

INDUSTRIAL DEVELOPMENT ADVISORY
SERVICES TO PAKISTAN

F I N A L R E P O R T

Project No. 086

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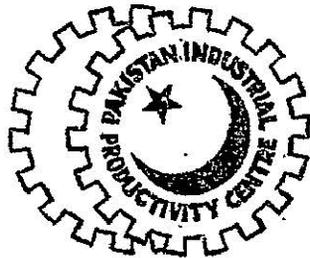
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Project No. 086

INDUSTRIAL DEVELOPMENT ADVISORY
SERVICES TO PAKISTAN

through the

PAKISTAN INDUSTRIAL PRODUCTIVITY CENTER



by George D. Thomas
Chief of Production Specialists
and Machine Tool Technologist

APRIL, 1959

D I S T R I B U T I O N L I S T

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American Embassy - Karachi, Pakistan
10. Mr. George D. Thomas
Personal File

Karachi, Pakistan
April, 1959

Dear Recipients:-

It gives me great pleasure to transmit the report on the program for Industrial Development Advisory Services to Pakistan, carried out by myself through the Pakistan Industrial Productivity Center (PIPC) as Chief of Production Specialists and Machine Tool Technologist.

This two-year program was conducted through an autonomous contract with the Government of Pakistan and financed and sponsored by the International Cooperation Administration. The field work covered broad areas of technological activities of the PIPC. I trust this report will be a valuable guide in the subsequent technical development activities in Pakistan. If there are continuation of services, it is hoped the recommendations in the report will be followed. Continued technical and economic aid to the existing industries of Pakistan will bring about increased productivity, as well as a firm basis for sound future planning of the industrial development program.

I wish to express my deep and sincere appreciation for the co-operation given me and the many courtesies extended during my stay in Pakistan. Special acknowledgment must be made of the friendly, cooperative efforts of the personnel of the industries with whom I have worked. From worker to top management, all made my job immeasurably easier by their deep interest and wholehearted cooperation in furthering the technological status of their industries:

In addition, the friendly assistance and constructive comments of the officials of the Government of Pakistan were deeply appreciated. In particular, I thank Mr. A. R. Khan, Director of the Pakistan Industrial Productivity Center, for his valuable assistance in helping to carry out the objectives and administrative responsibilities of the Center.

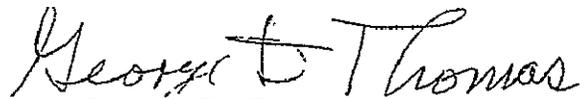
I also thank Mr. A. T. Khan, Finance and Accounts Officer of the Pakistan Embassy in Washington, for the many courtesies extended to the U.S. Advisors of the PIPC and his usual promptness in handling the settlement of all accounts through the Pakistan Embassy.

I wish to express appreciation and sincere gratitude to the Staff of the U.S. Mission in Pakistan; in particular, to Mr. James S. Killen, Director, for his continued splendid cooperation and his understanding and sympathetic approach to any problems in connection with the Center. I thank Mr. Killen for his kind personal interest in my related activities.

This report represents my affiliation and work with the Pakistan Industrial Productivity Center; and renders my findings in connection with the level of mechanization of Pakistani industries; specific improvement programs initiated and carried out; industry visits; additional technical assistance provided; the conclusions reached, and subsequent recommendations. All suggestions and recommendations have been made open-mindedly and impartially and the comments are offered only in the sense of constructive criticism.

Please accept this report in the good faith that it has been compiled and presented. It is respectfully submitted. Thank you for your kind indulgence.

Sincerely,



George D. Thomas
Chief of Production Specialists
and Machine Tool Technologist

PAKISTAN INDUSTRIAL PRODUCTIVITY CENTER
Ministry of Industries
Government of Pakistan

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I. INTRODUCTION

A. COMMENTARY

The economy of what is now Pakistan was severely disrupted when partition occurred in August, 1947. In the interim period, however, Pakistan has made great strides to develop its industries at a very rapid pace, considering the mass exodus by heavy losses in industrial equipment and materials.

