

GEORGIA INSTITUTE OF TECHNOLOGY  
OFFICE OF CONTRACT ADMINISTRATION  
SPONSORED PROJECT INITIATION

Date: May 1, 1979

Project Title: Extension Services to the Korea Credit Guarantee Fund

Project No: A-2354

Project Director: R. W. Hammond

Sponsor: Korea Credit Guarantee Fund

Agreement Period: From April 26, 1979 Until April 25, 1980

Type Agreement: Contract dated March 30, 1979

Amount: \$55,574\*

Reports Required: Quarterly, Annual

Sponsor Contact Person (s):

Technical Matters

Contractual Matters  
(thru OCA)

Mr. Youn Jai Kim  
Executive Director  
Korea Credit Guarantee Fund  
C.P.O. Box 1029  
Seoul, Korea

\*Including \$15,096 to be paid by KCGF in local currency for locally incurred expenses.

Defense Priority Rating:

Assigned to: International Programs Office (School/Laboratory)

COPIES TO:

Project Director  
Division Chief (EES)  
School/Laboratory Director  
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Library, Technical Reports Section  
EES Information Office  
EES Reports & Procedures  
Project File (OCA)  
Project Code (GTRI)  
Other

19-11  
GEORGIA INSTITUTE OF TECHNOLOGY  
OFFICE OF CONTRACT ADMINISTRATION  
SPONSORED PROJECT TERMINATION

Date: 9/2/80

Project Title: Extension Services to the Korea Credit Guarantee Fund

Project No: A-2354

Project Director: R. W. Hammond

Sponsor: Korea Credit Guarantee Fund

Effective Termination Date: 6/30/80

Clearance of Accounting Charges: 6/30/80

Grant/Contract Closeout Actions Remaining:

- ☒ Final Invoice and Closing Documents
- ☐ Final Fiscal Report
- ☐ Final Report of Inventions
- ☐ Govt. Property Inventory & Related Certificate
- ☐ Classified Material Certificate
- ☐ Other \_\_\_\_\_

Assigned to: EEL/IDO (School/Laboratory)

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Library, Technical Reports Section  
EES Information Office  
Project File (OCA)  
Project Code (GTRI)  
Other \_\_\_\_\_



EXTENSION SERVICES TO THE  
KOREA CREDIT GUARANTEE FUND

Annual Report  
(April 26, 1979 to April 25, 1980)

by  
Ben E. James, Jr.

Engineering Experiment Station  
GEORGIA INSTITUTE OF TECHNOLOGY  
Atlanta, Georgia 30332, U.S.A.

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## Foreword and Acknowledgments

This second annual report on services provided by the Georgia Institute of Technology (GIT) in a cooperative program with the Korea Credit Guarantee Fund (KCGF) represents extensive contributions from both organizations.

The Georgia Institute of Technology expresses its fullest gratitude to the entire staff of the Korea Credit Guarantee Fund for its diligent efforts and cooperation in making this second year's activities meaningful and productive.

Special thanks are given to the following individuals whose efforts and understanding have made this cooperative program successful:

Chairman and President Byoung-Soon Song  
Executive Director Youn Jai Kim  
Executive Director Choon Keun Lee  
Executive Director Pan Young Lee  
Mr. Yong Tae Sohn, Director, Extension Service Department  
Mr. Young Lae Cho, Director, Extension Service Department  
Mr. Un Young Lee, Extension Service Department  
Mr. Jae Sool Park, Extension Service Department  
Mr. Kee Hoon Kim, Extension Service Department

Many others on the staffs of both the Korea Credit Guarantee Fund and the Georgia Institute of Technology have contributed greatly to this program.

Special acknowledgement is given to Professor Young Ho Lim and his staff of the Mechanical Engineering Department of Soong Jun University for providing much research material and advice used on this project.

This program has a dual purpose: to provide management and technical assistance to companies selected by KCGF and to provide on-the-job training in extension methodology to KCGF extension staff as this assistance is provided. Valuable experience was gained on cases where the information and assistance were utilized by the selected companies as well as when, for

a variety of reasons, the information and assistance was not utilized.  
To this end, it is felt that the second year's activities met the program objectives.

Ben E. James, Jr.  
Senior Staff, Office of the Director  
Engineering Experiment Station  
GEORGIA INSTITUTE OF TECHNOLOGY

## Annual Report

### EXTENSION SERVICES TO THE KOREA CREDIT GUARANTEE FUND

#### Background

Initiated in April 1978, the cooperative program of training and technical assistance concluded its first year with the general feeling among KCGF and Georgia Tech representatives that it had been successful and could be profitably continued. Many of the traditional "start-up" problems had been resolved, and both the companies assisted and the KCGF personnel trained felt that the efforts had provided positive effects.

In the spring of 1979, Executive Director Young Jai Kim visited Atlanta and signed the joint agreement between the Korea Credit Guarantee Fund and the Georgia Institute of Technology renewing the cooperative extension services program for an additional year.

During the ensuing project year, three detailed reports describing the extension activities with KCGF member companies were presented to KCGF management. Also presented to KCGF was a detailed set of recommendations for establishing an information center for KCGF extension activities. Finally, the assistance needs of the companies being considered for the third-year program activities were outlined in a detailed report which was included with an extension activity report.

Appendix 1 indicates the subjects covered and the schedule of the KCGF training program held at Georgia Tech. Appendix 2 contains excerpts from a report providing recommendations for an extension information center, while Appendix 3 covers the details of assistance provided to the individual companies and the observed or anticipated results during the project year.

