENT ( SIGMA )
0024 10 IF ( EPSLON .GT. 0.00157 ) AREA = AREA * (1.0-1EPSLON-0.00157)
0025 SIGMA = 30.2E4 * EPSLON
0026 IF ( EPSLON .GT. 0.00157 .AND. EPSLON .LT. 0.010 )
0027 SIGMA = 5.0E4 * EPSLON + 47500.0
0028 IF ( EPSLON .GT. 0.010 .AND. EPSLON .LT. 0.033 )
0029 SIGMA = 447500.0 * EPSLON + 43325.0
0030 IF ( EPSLON .GT. 0.033 .AND. EPSLON .LT. 0.0668 )
0031 SIGMA = 215556.0 * EPSLON + 51444.0
0032 IF ( EPSLON .GT. 0.0668 )
0033 SIGMA = 1.5E4 * EPSLON + 54650.0
0034 RETURN
0035 END

```

FORTRAN DIAGNOSTIC RESULTS FOR STRESS
NO ERRORS

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PROGRAM LENGTH
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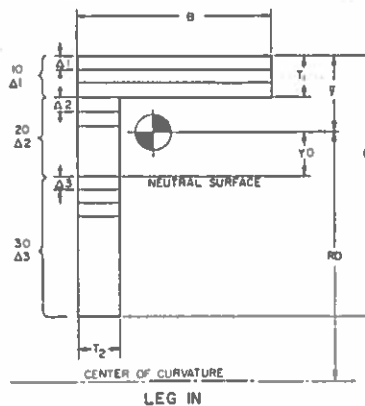
SIAP
43267 SPACF 43307 DRQERHOP 43556 PAUSE 63644 FIXF
44110 CONTROL 46255 PARAPMNT 46704 FORMAT 67246 UCDD
72415 INIGPT 73046 RADIUS 73433 0494

COMM CHI
0001A I

DATA CHI
73433

```

Part of computer program using adjacent procedure diagram



Analysis Diagram

RESULTS

Radius of part = 223.4 in.
 Actual radius of the die = 146.8
 Die radius suggested by our procedure = 157.7 in.
 Error = 10.9 in.
 Percent of error = 7.4%

CONCLUSION

Although the 7.4% error is questionable from a statistical standpoint we feel this is probably nearly correct. Our reasoning is that both the TAM report no. 327 and the Elastic Springback and Residual Stresses in Sheet Metal Formed by Bending have errors of less than 10%.

G.E.'s IN LINCOLN DESIGN COMPETITION

Four G.E. 242 design projects were entered in the 1971 Engineering Student Design Competition which is sponsored by the James F. Lincoln Arc Welding Foundation. All were entered in the Undergraduate Division, one as a structure design and the others as designs for manufactured products. Each entry was the product of a team of three men.

RODNEY G. KITICK, '71, of Champaign, DONALD M. FIELD, '71, who hails from Hazelcrest, and BRUCE R. HOLECEK, '71, Riverside, collaborated on the design of a Hydraulic Refuse Compacter for use in the average home. Their goal was to develop a device that was relatively inexpensive to manufacture, would have only a few parts which could all be easily repaired or replaced, and would be capable of generating a 6000 pound force using only tap water pressure. They investigated three separate and distinct designs; a rolling diaphragm and outer springs action, a balloon and innertube action, and a rolling diaphragm and inner springs action, choosing to develop the last scheme because it met their criteria. Mr. C.W. STONE, Mr. R.J. HENNEMAN, of Carroll-Henneman and Associates, Inc., Urbana, and Mr. Sam Kennedy, President of New Products, Inc., Taylorville, served as consultants. In fact, Mr. Kennedy had a prototype built.

The team of RICHARD A. CIELLO, '71, from Chicago, JAMES W. LOCKE, Jr., '71, Lancaster, Ohio, and STEVEN P. NYSTEDT, '71, of Waukegan, worked on the development of a Power Respirator for Large Animals. Objective of the study was a simple, inexpensive prototype ventilator which could be operated with maximum safety for large animal surgery. Ultimate solution involved pneumatically operated controls and variable capacity at a cost of only \$250 for construction of the prototype. However, since there are still some "bugs" in the systems which must be eliminated, the study is being continued. The advisors on this project were Professor H.J. SPRENGEL, Dr. J.C. Thurmon, Department of Veterinary Medicine, and Mr. C. GEBHARDT from Caterpillar Tractor Co.