Development was started mostly by merchants and traders with no previous industrial background but realized the great profits to be made from a country still in its rudimentary stages by investing in its industrial enterprises. To furnish a bit of background, it was prior to '52, that these merchants and traders imported finished goods into Pakistan. However, when the supply of foreign exchange was nearly exhausted, imports were frozen and these business people realized the necessity to produce the commodities locally.

Unfortunately, people engaged in business ventures lacked technical know-how, particularly concerning the selection of machinery and equipment and proper program planning. Because great profits were being enjoyed by the industrialists, and inasmuch as the young Government was at that time preoccupied organizing its own functional operations, as well as lacking qualified leaders with technical know-how to guide the industrialization program, no substantial or recognizable efforts were made by either Government or industry to set up and maintain production standards and initiate adequate training facilities to develop skilled

and semi-skilled labor abundantly available in Pakistan. The industrialists considered that since the local demand for the finished products far exceeded the supply, and also that a shortage of foreign exchange existed, there was no necessity to allocate and expend additional funds to improve quality and develop skills.

The Government of Pakistan, recognizing the inherent weakness of an economy built mostly on agriculture, and encouraged with the establishment of U.S. aid in Pakistan, concentrated its efforts on an industrial policy aimed at maximum industrialization through development of its industries. The industrialists were made cognizant of the great need to develop the industries with more modern production techniques and to train skilled and semi-skilled labor. Consequently, both the Government of Pakistan and the industrialists realized the need to take advantage of the various offers of technical assistance received from abroad to make the industrialization program more effective. For the provision of technical assistance, the Government of Pakistan requested needed service in different fields from what is now known as the International Cooperation Administration. Accordingly, extensive industrial survey programs were executed followed by recommendations on proper methods to be applied to stream-line this industrial development.

B. SCOPE OF ASSIGNMENTS

In 1953, technical assistance to the production and engineering industries of Pakistan was initiated under a contract between the Armour Research Foundation of Illinois Institute of Technology and the International Cooperation Administration. Under this contract, Mr. George D. Thomas was assigned to the field as Machine Tool Technologist for a one year period beginning in May, 1953.

As a result of his highly successful performance, the work was continued under a two year contract extension. This second tour of duty commenced on October 8, 1954 and terminated on September 19, 1956. The contract provided for assistance to the Government of Pakistan and USOM/Pakistan in improving technological and production methods related to the many industries under the Technologist's surveillance.

The scope of these first two assignments, modified somewhat by subsequent detailed study when actual field work was initiated, covered the following:

1. Preliminary study of the manufacturing operations of industries, particularly from the viewpoint of correct use and application of machine tools and other production machinery.
2. Advice to those industries on the improvement in the use and application of such machinery, and, also, the use of machinery in place of hand labor whenever economically feasible.
3. Assistance to Pakistani industries in proper planning, designing, organization, and other aspects affecting quality and quantity of production.
4. Training of skilled and semi-skilled personnel in progressive

production techniques, with particular emphasis on making the best use of the equipment and skills at hand.

5. Advice to the Government of Pakistan, particularly its Ministry of Industries, on the balanced expansion of small-scale and medium size industries, with minimum expenditure of foreign exchange.
6. Assistance to the industrial branch of USOM/Pakistan on any matters pertaining to the improvement of industrial program.
7. Additional - Industrial development advisory services to the Mission as Acting Chief Industry Officer.

Again, as a result of the Technologist's continued highly successful performance, an autonomous contract this time was negotiated with the Government of Pakistan and financed and sponsored by the International Cooperation Administration, which provided another two year tour of duty. This third assignment started in January of 1957 authorizing the Technologist to recruit specialists for the project. Subsequent arrival in Pakistan dated April 14, 1957, and the Technologist assumed the following responsibilities in accordance with the terms of his contract:

1. To act as Chief Advisor to the Director of the Center in connection with production methods, engineering in tool designing, processing, plant layout, and general machine and tool practice.
2. To act as Chief in technical matters of the group of production specialists proposed as advisors to the Center.
3. To assist the Government in the initial organization of the functions of the Center as set out in the Project Agreement.