#### Summary of Activities

The program of activities during this project year consisted of three major segments:

Training at Georgia Institute of Technology

Assistance in establishing an information center at KCGF

Direct management and technical assistance to KCGF member companies

## 1. Training

A formal training program was conducted at the Georgia Institute of Technology from November 19, 1979, through May 9, 1980. This training program was custom designed to provide experience in industrial extension techniques and principles as well as training in the English language. Four KCGF staff members participated: Mr. Min Seong Ha, Mr. Woo Seock Jeong, Mr. Jae, Young Jang and Mr. Young Rock Hwang.

The training program was conducted in three segments: The first segment consisted of seven weeks of lectures and field visits, and the second segment comprised ten weeks of intensive English language instruction. The final nine-week segment involved lectures and extensive field visits. (See Appendix 1.)

The informal training mentioned in the first annual report was continued and remained a valuable component of the total training effort. This "on-the-job" training that occurs when KCGF staff accompanies a Georgia Tech field engineer on a company visit in Korea could have been more effective had a greater number of the engineers on the KCGF staff been involved. It is recommended that in order to increase on-the-job training benefits to the KCGF technical staff, small teams (two to three persons) of technical staff be assigned to work with the Georgia Tech field engineers on each assigned company.

## 2. Extension Information Center

Assistance in establishing an extension information center was provided to KCGF during the project year. The first step was to determine the type of publications required to meet KCGF's information needs. Next, various Korean sources of this type of information were investigated. Then a list of publications recommended for purchase by KCGF was developed. Finally, basic procedures for an information center were established and brief training sessions were held with KCGF personnel. At the termination of this activity, the Georgia Tech information specialist accompanied staff members of KCGF to Taipei to assist in placing orders for recommended publications. (See Appendix 2.)

### 3. Direct Management and Technical Assistance

This activity consisted primarily of providing direct management and technical assistance to Korean companies which had been designated by the Korea Credit Guarantee Fund.

During this phase of the program, a total of 62 management and technical assistance visits were conducted with personnel from 20 companies. In addition, 20 fact-finding visits were made to 19 companies being considered for the third-year program. This total of 82 visits with 39 companies contrasted with the first-year program, where a total of 62 visits were made to 15 companies.

The general procedure established for management and technical assistance visits during the first-year program remained basically unchanged during this program year. This procedure is as follows:

a. Preliminary Meeting. KCGF schedules appointments for KCGF and GIT technical personnel. This meeting is usually held at the company factory, where the manufacturing operation is observed. First, company management discusses the company's background, products, processes, and other pertinent material. An inspection of the manufacturing facilities follows, with a discussion of the company's technical problems and needs. Where appropriate, suggestions for production improvements are made immediately. A final session reviews technical areas where assistance or information can be helpful.

b. Second and Subsequent Meetings. As soon as relevant information is available or assistance ideas are formulated, KCGF schedules one or more subsequent visits to the company. KCGF and Georgia Tech then present the information or technical assistance concepts to the company, utilizing detailed explanations, sketches, calculations, or whatever is needed to permit management to give consideration to the recommendations.

During the first program year, it was suggested that Extension Service Department personnel of KCGF check back at six-month intervals with the companies which had been provided information and assistance in order to determine, first, what actions had resulted from the recommendations and, second, if there were additional problems or needs. This check, which should be done by telephone, will allow KCGF to ascertain whether or not additional plant visits will be needed.

The nature of the technical assistance provided to these companies covered many areas. The individual company write-ups in Appendix 3 cover the types of assistance provided to each company.

A list of the specific types of assistance and information provided to the 20 companies is included here to show the scope and variety of activities. The assistance and information provided were both technical and managerial in nature.

#### Management and Technical Assistance and Information

- o Use of lower-cost soldering material
- o Design concept for cooler assembly fixture
- o Design concept for improved tube roller expander
- o Information on U.S. sources of small fan motors
- o Information on lower-cost alternate fuel
- o Design concept for gas fluxing attachments
- o Information on sources of shut-off valves
- o Information on foreign fabrication techniques for aluminum coolers
- o Concept for using waste heat instead of electric heat for drying
- o Suggestions for speeding up drying process
- o Suggestions to improve quality control methods in glass forming process
- o Data on machine tool speeds and feeds
- o Information on rotor coil casting
- o Design concept for improved coil winder
- o Information on use of tungsten carbide cutting tools
- o Concept suggestions and source information on pneumatic files
- o Suggestion for improved workplace layout on stator punch
- o Information on spring design and application
- o Design data on "Belleville" springs
- o Information on ASTM and ANSI standards for springs and spring materials
- o Design concepts for improving productivity on trim saw
- o Suggestions for improving tool bit silver soldering process
- o Suggestions on general improvement in bit manufacturing productivity
- o Information on special fixture clamping components



- o Suggestions for modifying hydraulic circuit in press
- o Information on cutting tool engineering
- o Information on sintered carbides
- o Assistance in improving diamond grading process
- o Design concept for mold demagnetizer
- o Design concept for productivity and quality improvement in blade truing process
- o Design concept for hydraulic clamp for silver soldering process
- o Data for rotary pressure/vacuum joints
- o Information on truing and dressing diamond wheels
- o Information on miniature diamond tooling
- o Information on diamond tools compared to diamond-compact tools
- o Assistance in reducing blowholes in aluminum castings
- o Information on improving safety of punch presses
- o Suggestions to save energy by using sodium vapor light
- o Information and assistance on machine tool vibration reduction
- o Design information on epicycloidal speed reducers
- o Information on planetary gear train design
- o Design concepts for vibrating screen separators
- o Assistance in determining "eccentric throw" calculations.
- o Assistance and information on manufacturing resistance heating elements
- o Assistance and information on solving aluminum casting defects
- o Suggestions for reducing product cost by material substitution
- o Assistance in weld joint redesign to reduce leaks
- o Design concept for resistance seam weld head
- o Assistance in environmental testing blower impeller
- o Information on "value engineering" application
- o Assistance and information in selecting heat treatable aluminum alloy
- o Information on aluminum anodizing
- o Information on electroplating processes
- o Cost information on U.S. brake spring components
- o Cost information on U.S. spring steel raw material
- o Design concepts for fixtures to reduce welding warpage.
- o Information on heat treating tool steels