Working in the same general field, DONALD A. CARLSON, '71, an E.E. from Urbana, LAWRENCE W. HINDLE, '72, of Earlville, and JOHN M. MUNSON, '72, Mendota, developed a Large-Animal Anesthesia Machine. This problem was to design a portable, inexpensive but reliable machine of variable capacity that, in a closed system, takes air expired by an animal, cleanses it, introduces anesthesia gas, and returns the combined air and gas to the animal's lungs. As finally developed, this design called for two vertical canisters filled with soda lime crystals. Air exhaled by the animal entered the bottom of the canisters, filtered upward through the crystals and out through the top, free of CO₂ and ready for the anesthesia gas. Another innovation was the use of 1/4" diameter tubing in contrast to the 3/4" tubing currently used in anesthesia machines. The larger diameter permitted freer flow of air and required less effort to breathe on the part of the animal. Professor H.J. Sprengel and Dr. J.C. Thurmon were other design advisers.

The fourth project, Elastic Springback in Rolled Sections Cold Formed in a Die, was the work of CHARLES W. FELLMAN, '71, Peoria, RONALD R. RUTGER, '71, of Moweaqua, and JOHN A. TURNER, '71, of Champaign with Professor M. SCHEINMAN, Professor O.M. Sidebottom from the T.A.M. Department and Mr. C. Gebhardt of Caterpillar Tractor Co. serving as consultants. It was entered in the Structures Division of the competition. These students developed a strictly computerized model of what happens in the bending and spring-back of a hot rolled section when it is cold bent and released in a die form. From this model, the die radius required to obtain the desired radius or curvature of a given cross section can then be determined. The purpose of this project was to save industry the tremendous expense of trial-and-error die making for the cold bending of rolled sections other than plates. This project received the G.E. Design Award last spring.

I.S.G.E. STUDENT SOCIETY

New officers for 1971-72 are: President, ALBERT J. AIKUS, '72, Waukegan; Vice-President, FRANK J. FRONCZAK, Jr., '73, Chicago; Secretary, JAMES H. WILDEMUTH, '72, Annawan; Treasurer, SAMMY ANDERSON, '72, Mt. Vernon; Engineering Council Representatives, JOSEPH J. SARMIENTO, '73, Olympia Fields; ALLEN SCHWARTZBERG, '72, Miami, Florida. Faculty advisors continuing from last year are Dr. DAN METZ and Dr. ROLAND RUHL.

First-meeting discussion of possible activities included Engineering Open House, seminars, a letter to companies interviewing on campus, and student participation in the Curriculum Committee. The group already has established a textbook exchange and has distributed class rosters so that members of G.E. classes can get to know each other more readily. The society will also sponsor basketball and softball intramural teams and will again challenge the faculty to a bowling match. Last year's match, won by the students, featured a close and exciting contest.

Monthly meetings feature University and industry speakers as well as discussions, and alumni are cordially invited. A request will bring you detailed announcements.

The Society is to be commended heartily for arranging its November meeting to take advantage of the Ergonomics-Human Engineering theme originally planned for the Alumni meeting. The two guest speakers were Dr. Bruce A. Hertig, Director of the Laboratory for Ergonomic Research, and Dr. Robert C. Williges, Assistant Head for Research, Aviation Research Laboratory.

GENERAL ENGINEERING TRUST FUNDS

The University of Illinois Foundation recently transferred the amount of \$5,000 from the General Engineering Trust Fund to create an invested account by the name of the General Engineering Special Endowment. The balance in the Trust Fund still exceeds \$2,000. Two other funds, the Scholarship and the Special Endowment Income, continue with balances at or above \$500 each.

STUDENTS WORK IN EUROPE

Three seniors in General Engineering, SAMMY L. ANDERSON of Mount Vernon, RICHARD A. FORBES from Robinson, and MARIO A. STELLA, Chicago, were among the eleven students from the University of Illinois who worked in Western Europe last summer. They were employed 8 to 12 weeks in jobs in their fields of study. The students received salaries which covered their living costs but did not pay their travel and other expenses. Their jobs were arranged through the International Association for Exchange of Students for Technical Experience.