The present contract terminates under date of June 10, 1959. The report summarizes the work conducted during this period. Request for the Technologist's continued services are currently being negotiated to implement further the objectives of the project.

C. ADDITIONAL DUTIES

During the Technologist's second assignment, the USOM Chief Industry Officer returned to the U.S. leaving that position vacant until a replacement could arrive in Pakistan. The USOM/Pakistan conferred with the Technologist and determined that in view of his past experience, he would be capable of extending his sphere of responsibility to include this additional temporary duty.

Consequently, at the request of USOM/Pakistan, the Technologist assumed the duties of the Chief Industry Officer to the Mission, pending the arrival in Pakistan of a newly-appointed permanent Officer. The Technologist actually served in this capacity for 23 months in which, during this interim period, he carried out duties of the Chief Industry Officer to the Mission in addition to those of Machine Tool Technologist. It was during this period as Acting Chief Industry Officer, the Technologist finalized the preparatory work of the Industrial Research and Development Center, Lahore, and implemented the Pakistan Industrial Productivity Center, Karachi, two of the major projects in the industry program. Information on these are furnished separately.

D. PRELIMINARY SURVEY

Upon arrival in Karachi, Pakistan, in 1953, the Technologist immediately started an extensive survey of industries in the Karachi and Punjab areas. The survey, scheduled and facilitated by the Pakistan Government, enabled him to study the various industries in general and to note those industries which required technical aid and constituted a cross-section of the technological status of Pakistan industry. The survey was merely a quick, broad study and thus observations were somewhat limited; however, whenever possible, advice and consultation was offered when obvious problems presented themselves. Approximately six weeks were required for the preliminary survey. The summary below is based on the general findings of the survey and on the rudiments involved in any improvement program in the use and application of machine tools and other production equipment. The survey provided the Technologist a basis for planning the modus operandi of subsequent activity, particularly the implementation of the two projects discussed in the next section.

1. Correct feeds and speeds should be maintained on all machine tools to produce better finishes, prolong the life of the cutting tools, and turn out more products per period of work.
2. Machine tools should be continuously maintained and periodically overhauled in order to increase their life and to turn out better products cheaper.
3. Proper use and application of each piece of machinery and equipment should be emphasized.
4. More consideration should be given to better design and production of jigs, fixtures, dies and cutting tools to improve their performance.

5. Proper material should be used for tools, as well as correct heat treatment.
6. Proper cutting tools should be used for machining each kind of material.
7. Proper tolerances should be maintained on machine fits, to produce quality work and effect interchangeability.
8. Quality control should be installed and maintained in all industries, including greater use of gages.
9. Better production planning and control should be installed, enforced and practiced.
10. Industrial engineering methods, including time and motion study, should be established.
11. Every effort should be made to apply and practice product standardization.
12. Design of a product should be reviewed periodically from view of obsolescence, customer appeal, and current manufacturing methods.
13. Safety at all times should be practiced to prevent injuries, as well as lost time and spoiled products. Avoiding safety rules is a dangerous risk.

The above suggestions were incorporated in the subsequent improvement program, utilizing existing machinery whenever possible, with only minor modifications. Since it was then difficult to secure import licenses, new machinery and equipment were recommended only when absolutely necessary.

Based on the findings of the preliminary survey and numerous conferences with officials of both Governments, the Technologist defined more completely the scope of the project and established a framework of operation. It was decided that the technical aid program was to:

1. Introduce standardization and quality control.
2. Improve available machinery and mechanize some hand operations wherever possible and economical.
3. Select certain skilled men from various industries and train them in modern shop techniques through demonstrations and instructions, equipping them to carry on the program after the completion and termination of the project.
4. Analyze manufacturing requirements of products being manufactured and offer suggestions for improvements.
5. Initiate production control, and other aspects of industrial engineering, whenever possible.
6. Evaluate existing plant design and plant layout and make suitable recommendations.
7. Review raw materials and new uses for old materials from viewpoint of reducing costs and improving products.
8. Apply new manufacturing methods, aimed at eliminating useless motions, aiding work, increasing output, and reduce fatigue.
9. Throughout, emphasize that accuracy of work, reflected in quality and quantity of product and ultimate cost to consumer, no longer depends on the skill of the worker but on the accuracy of the tools.
10. Training and improvement of management.