- o Information on production and inventory control
- o Review and critique of heat exchanger design calculations
- o Investigation of fatigue failure in heat exchanger tube and recommendation of corrective action
- o Information on dissimilar metal welding
- o Investigation of tube to tube sheet weld failure and recommendation of corrective action
- o Assistance in calculating tube expansion in heat exchanger tubes
- o Information on nondestructive testing weld examination
- o Design concept for semiautomatic heat exchanger tube welder
- o Design concepts for vapor degreasing equipment
- o Design concepts for special drill jigs
- o Information and technical opinions on internal helical broaching
- o Assistance and information on automated tank manufacturing
- o Assistance and advice on forming transformer cooling panels
- o Assistance in plant layout for electronic assembly
- o Design concept for electronic assembly fixtures
- o Information on mechanization concepts for tool segment production
- o Assistance in gage design for maintaining taper dimensions
- o Information on design concepts by U.S. manufacturers for vibrating screens
- o Design information on bucket elevators
- o Information on "line balancing" for multi-operator work stations
- o Assistance in swaging die and guide design
- o Assistance and advice on reducing warpage in cast iron frames
- o Information on U.S. military specifications for vehicle and weapons springs
- o Assistance in writing and editing technical brochure
- o Assistance in straight-line projection production forecasts
- o Assistance in setting up plant-wide safety program
- o Information on U.S. techniques of operator training
- o Information on fringe benefits provided by U.S. industries

### Results

As pointed out in the annual report for the first program year, the acceptance of advice, information, and assistance by company management

varies widely from dynamic and eager immediate acceptance to the other extreme of distrust of advice from outsiders which usually results in complete indifference and nonacceptance. Because of the extensive experience of Georgia Tech in transferring technology both in Georgia and in many developing countries, the recommendations are always tailored to the companies' abilities to implement these recommendations with respect to available capital, available technical skills, and readily available equipment and materials. Even so, the time lag between the assistance provided and actual implementation of the advice, new technology, or information is unpredictable.

Georgia Tech field engineers and management personnel, in evaluating the KCGF/GIT management and technical assistance phase of this program have noticed a definite similarity between the rate of acceptance of new technology by Korean companies and companies in Georgia. A pitfall to be avoided, however, is for program managers, in their zeal to gain widespread acceptance of the management and technical assistance activities, to "oversell" or promise more immediate results than are economically or technically feasible. Again, comparing the management and technical assistance program in Georgia with this program, the Georgia Tech staff feels that the results compare very favorably. Much of the permanent or long-range benefit from this program to the Korean companies serviced will depend upon the follow-up from the KCGF technical staff.

The results of the training for KCGF staff were generally favorable. The subject matter in the lectures and case studies seemed to be well received and capable of being readily assimilated by the trainees. It is felt, however, that the English language training could be more cost-effective if administered in Korea.

The efforts expended toward the establishment of the KCGF information center showed the most immediate and obvious results. KCGF now has a modest but creditable technical and management information collection. This information center will contribute much to the success of the technology transfer activities.

### Future Activity

It is recommended that KCGF continue to recruit personnel with technical education or background for their Extension Department staff. It is also recommended that task teams composed of members with different experience and specialties be established so that all members of the Extension Department will be able to gain experience in diagnosing and solving KCGF member companies' problems. It is also recommended that adequate follow-up be maintained with GIT/KCGF-assisted companies in order to stimulate the implementation of suggested improvements.

Appendix 1  
TRAINING FOR KCGF STAFF

# TRAINING FOR KCGF STAFF

Nov. 19, 1979	Welcome to IPD - Opening Remarks by Director, Nelson Wall - coffee and doughnuts will be served - Introduction to Staff -	
Nov. 20	High Temperature Applications	J. D. Walton
Nov. 21	High Temperature Applications	J. D. Walton
Nov. 22-25	Thanksgiving Holiday - No activities	
Nov. 26	Introduction to Georgia Tech, EES/IPD	R. Johnston/ F. Malvar
Nov. 27	Field Office Work (Introduction)	Eric Berg
Nov. 28	Field Trip (Industrial Park)	E. Berg
Nov. 29	Field Trip (Industrial Park)	E. Berg
Nov. 30 A.M. P.M.	Information Management and Word Processing Information Systems	E. Jacobson K. Finkelstein
Dec. 3-13	Visit to the Field Offices in Rome, Gainesville and Augusta -- including field office work and plant sites visits (two weeks)	Field Office Staff
Dec. 14	Critical Path Method and Program Evaluation and Review Technique	F. J. Malvar
Dec. 17	Problem Analysis, Decision Analysis, Decision Making, Potential Problem Analysis	F. J. Malvar
Dec. 18	Introduction to Economic Development and Technology Extension	R. L. Tessner
Dec. 19	Visit Georgia Dept. of Industry & Trade (Research & International Divisions)	E. Berg