Sammy L. Anderson

Sam Anderson worked as an industrial engineer-in-training for Kodak Pathé in Vincennes, France, a suburb of Paris. He was assigned to the micro-film and copy department. Much of the time his duties were those of a photographic technician. Sam lived in one of the French houses in Cité Universitaire, an area of dormitories for students, especially students from outside of France, and ate at the various "student" restaurants in the area. He considered the experience worthwhile because of the insight into engineering and managerial problems which he gained. Since Sam is interested in the business operation of engineering, the understanding he acquired of the motivation of the worker and of the status of professional men as opposed to that of the factory worker seemed valuable to him. His big problem was his inability to speak or understand French. After completing his work experience he traveled through Italy, Switzerland, Germany, Belgium, the Netherlands, and England before returning home.

Richard A. Forbes

Richard Forbes was employed as a mechanical engineer in a power plant of Kobenhavns Belysningsvaesen, Copenhagen, Denmark. He was assigned to the Svanemolle Vaerket, the second largest of the company's three plants. This plant was built in 1950 to furnish power and hot water in summer and power, hot water, and steam for heating in winter to a section of Copenhagen. Dick was expected to learn the processes used to produce these products by observation and by questioning the engineers on the job. He was particularly impressed by the efficiency and economy of the operation. The water used was thoroughly purified and then re-cycled a number of times. Depending upon which procedure was the most economical at the time of the year, the power company bought power from Sweden, generated power by burning coal imported from Poland and Russia or oil purchased from American oil companies. The same burners were used in both operations.

Dick lived in Lyngby, a suburb on the north side of Copenhagen and close to his work. He particularly enjoyed his contacts with the people of Denmark. Language was no problem for him because the Danish children start learning to read and speak English in the lower grades. Dick traveled some in Europe before starting work, bicycling from Hamburg, Germany to Copenhagen.

Mario A. Stella

Mario Stella worked on a research project in heat transfer at the applied science laboratory of the University of Sussex in Brighton, England. The project was concerned with the removal of heat developed in the operation of large generators. This heat becomes so intense that it cannot be effectively removed by forced air. Wire used in the coils of the generators is so large in diameter that it actually can be a tube through which a coolant is pumped to keep the coil from overheating. Mario's assignment was to measure the heat transients of sample cylinders of the coil tubing which were heated and then cooled by a variety of coolants simulating the cooling of high-powered coils in large generators. This research seemed to be funded by industry.

Actually, the university is located in Falmer, a suburb of Brighton, and Mario lived in Hove, another suburb nearby. He, with twelve other young people, was housed in a boarding house which catered to students from outside England. There was little opportunity for him to meet socially the people of the country. Mario found interesting some of the differences between the academic worlds of England and the U.S. Over there only the department heads are called "Professor," and most members of the instructional staff have doctor's degrees and so are addressed as "Doctor ———." Only three years of study are required to earn a bachelor's degree and three more years to earn a doctor's. Common practice seems to be to by-pass a master's degree. Mario spent two weeks in Italy and a few days in Paris before starting his work.

All of the men enjoyed their experiences out of this country and considered them worthwhile. They returned with the feeling that the United States, with all its faults and problems, is not a bad place to live.

Students hoping to participate in the IAESTE program in 1973 or 1974 should begin now to plan for it. Juniors or seniors are preferred although graduates are accepted. Application forms may be obtained from Dean Wakeland's office. Mrs. Burroughs, in that office, will be glad to answer any questions the applicants may have about the program.

SUMMER OFFERINGS FOR SECONDARY SCHOOL STUDENTS

This summer three high school programs were offered by the Department to acquaint participants with the character and scope of engineering and how engineering can be used to solve problems of our society. First was the twelfth Summer Science Training Program for high-ability students, sponsored by the National Science Foundation. Thirty-three students from Illinois and nine other states attended. Professor DOBROVOLNY was program director.

The Junior Engineering Technical Society (JETS) also sponsored its 10th annual two-week summer program, plus a special two-week section for inner-city students from the Chicago area. Staff members involved included: GORDON E. MARTIN, L. DANIEL METZ, D.C. O'BRYANT, and HAROLD KERZNER.

ALUMNI NEWS

'26 HAROLD M. DOWELL began his higher education in the University of Illinois; he received his bachelor's degree from New York University in 1940, and his C.P.A. certificate from the State of New York in 1943. As a tax consultant and auditor his travels take him widely through the southern states and to Europe.