E. IMPLEMENTATION OF PROJECTS

During the course of the Technologist's tenure in Pakistan, he realized the urgent need for a training center and technical and managerial consulting facilities, and was successful in originating and implementing the following two major projects in the Industrial Development Advisory Services to Pakistan. To initiate these projects involved many meetings and consultations with the Government of Pakistan and ICA officials, to make them cognizant of the importance of these two projects for the industrial development of Pakistan. Considerable time was devoted to planning and designing of the building and office facilities, preparing detailed lists for the procurement of commodities and recruiting the specialists for the Pakistan Industrial Productivity Center.

1. Industrial Research and Development Center, Lahore.
Later program will possibly include similar Centers in Karachi and Dacca.

To help and stream-line the industries engaged in the manufacture of metal products, it was unanimously accepted that extensive training programs were absolutely necessary to train and up-grade skilled workers in the field of production tools including the design and manufacture of jigs, fixtures, dies, gages and many other time-saving devices. It was easily recognized that production tools are the backbone of any industry. With these existing conditions, a subsequent request was made by the Ministry of Industries, Government of Pakistan, after implementation by the Technologist, to set up and establish what

is currently known as the Industrial Research and Development Center.

This Center has been established to train and up-grade local skilled technical personnel in staffing the Center as counterparts to be advised by the foreign technicians in order to continue and carry on these facilities after departure of the foreign technicians.

The Center is intended to select one or more key personnel from various shops and give them practical training in general shop practice, maintenance of machinery and equipment, design and manufacture of production tools such as jigs, fixtures, dies, gages, etc., that the local industries are unable to manufacture with precision.

Along with the training program, the Center will also manufacture production tools if needed and requested by industries. At all times, the Center will continue to act as a backstopping organization to industries and help them solve some of their difficulties when such requests are made to the Center. Similar training given abroad to a skilled worker would be expected at the Center. This would mean only a fraction of the cost involved in sending trainees abroad.

Another favorable aspect to consider is that the trainees will be trained under local conditions and will have the opportunity to visit the shops on occasion before completing the training period.

2. Pakistan Industrial Productivity Center, Karachi

After the Lahore Center was established, and after implementation by the Technologist of this second project, the Ministry of Industries, Government of Pakistan, and ICA, set up and established what is currently known as the Pakistan Industrial Productivity Center in Karachi.

The primary objective of the Center is to provide a program of technical and managerial assistance to existing Pakistan industrial operations, principally in the private sector with special emphasis upon small and medium size enterprises in the following fields: Machine Tools, Ceramics, Chemical, Steel Re-Rolling, Electrical, Foundry, Cost Accounting, Industrial Engineering, Industrial Management and Industrial Development.

Objectives -

- a) - To set up a well-organized engineering consultant organization within the Ministry of Industries, to assist and guide Government and private industry with technical and management problems for a sound industrial development program.
- b) - To train a group of Pakistani counterparts appointed by GOP to work with the U.S. Advisors on the operation and function of the Center enabling these counterparts to continue this work when the U.S. Advisors leave the Center.
- c) - To give technical assistance to Government and private agencies involved in investment proposals. This will provide better evaluation of the project following requests made by the private industries for machinery, equipment and materials.
- d) - To act as an information center on all technical matters and supply needed technical data to industries and other organizations.

- f) - Wherever possible, recommendations be made to improve methods and product designs for better quality, production and saving of raw materials ultimately improving the economic situation.
- g) - Closer coordination be made with other projects, agencies, Chamber of Commerce, private industrial organizations and Trade Unions for a better balance and sound industrial development program.
- h) - Development of new industries and the expansion of the existing industries be encouraged in those cases where most or all of the raw materials are locally available. This will stop imports and save foreign exchange.
- i) - Seminars be held at the Center and in the industries and audio-visual methods be introduced to guide the industries to create better production and management training. Teams will be sent abroad for further training.
- j) - PIPC encourage industries to create regional productivity centers sponsored by private industries to help improve their productivity in those respective areas. In the course of time, PIPC establish a chain of productivity centers throughout Pakistan to work under the guidance and general surveillance of the Center office.
- k) - Whenever possible, PIPC make recommendations to the Government of Pakistan, private industries and foreign aid agencies to manufacture locally those items which are imported. This will help save foreign exchange, develop industries and create employment.