# TRAINING FOR KCGF STAFF

Dec. 20, 1979	Visit Cobb County Chamber of Commerce	E. Berg
Dec. 21 A.M.	Industrial Extension Division activities	B. James
Dec. 22 to Jan. 1, 1980	Christmas Holidays - No activities -	
Jan. 2	Case Review (KCGF)	R. Johnston
Jan. 3	Case Review (KCGF)	B. James
Jan. 4	Case Review (KCGF)	B. James
Jan. 7 to March 14	Intensive English Course - 10 weeks - 5 days a week - 5 hours per day	
March 17 C&S Bank	Orientation to Industrial Extension Techniques	E. Berg
March 18	Records and Reporting	R. Hawkins
March 19	Supporting Services	E. Berg Various
March 20	Industrial Development and Expansion and Spinoffs	E. Berg
March 21	Supporting Services - System Storage and Readout	R. Hawkins
	<u>Field Office Visits</u>	
March 24	Macon	G. Lee
March 25	Macon	G. Lee
March 26	To Albany	G. Lee
March 27	Albany - Inventory Control Lecture	E. Lewis
March 28	Albany	E. Lewis

# TRAINING FOR KCGF STAFF

March 29	Return to Atlanta	
March 31	Gainesville	P. Loveless
April 1	Gainesville	P. Loveless
April 2	To Rome	W. Darley
April 3	Rome	W. Darley
April 4	Rome (Return to Atlanta)	W. Darley

## Classroom Instruction

April 7	Equipment Replacement Analysis	P. Loveless
April 8	Equipment Replacement Analysis	P. Loveless
April 9	Work Sampling	R. Tessner
April 10	Quality Control	W. Darley
April 11	Production Planning	R. Tessner
April 14	Information Data Banks	R. Johnston
April 15	Export Opportunities	Various
April 16	Investment Proposals	S. Dudley
April 17	Small Business Administration	H. Taylor
April 18	Industrial Park Visit - Carrollton	E. Berg



Recommendation to the Korea Credit Guarantee Fund  
Concerning the Extension Information Center

by

Richard Johnston  
Engineering Experiment Station  
Georgia Institute of Technology  
Atlanta, Georgia

Prepared in  
Seoul, Korea  
for the  
Korea Credit Guarantee Fund

November, 1979

### Summary

1. Employ a librarian-information specialist.
2. Contract with Georgia Tech and KORSTIC to provide search assistance.
3. Use existing KCGF library facilities for next one to two years.
4. Expand collection of Korean publications (books, magazines, reports, directories).
5. Develop programs for computer use in library by librarian and computer professionals.
6. Establish a patent search service, using a Japanese-reading librarian-patent specialist, to identify new products Korean industry can produce for export markets.
7. Train information center director only if without academic library education and without reference experience.

### Premise

One factor prompting Georgia Tech to propose assisting KCGF to establish an information center was the obvious need of the Extension Department staff for engineering, technological and management information. Apparently no person knew where to get the publications required or what publications were needed. Georgia Tech, proposed and KCGF accepted Georgia Tech's proposal, to supply lists of recommended publications for KCGF to purchase. These lists have been prepared, but during their preparation certain facts became apparent. These facts related to Korean's development and existing information infrastructure.

Korea's fantastic development could not have occurred without a large information infrastructure. This information infrastructure exists, is growing, and can already support much of the information needs of business, commerce, industry and manufacturing.

Unfortunately, the information delivery system is oriented to large industry because of the fee structure or charges for information services made by the major information delivery organizations. KORSTIC charges 50.00 Won for each question and 1,000,000 Won each year for class A services.

KCGF has a great opportunity to become the agency through which technical information now existing in Korea can be transferred to small industry. KCGF should strive to create and support a KCGF section dedicated to the transfer of technology to Korean small and medium sized businesses using existing information resources and services--KORSTIC, KIST, and others--as much as possible.

KCGF's publication selection policy should be to acquire only those publications needed by the staff for immediate information support--the basic and fundamental publications (handbooks, directories, core magazines, dictionaries, encyclopedias, abstracts and indexes) and the bibliographic publications required by the library staff for selection and acquisition.

## Recommendations

### Personnel

KCGF should immediately employ a librarian-information specialist with academic training in librarianship and experience in providing reference services in the fields of engineering, science and technology. This person should have a job position on a high professional level, with a title such as the Director of Engineering Information Research (DEIR).

Soon KCGF will have an outstanding collection of expensive engineering publications comprising a valuable capital asset. Without proper care, these publications will be misused, underused, abused or ignored. Valuable capital assets should be entrusted to persons who understand the manipulation of these assets so as to generate the greatest returns. Engineering extension officers should present their search questions to the reference specialists who, having the academic training and experience, can locate the needed information quickly and efficiently and with great specificity. Thus the engineers would spend less time in literature searching, which is not their skill, and more time in extension engineering, which is their skill.

Librarianship has a unique body of knowledge not generally known to others. The librarian has the skills to determine which publications should be acquired, where to acquire publications, and where to find the required information in the most efficient way. Entrusting the information resources to a knowledgeable librarian provides a much greater chance of success than merely assigning an unqualified person to a job about which the person knows little and in which the person has little experience.

KCGF should employ as the librarian-information specialist a person such as Mr. Yoon Koo-Ho, Director of Information Resources at KORSTIC, or a person of similar background, reputation and experience. Several Korean universities provide the graduate training necessary for this position.

### Contract Agreement

KCGF should become a class A member of KORSTIC, which can now provide current awareness services and will provide retrospective searches in the future. KCGF should contract with GIT to provide retrospective pre-computer data base searches.

KCGF should sign computer search agreements with DIALOG and ORBIT to cover the data bases not owned by KORSTIC and to perform retrospective data base services. These agreements cost nothing until the service is used.

The publications selected are designed to provide KCGF engineers with basic and fundamental information to support the extension work. The abstracts and indexes to be acquired will provide citations to books and magazine articles. KCGF will have some of the magazines to which citations will be made, but neither KCGF nor any other organization will ever have all of the magazines, patents, reports and books cited in the abstracts and indexes. Therefore, to enable their engineers to acquire the necessary publications, KCGF must establish strong, mutually beneficial information relationships with organizations having large collections and established reference services. (See the photo copy of libraries in Korea having foreign serials--9,354 titles.)