'26 ARTHUR F. ZITZEWITZ is Chairman of the Board for Mid-Continent Metal Products Company, Chicago.

'34 ROGER S. FABRI will head up a ten-man crew for appraisers traveling throughout Mexico for three months this fall. He will be representing his firm, Coats and Burchard Company, and Lloyd Thomas Company, in evaluating the various properties of Cerveceria Cuauhtemoc S.A., a large brewery complex.

'39 JULIUS E. SCHOELLER has retired from the U.S. Army with the rank of Colonel. His address is Carmichael, California.

'39 RAYMOND WIGGINS was originally in the UI class of '39, was graduated from the U.S. Naval Academy in '41, from the U.S. Navy Post-graduate school in '49, and received his M.S. degree from M.I.T. in '50. He has retired from the Navy with the rank of Commander, and now is employed by North American Rockwell, Los Angeles Division, in the B1 Program. Four of his six daughters live at home in Fullerton, California.

'43 RICHARD H. HORNING has recently changed his address to Oakland, California, where he is director of marketing and planning for Physics International.

'58 JON PEACY is currently employed as C.E. III, Metropolitan Sanitary District, in Chicago. Jon received his M.S. in '67 from the U. of I., and an additional degree from the University of Washington (Seattle) in '71. He plans to become active in air-pollution control.

'59 WILBUR L. KNUTSON is practicing as estimating manager of Allied Industries, Houston, Texas, and has qualified as a registered professional engineer in that state.

'63 CHARLES H. THOMAS, Jr., received his law degree from DePaul University in Chicago and is now a patent attorney with Nuclear Chicago Division of J.D. Searle.

'64 G. RICHARD ARMSTRONG is back in the Navy and currently stationed at the Naval Air Station in Corpus Christie, Texas. Dick has been one of the alumni directors while working as a marketing engineer for Olin Brass Company in East Alton, Illinois. His tour of active duty extends until July, 1973.

'65 ROGER A. LARSON completed his M.B.A. from Northwestern University in June of this year, and then moved to Saratoga Springs, New York. He is Plant

Engineering Manager for the Carton & Container Division of General Foods Corporation. He and his wife Ann now have two daughters, Liz, 3 years, and Jennifer, 11 months.

'65 JOHN A. REDIN is now a missionary-teacher at the Beautiful Gate Baptist Church, Kowloon, Hong Kong. He married Lucy Perea, a missionary-nurse, there in June of this year.

'66 STEVEN G. JONAS received his law degree from Wayne State University Law School, Detroit in June, 1970. After graduating from the U. of I. he became Product Design Engineer with the Ford Motor Company. Presently he is an attorney with American Motors Corporation, Detroit.

'66 KAY LESTER, (Mrs. E. Reid McDaniel), is now living in Little Rock, Arkansas, where her husband is sales manager for the Taylor Wine Company.

'67 JAMES E. SKIERSKI moved to Connecticut after completing his M.B.A. at the U. of I. in '69. Now he has returned to the midwest, assuming the position of Assistant Plant Manager for Gould, Inc., in Kankakee.

'68 PHILLIP M. KASIK received his M.S. from the University of California at Berkeley in 1969, and is now a Lieutenant in the U.S. Navy. He has just completed a six-month program at the Bettis Reactor Engineering School of Westinghouse. Phil is now Core Materials Engineer for the Division of Naval Reactors, AEC, Washington, D.C.

'69 ROBERT A. SHOOK, released from active duty with the U.S. Army in March, was married to Elizabeth Kelso ('68) in April, and began working for Ingersoll-Rand in July. His position with the company is Maintenance Project Engineer, and his address is Painted Point, New York.

'70 BARRY R. GOODMAN married Marly Ragins ('70) this past June and moved to Cincinnati, where he will enter Chase School of Law. He will work as Assistant Project Engineer for the Turner Construction Company; Marly will be teaching school.

'70 HERBERT W. LINNE has earned his Navy pilot's Wings and the rank of LTjg in Pensacola. Beginning this fall he will start a three-and-a-half year tour of active duty, with home base at Quonset Point, Rhode Island. Herb and Joyce ('70) had their first child July 6, '71 and named her Suzanne Michelle.

'71 RODNEY J. BAUDINO married Donna Sutton immediately upon graduating in February. They moved to York, Pennsylvania, where Rodney began a graduate engineering training program with the York Division of Borg-Warner.