II. IMPROVEMENT PROGRAM

A. Technical Aid to Industries

Following the preliminary survey and the technical aid program carried out in the first two assignments, and the Technologist in this third assignment, by rendering further technical assistance through the Pakistan Industrial Productivity Center and ascertaining the technological problems of representative industries, continued his program in emphasizing technical aid given to the specific industries.

Please note that in the interest of conciseness, only a relatively few (but representative) of the many drawings, presented to the Pakistani industries by the Technologist, are given in the appendices. In addition, only a relatively few (but representative) of the many changes and developments are shown in the photographs found in the appendices.

Plant visits made by the Technologist are listed in the following pages in alphabetical sequence, by company name, and not in the order visited. The latter did not lend itself to sequence-listing since a number of the companies were revisited during the course of the project. All of these places (not including the Surveys) are in the Karachi area.

The numerous specific problems encountered by the first three respective industries, warranted more of the Technologist's time than the remaining industries. Consequently, these are discussed first.

L. Allwin Engineering Company

Personnel - 65

This company manufactures rings, pistons, liners, guide pins and guide valves for automobiles, tractors, Diesel engines, etc.

This industry had contemplated the purchase of a single-purpose piston ring lathe to machine cast-iron piston rings and liners from the "Pot" castings. The machine (costing approximately Rs. 60,000) "roughs" and "finishes" the outside and inside diameter of the "Pot" and also gang parts off the rings. The Technologist suggested to this firm that he retool one of their heavy-duty lathes to perform the same operation with the cost of retooling not to exceed Rs. 2,000. The Technologist completed the design of the new tools for the machine and the shop proceeded to manufacture these tools in preparation for a trial run. The Technologist made frequent visits to the plant to supervise the work to make sure it was being prepared properly.

The machine the Technologist retooled was completed and worked satisfactorily. The "rough" and "finish" boring and turning of the 4" diameter pot and parting-off 36 rings were performed in about 20 minutes against the previous method of 90 minutes. The new method also eliminates one machine which was used to face both sides of the rings after they were parted.

The Technologist completed the design to tool a second precision machine, which the company had not been using, to "rough" and "finish"

bore the piston pin holes. This operation was being performed on the lathe which method is incorrect. The new tooling of the machine was completed and tested with good results. Several changes on the cutting tools had to be made as well as a new pilot bushing bracket. This was due to poor facilities found at Allwin to make this type of precision tooling. After the boring bar for this machine was finished, turned and heat treated, it had to be ground. Since Allwin had no external grinder facilities to grind this size of boring bar, the Technologist made arrangements with the Pakistan Air Force Work Shop to perform this operation. The Technologist took the bar to this shop where it was placed on a Churchill Grinder and the operation completed the following day. The boring of the piston pin holes in a 5" diameter piston was completed by this machine in six minutes including loading and unloading time against the previous method which took about 30 minutes. This machine can be used to bore the piston pin holes in most of the pistons by only changing the adapter plate and the boring bar.

The frequent visits made to the shop also afforded the Technologist an opportunity to train the foremen and the tool makers the techniques of tool-designing, the manufacture of production tools, machining and checking the precision parts of the tools, the proper use of gages for inspection and proper methods of grinding cutting tools. In addition, the Technologist has impressed upon the management the importance of having drawings for tools and also for their manufactured parts to enable them to have a complete record in their files for future use when tooling is duplicated or a similar design is required, the same idea can

be applied for the new tool.

The Technologist further suggested to the management that two of their small lathes be tooled to saw-cut the oil grooves in the oil rings. These rings range from $2\frac{1}{2}$ " to 8" diameter and the tooling must accommodate this range. With the new tooling, this operation increases by several times and improves the quality of the ring grooves. The tooling has not been started yet, and the Technologist will continue his efforts to complete the necessary recommendations.