The KCGF reference librarian will search KCGF and other agency abstracts and indexes for citations to articles and use appropriate procedures to acquire the cited publications needed by KCGF engineers from other libraries and information centers, if not available at the KCGF information facility.

### Existing KCGF Library Facilities

KCGF should use the existing KCGF library for necessary clerical services and for housing and care of the new publications to be ordered. The existing library has ample room and facilities for one or two years, at which time more space will be required. An additional librarian will be needed within one year to handle the increased work load resulting from the large increase in the ordering and delivering of new books, patents, magazines, abstracts, indexes and reports.

### Korean Publications

The lists of publications recommended for acquisition by KCGF provide a strong base for the development and growth, under the direction of professional librarians, of an excellent research facility. In addition to these publications, the library should acquire those Korean publications, such as government statistical reports, census reports, and directories of government, education, business, commerce, industry, science, engineering and technology, that are needed to carry out the extension work of KCGF.

The KCGF information center should concentrate on acquiring directories of all types, but especially Korean directory information. If the Korean directory information is not published, KCGF should compile and publish it. (See "Directory Information on Korea Needed.")

### Directory Information on Korea Needed

The directory information on Korea needed is as follows:

- o Directories of libraries and information resources in Korea.
- o Directories of universities, colleges, technical and vocational schools in Korea.
- o Directories of engineering, scientific and technical societies, associations, federations and similar organizations in Korea.
- o Directories of consultants in Korea.
- o Directories of manufacturers, importers, exporters and trading companies in Korea.
- o Who's Who in Korea.
- o Directories of associations, trade groups, federations, cooperatives in Korea.
- o Directories of banks, business and chambers of commerce in Korea.
- o Directories of Korean government and congress.
- o Catalogs of Korean manufacturers.
- o Directories of trade fairs, exhibitions and displays in Korea.
- o Catalogs of manufacturers selling in Korea.
- o Directories of Korean publications in science, technology and engineering.

### Computers

After the reference librarian has been employed, representatives of the KCGF computer center should form a permanent committee with the librarian to develop programs serving the needs of the information center. This committee should observe the application of computer technology in other information centers.

The most immediate and promising computer application is placing the company files on tape for generation of directories and financial, credit and management information.

### Patents

Patent literature of Japan, United States, Korea, the European countries, and other nations comprise an extremely valuable information asset. The patent literature is complicated and often difficult to use. KCGF could concentrate on studies of the patent literature to identify patented products for manufacture, under license, by Korean firms. These products could be specifically aimed for the export market.

KCGF should seriously consider employing a Japanese language-reading librarian-patent specialist to operate a patent search system for the use of small and medium export-oriented industries of Korea. KORSTIC now produces patent literature from its tapes of Derwent's World Patent Index.

### Training

If KCGF selects a librarian from some existing information center in Korea such as KORSTIC or KIST, or a reference librarian from a science reference department, there will be little need for training because this person will know how to operate an information center. However, if KCGF selects a person to operate the information center who has had no training in library science or experience in reference service, much training will be necessary in the subjects of reference, data bases, and procedures: cataloging, classifying, selection, acquisition and operation of an engineering information center.



The KCGF Extension Department person responsible for the overall operation could greatly benefit by attending library science classes at night at a Korean university, by working in Korean information centers, such as KORSTIC for several months, and by observing and working in information centers in the United States for a period of at least six months.

From time to time, as new data bases develop and new procedures are needed, some short periods of training will be required in Seoul or Tokyo or Atlanta or other places. Although the exact nature of these training courses will depend on the librarian selected, likely areas to be covered are patents, DIALOG, ORBIT, and computer use in libraries.

#### Supporting Publications

- o Brochure from library of Seoul National Univesity
- o Brochure from KORSTIC
- o Guide to the literature - Georgia Tech
  - Chemistry and chemical engineering
  - Ceramic engineering
  - Electrical and electronic engineering
  - Industrial and systems engineering
  - Mechanical engineering
  - Textile engineering
- o Union List of Foreign Serials Holding in Korea
- o Ulrich's International Periodical Directory

### Selected Lists of Publications to Purchase

The publications listed below are typify the kinds of core publications needed for an engineering extension service.

The lists were compiled from the Georgia Tech Library card catalog on microfiche, the Georgia Tech guides to the literature on ceramic engineering, chemistry and chemical engineering, industrial and systems engineering, mechanical engineering, metals and metallurgical engineering, and textile engineering; Ulrich's International Periodicals Directory, 17th edition, 1977-78; Union Catalog of Foreign Scientific Journals in Korea; and the publications listed on the computer printout of the ready reference section of the Georgia Tech Library.

The staff of the KCGF Extension Department, various Georgia Tech engineers, and others provided suggested lists of publications to acquire.

Ordering, acquiring, cataloging, housing and searching of the publications is a function of librarians. Without supervision of these library functions by a professional, graduate, experienced librarian, only poor results can be expected.

The publications selected reflect the professional opinion of one person. Other persons probably would have selected some different titles but the results would have been basically the same--a list of key or core publications.

In addition, staff members of the Extension Department indicated publications they considered important enough to order by marking additional items on the Georgia Tech guides to the literature. These guides will be left with the Extension Department, and specific publications may be ordered from these guides by the librarian.

Appendix 3  
INDIVIDUAL COMPANY REPORTS

## COMPANY A

Number of Visits: Three by GIT and KCGF personnel

Principal Products: Conveyors and mining equipment

### Observed Problems

This company required information on epicycloid gears and other production gear systems. They also required assistance in design considerations for vibrating screen separating devices. Another area of desired assistance was in determining the configuration of "buckets" in bucket conveying systems.

### Action Taken to Solve Problems

This company was presented with information from manufacturers in the U.S. The company design engineer was assisted with calculations on "eccentricity" and "eccentric-throw" for vibrating screen mechanisms. GIT also assisted the company with bucket conveyor design by providing information from U.S. manufacturers.

### Observed Results from GIT Assistance

Results from this information and assistance are indeterminate at this time.

### Recommendations for Future Assistance

This company's information and assistance needs should be served on an as-required basis.

## COMPANY B

### Number of Visits:

Four by GIT and KCGF personnel

### Principal Products:

Gas hot plates, oil heaters, rice cookers

### Observed Problems

This company requested assistance in solving the problem of "blowholes" in a cast aluminum heating element as well as in solving a leak problem in oil heater wick support. This company also requested that GIT provide environmental testing on "ABS" plastic vent impeller.

### Action Taken to Solve Problems

Several alternative mold designs were provided to this company as a possible solution to the "blowhole" problem. A U.S. aluminum foundry also was consulted. This foundry has solved a similar problem and its recommendations were passed on to this company. An improved joint design for the oil heater was discussed with the technical director. A design concept for an improved resistance seam welding head was given to this company. The plastic impeller was brought to the U.S. and tested at GIT. Suggestions were made to the company that cast iron be substituted for brass in a major component of one of its products with a potential savings of \$30,000 per year.

### Observed Results from GIT Assistance

This company is now evaluating ramifications of materials substitution. Recommendations from U.S. aluminum foundry will be tried on next heating plate production run. ABS rotor was tested and proved to be unsuitable for the company's intended application.

Recommendations for Future Assistance

Continued assistance should be given this company on the casting blowhole problem. Otherwise, this company's assistance and information needs should be served as they request.

## COMPANY C

Number of Visits: Six by GIT and KCGF personnel

Principal Products: Ferrous and nonferrous screws, bolts and rivets

### Observed Problems

This company required general information on fringe benefits provided to U.S. workers. They also requested information on operator training methods used by U.S. manufacturers. The company requested information on specifications for heat treatable aluminum as well as details for the heat treating process. Additional information was requested on aluminum anodizing and ferrous metal plating.

### Action Taken to Solve Problems

This company was provided with much information on U.S. fringe benefits. Various operator training methods were discussed with company management. Technical information on aluminum specifications and heat treating methodology was provided. Extensive information on anodizing and plating was furnished.

### Observed Results from GIT Assistance

Samples of heat treatable aluminum alloy were obtained and sample fasteners were fabricated. These fasteners were taken to another facility for heat treating.

### Recommendations for Future Assistance

Company management should be provided with information and assistance as they require. They should be kept informed on new screw-making technology as it becomes available.

#### COMPANY D

Number of Visits: Four by GIT and KCGF personnel

Principal Products: Compression, tension, torsion and flat springs

#### Observed Problems

This company requested design data and materials specifications for "Belleville-type" springs. They also required specifications for U.S. military automotive and weapons springs. The company, in order to submit a quotation for U.S. automotive brake springs, needed extensive information on material specifications, material costs, and representative prices on U.S. automotive brake springs. The president of this company also indicated a desire to visit U.S. spring manufacturers.

#### Action Taken to Solve Problems

This company was presented with information on Belleville springs after extensive research in the U.S. Similarly, the information on U.S. military springs was gathered over a period in the U.S. and given to the company. Researchers at GIT in the U.S. gathered information on automotive brake spring material cost and selling prices. This information was airmailed to the GIT field engineer and then presented to the company. If authorized by KCGF, GIT will arrange for the company president to visit spring manufacturers in the U.S.

#### Observed Results from GIT Assistance

This company was able to submit a quotation on parts to be supplied for an american company. The company also was in the process of evaluating the other information provided.

#### Recommendations for Future Assistance

This company's information and assistance needs should be served on an as-needed basis.



## COMPANY E

Number of Visits: One by GIT and KCGF personnel

Principal Products: Steel cargo containers

### Observed Problems

This company requested information and assistance necessary to reduce plate warpage induced by butt seam welding. They also required information on reducing warpage induced by plate shot blasting.

### Action Taken to Solve Problems

Assistance was provided to this company in the form of design concepts for plate clamping during the welding process. Research is still in progress on techniques necessary to reduce "shot-blast" warpage.

### Observed Results from GIT Assistance

During a visit by the GIT field engineer, he observed many fixtures that incorporated reverse camber to minimize weld distortion. These fixtures were not evident at the first visit by the GIT field engineer during the first-year program. Suggestions had been made at that time similar to this year's suggestions.

### Recommendations for Future Assistance

Research should continue on technology required to minimize shot-blast warpage.

## COMPANY F

Number of Visits: Three by GIT and KCGF personnel

Principal Products: Steel files

### Observed Problems

This company has many problems induced by poor plant layout and out moded labor-intensive manufacturing processes. They requested assistance in methods of improving the taper grinding process, improving the heat treating process, improving the performance of a custom-designed Swiss-made rotary swaging machine, and setting up production and inventory control procedures.

### Action Taken to Solve Problems

The company was provided the following assistance: (1) extensive information on tool steel heat treating; (2) work station layout concepts for improved productivity at heat treat stations; (3) design concepts for mechanized file straightening device to supplant present manual method; (4) design assistance in rotary swaging guide; (5) general information on production control and inventory control systems; (6) suggestions for improving design on grinding wheel dressing mechanism on taper grinding machine.

### Observed Results from GIT Assistance

There were no obvious results evident from the assistance. The company, however, was in the process of evaluating the advice and information provided.