This company had approached the Karachi Ship Yard to place an order with them for 42 Guide Pins, $5\text{-}\frac{3}{8}$ diameter by $10\text{-}\frac{11}{16}$ long. The Ship Yard had no interest in this order and, because of its urgency, the general manager of Allwin solicited the help of the Technologist to make the proper contacts in connection with this order. The contacts were made by the Technologist and the Ship Yard was willing to handle this order at about $\frac{1}{5}$ of the cost Allwin had estimated to pay for this work. The commitment was executed in writing and Allwin supplied the raw material to the Ship Yard to have this work completed. The results were satisfactory.

This company has recently received an order from the Pakistan Army to supply a large quantity of Jeep and Triumph Motorcycle Pistons to this department. The company requested the Technologist to advise them on the processing of these two pistons to acquire higher production and better quality control. The processing was completed step by step and necessary tooling was subsequently recommended to the management. This

work is now in progress and with the aid of the new tooling, the production has increased from 100 pistons per day to about 400 pistons per day and with better quality of production. The management is very pleased with the new production tools and methods.

2. Metalex Corporation

Personnel - 60

The Technologist has made many calls to this plant to render technical service. He initially had a lengthy discussion with the general manager to redesign the ceiling fan for better quality, economical production and savings of raw materials. The Technologist recommended two fan designs; one design was to stamp both the top and bottom covers. With this method, the company could save about Rs. 4 per fan for these two parts in aluminum alone and considerable time in labor. These parts are presently sand-casted from aluminum. The Technologist also redesigned other parts of the fan and recommended improved assembly methods and procedures.

A temporary cast iron draw die was manufactured and few samples of the fan cover were produced with success except that the bearing retainer cracked. It was suggested that the draw operation be done in two steps; first, draw the bearing retainer, second, draw the rest of the cover. Inasmuch as this design was not successful the first time, the company was reluctant to make a second attempt.

The second design was completed and one sample fan was made and

tested. The new design has better eye appeal and provides more volume of air. The management has been very keen to start the production of this new fan. They are now in the process of manufacturing new dies for the production of fan blades and bearing retainers. They have also requested the Allwin Engineering Company to manufacture one permanent mould to cast the top and bottom fan covers rather than continue the present sand-casting method. This tooling should be complete within a few weeks at which time the company will start the manufacturing of fans in accordance with the new design.

The following are some of the parts which have been redesigned to save time and material and eliminate machining operations: (1) housing capacitor, (2) top cover, (3) bottom cover. Items two and three were previously two separate designs, and the new design combined the top and bottom covers into one design. The following items are eliminated: one grease cup, three blade brackets, one bearing retainer, 14 screws, 39 washers and 21 nuts. The total savings of material and labor cost of the parts shown above are Rs. 11.6 per fan. This company has been allowed to manufacture 10,000 fans per year giving a savings of Rs. 1,16,000 per year.

3. Motor Parts Stores

Personnel - 35

This industry has a sales store plus an automobile spare parts manufacturing plant, engaged in manufacturing pistons, rings, liners, valves, etc. The machinery in the manufacturing plant is old and the

production methods are not up to standard. The plant had been operating at about 30% capacity due to lack of raw materials.

The Technologist has designed a special vertical boring machine using a standard boring head which the company had as a spare and was not being utilized. The special machine bores the piston pin holes in six different sizes of pistons with precise accuracy. The operation was being performed on a lathe with no precision quality. It took several months to complete the machine. The Technologist stressed the importance of holding the precise dimensions when machining the parts and assembling the machine. During this period, the Technologist continued to train top supervisors and the tool makers in drawing techniques.

After the machine was completed, including all its component parts, it was tested. The results were not satisfactory due to faulty cutting tools made by the shop and the speed of the spindle was not fast enough. The Technologist made the final adjustments on the machine and the finished product was satisfactory. This company is now using the vertical boring machine for boring of the piston pin holes.

This company has acquired several acres of land in the Sind Industrial Trading Estate to build a new plant. The Technologist has made a floor plan for the different departments with the location of the machinery.