### Recommendations for Future Assistance

KCGF should set up a task-team composed of members of its technical staff. This team should make a concentrated effort to assist this company in three major areas: plant layout, production control, and equipment modernization. This company requires more than nominal technical assistance in order to achieve substantial results.

## COMPANY G

Number of Visits: Four by GIT and KCGF personnel

Principal Products: Heat exchangers

### Observed Problems

This company requested assistance in reviewing the design and verifying the thermodynamic calculations on a large feed water reheater for a power plant installation. They also required information on nondestructive testing methods and standards. In addition, the company needed information on procedures for welding copper alloys to steel. They also requested assistance in improving the process of welding boiler tubes to tube sheets. Another problem on which assistance was requested involved tube cracking inside a large heat exchanger.

### Action Taken to Solve Problems

Drawings and calculations of the feed water reheater were brought to the U.S., where an engineering specialist at GIT did a design review. Many recommendations were made and this information was returned to the company on a subsequent visit by a GIT field engineer. Extensive information and advice was provided to this company on welding dissimilar metals. Information sources were researched in the U.S. and comprehensive data were provided to this company on standards for nondestructive testing to boiler code specifications. Design concepts were given to the company which would enable them to mechanize the tube to tube-sheet weld. The Mechanical Engineering faculty of Soong Jun University collaborated with the GIT field engineer to determine the probable cause of the tube cracking failure in the large heat exchanger.

### Observed Results from GIT Assistance

Results from this advice, informatio and assistance are indeterminate at this time.

Reommendations for Future Assistance

This company's information and assistance needs should be serviced on an as-needed basis.

## COMPANY H

Number of Visits: Five by GIT and KCGF personnel

Principal Products: Diamond cutting tools and grinding wheels.

### Observed Problems

This company requested assistance in improving the production rate of diamond saw blades. They also requested information on assistance on reclaiming small diamond particles being lost in their production process. The company needed general assistance in improving mold production and wheel truing.

### Action Taken to Solve Problems

During several visits to the company, many suggestions were given to the technical management on improving saw blade production. Conceptual designs were given to the company for a water separator which would allow the small diamond particles to be "graded-out." Design concepts for several process improvements were given to the company. These included improvements in mold production as well as wheel truing. Many specialized technical articles on diamonds and diamond tool production were obtained after researching available information in the U.S. This information was provided to the company.

### Observed Results from GIT Assistance

The company has begun to investigate the costs involved with putting these suggestions into practice.

### Recommendations for Future Assistance

This company should be furnished assistance and information as it is requested.

## COMPANY J

Number of Visits: Four by GIT and KCGF personnel

Principal Products: Electric motors and pumps

### Observed Problems

Many problems were observed, including poor plant layout, inadequate housekeeping, and unsafe working conditions. Other problems included lack of standard machining information for operators and low productive methods for coil winding. A problem was indicated with warpage on cast iron stator frames after machining.

### Action Taken to Solve Problems

Standard machining information (feeds and speeds tables) were supplied to this company. A design concept for improving the productivity of coil winding operations was produced for the company. Much information was provided on readily available techniques and tools for increasing production. These included using tungsten carbide tools, pneumatically powered files, workplace rearrangement etc. After investigating the warpage on cast iron stator frames, the GIT field engineer pointed out that it was being caused by residual stresses in the casting reacting to sections which had been machined too thin.

### Overall Results from GIT Assistance

There appear to be no results from GIT assistance.

### Recommendations for Future Assistance

This company seemed unwilling to utilize the assistance and information provided during this year's program. In light of this, any future assistance requests should be considered carefully by KCGF.

## COMPANY K

Number of Visits: Three by GIT and KCGF personnel

Principal Products: Air conditioners and heaters

### Observed Problems

This company required assistance and information on alternate sources of supplies and component parts used in producing its products. It also required general information and assistance in improving the mechanization of its manufacturing processes.

### Action Taken to Solve Problems

After research in the U.S., sources of supply were found for small fan motors and air conditioner compressors. Design concepts were produced for fin assembly fixtures as well as an improved tube roller expander. Another design concept was provided for a gas fluxing attachment which would increase productivity. Suggestions were made to company management for a material substitution which could result in a substantial savings.

### Observed Results from GIT Assistance

The company is presently evaluating the suggestions given by the GIT field engineer.

### Recommendations for Future Assistance

This company needs extensive assistance in product redesign. This would require many man-days of specialized engineering technology.

## COMPANY L

Number of Visits: Three by GIT and KCGF personnel

Principal Products: Fluorescent lamp starters

### Observed Problems

The company requested information on alternate materials for "getter" and gas in the starters. They also requested general assistance in reducing labor costs.

### Action Taken Solve Problems

Samples of European fluorescent starters were obtained. They were brought to the U.S. and attempts were made to determine the composition of the "getter" material and the gas. These attempts were unsuccessful. Several suggestions were given to the company management concerning process improvement. A design concept for a conveyor system was developed and provided to the company.

### Observed Results from GIT Assistance

Results from the information and assistance given to this company are indeterminate at this time.

### Recommendations for Future Assistance

This company should be provided with information and assistance as required.



## COMPANY M

Number of Visits: Three by GIT and KCGF personnel

Principal Products: Gears, spline shafts.

### Observed Problems

The company requested information on techniques for hobbing irregularly splined shafts. They also requested information on special drilling fixtures and generating internal helical splines. Later this company requested intensive design information on special cutting tools for gear manufacture.

### Action Taken to Solve Problems

This company was provided with a design concept for a special drilling fixture. In addition, general design information for drill fixtures was provided. Advice was given to the company's technical management with respect to irregular spline hobbing. Advice and information also were given to the company on broaching internal helical splines.

### Observed Results from GIT Assistance

Results from this information and assistance are indeterminate.

### Recommendations for Future Assistance

If this company's request for assistance and information on special cutting tools is to be filled, a rather large commitment of engineering time must be made. This decision will be made by KCGF.

COMPANY N

Number of Visits: Two by GIT and KCGF personnel

Principal Products: Electronic stereo equipment.

Observed Problems

This company was observed to have a major problem in assembly line imbalance. There also appeared to be a lack of holding fixtures, resulting in a loss of productivity during assembly operations.

Action Taken to Solve Problems

A design concept for an improved assembly line was produced and given to the company management. Another design concept for a chassis holding fixture was produced and provided to the company.

Observed Results from GIT Assistance

No immediate results were observed.

Recommendations for Future Assistance

This company's information and assistance needs should be served on an as-needed basis.

COMPANY O

Number of Visits: One by GIT and KCGF personnel

Principal Products: Cassette recorders.

Observed Problems

In discussions with the company management, it was indicated that this company has no immediate problems. Since a factory visit was not permitted, it was impossible for the GIT field engineer to identify possible problem areas.

Action Taken to Solve Problems

None.

Observed Results from GIT Assistance.

None.

Recommendations for Future Assistance

Indeterminate.

## COMPANY P

Number of Visits: Five by GIT personnel

Principal Products: Power and distribution transformers

### Observed Problems

This company required information on advanced methods of transformer manufacture. They indicated that they wanted to visit the U.S. to observe transformer manufacturing methods. This company also requested information on the reliability of an American joint venture prospect. The company also sought special information on explosion-proof transformer design. The president of this company requested that the GIT field engineer meet with him and representatives of a foreign investment group to discuss possibilities of a joint venture.

### Action Taken to Solve Problems

It was arranged for the president of this company to visit several U.S. transformer manufacturers. Several equipment manufacturers were contacted in the U.S. for information on improved transformer manufacturing facilities. GIT personnel investigated the American joint venture prospect. A contact was made with an American transformer manufacturer who specialized in explosion-proof transformers. GIT arranged and conducted a meeting between the president of this company and the management of the American firm. The GIT field engineer met with the president of this company and representatives of a foreign investment group.

### Observed Results from GIT Assistance

During the first visit to the U.S., the president of this company gained much knowledge and experience in advanced techniques of transformer manufacturing. During his second visit, he was able to order special transformer designs from the American company. The investigation of the American joint venture prospect disclosed that it was not an ethical or reliable prospect.

Recommendations for Future Assistance

This company should be served on an as-needed basis.

## COMPANY Q

Number of Visits: Two by GIT and KCGF personnel.

Principal Products: Injection molding equipment

### Observed Problems

The company has a problem with one of its major machine tools being affected by vibration induced by an adjacent piece of equipment. It also has a problem obtaining consistent results from the plasma ion-nitriding hardening process because of inadequate parts cleaning prior to the ion-nitridings.

### Action Taken to Solve Problems

Information and advice on machine tool isolation to reduce vibration was provided to this company. Product brochures obtained in the U.S. describing various types of vibration isolators were given to the company. A concept design for a vapor degreasing system was prepared and given to the company. Extensive information on metal cleaning also was provided.

### Observed Results from GIT Assistance

Results from assistance provided during the second program year are indeterminate at this time.

### Recommendations for Future Assistance

This company's information and assistance requirements should be served on an as-required basis.

COMPANY R

Number of Visits: One by GIT and KCGF personnel

Principal Products: Aluminum extrusions

Observed Problems

This company has moved the majority of its manufacturing facilities to a new factory. During the visit to the old facility, it was found that only the billet casting operation was retained. The company was having quality problems with billet production. The billets contained many "blow-holes" and "cold-shuts" as a result of the casting process.

Action Taken to Solve Problems

Several suggestions were made to the company representative which might improve the quality. The equipment being used was almost identical to that observed in other aluminum extrusion factories. It is likely that much of the quality problem stems from the skill level of the operator.

Observed Results from GIT Assistance

Since all the manufacturing operations with the exception of billet casting, had been removed to another location. No results from past assistance was evident.

Recommendations for Future Assistance

After observing aluminum extrusion factories in the U.S., the GIT field engineer should provide a general process instruction for producing aluminum billets.

COMPANY S

Number of Visits: One by GIT and KCGF personnel

Principal Products: Bridge cranes

Observed Problems

This company has a problem involving the cost of its major raw material, steel. Because of certain requirements, the company must purchase domestic steel at a substantial price differential over foreign steel. This is reflected in a higher selling price of its product which prevents the company from effectively competing in the export market.

Action Taken to Solve Problems

Since this problem was outside the scope of GIT, no action was taken.

Overall Results fromm GIT Assistance

There were no results from GIT assistance during the second program year.

Recommmendations for Future Assistance

This company's needs should be responded to as requested.



COMPANY T

Number of Visits: One by GIT and KCGF personnel

Principal Products: Aluminum extrusions

Observed Problems

This company had recently replaced its entire technical staff. The present staff seemed to be unaware of the extension service performed during the first program year. No information was provided to the GIT and KCGF personnel indicating company problems.

Action Taken to Solve Problems

None.

Observed Results from GIT Assistance

None.

Recommendations for Future Assistance

This company should be assisted upon request.

COMPANY T

Number of Visits: One by GIT and KCGF personnel

Principal Products: Aluminum extrusions

Observed Problems

This company had recently replaced its entire technical staff. The present staff seemed to be unaware of the extension service performed during the first program year. No information was provided to the GIT and KCGF personnel indicating company problems.

Action Taken to Solve Problems

None.

Observed Results from GIT Assistance

None.

Recommendations for Future Assistance

This company should be assisted upon request.