The Technologist recommended and submitted to the management a complete list of production and final inspection gages to be purchased.

These gages will enable the industry to maintain quality production. Most of the parts are presently made with crude methods of gaging. The Technologist also recommended that such an industry should better utilize the Government's testing facilities such as the Central Testing and Standard Laboratory for their chemical and physical analysis of the materials used in the production of parts.

The Technologist inspected a centerless grinding machine and a screw press to forge the valves and he recommended the company purchase this equipment. The company has purchased this machinery. The 200-ton screw press has been installed on its foundation under the direction of the Technologist and is now ready for production.

This company had been encountering difficulties in manufacturing permanent moulds to cast pistons. The Technologist designed one permanent mould and suggested to the manager of this company that he contact the Industrial Research and Development Center in Lahore and have them submit a quotation to manufacture this item for the company. The Lahore Center has quoted on two such dies and they are in the process of manufacturing them.

4. Akmy Industries - Mirror Manufacturers

Personnel - 40

As requested by the owner of this industry, the Technologist called to make recommendations to help increase productivity. Subsequently, one additional fixture was added to the bevel grinding machine and two additional fixtures to the bevel polishing machine to double the production on these two operations - these machines are used for the production of round mirrors only. On the rectangular-shaped mirrors, as recommended by the Technologist, two additional fixtures were added to the bevel grinding machine and four fixtures to the bevel polishing machine to double production on these operations. In accordance with a further request, the Technologist submitted sketches for bevel grinding and polishing oval-shaped mirrors. The sketches included a design of a cam and a cam follower to generate the profile of the oval-shaped mirror. The company has already adopted these changes.

5. Ali's Industries, Ltd.

Personnel - 16

This company, established a comparatively short time, was producing a table model oscillating fan. The Technologist was asked to visit this plant and make recommendations to improve production. At his initial visit, he was told 200 table model fans had already been produced but with a high percentage of rejections. After studying the operations to ascertain the difficulties involved, the Technologist discovered that

many changes in the fan design could be effected to eliminate unnecessary operations. He also noticed that the production methods were extremely crude, and, consequently, the shop could not be expected to maintain quality fans. Several meetings with the management were conducted to discuss the changes in the fan design and ways to correct the faulty tooling used by this company. It was agreed to accept any recommendations made by the Technologist.

Subsequent visits were made whereby the Technologist redesigned the fan and reprocessed the manufacturing of all the fan parts. He designed two tool holders for one of the lathes to rough and finish in one operation five diameters and five faces on the fan body. The new machining method makes five diameters concentric to each other and at right angles to five faces. This method guarantees quality and parts to be interchangeable. The operation was previously performed in several stages with no consideration to concentricity and parallelism to the diameter and faces; therefore, parts did not fit properly and it was difficult to maintain quality.

The company hired a tool maker to manufacture the new tooling. Consequently, with the new tooling, the parts are made accurately, they are interchangeable and production is increased. The Technologist helped guide the tool maker to manufacture these tools as well as train him in the techniques of designing and making of the tools. The Technologist also suggested better designs for the dies and other production tools to improve quality of the table fan.

Further, inasmuch as this industry plans in their future program to manufacture ceiling fans, the Technologist completed a drawing of a ceiling fan and submitted this to the management. The new design is very attractive and simple for manufacture and the management is very pleased. Plans are in operation to make several models before actual production is started.

6: Azad Friends and Company, Ltd.

Personnel - 145

This company manufactures fountain pens, plastic mechanical toys and have recently been manufacturing machine tools such as centerless grinders and milling machines. The industry has made plans to move in the Sind Industrial Trading Estate and approached the Technologist to make a plant layout for the new location to determine the size of the building and also have the plant set up along more modern lines.

The Technologist visited this plant and made suggestions on the production of machine tools. He asked the management to prepare a complete list of machinery and equipment with the floor space required by each machine to enable him to make this drawing. The Technologist completed an extensive plant layout for this company showing the location of different departments and machinery for better production and material handling. He studied all the operations and made necessary recommendations.

The layout was approved by three of the company's officials and was

redrawn on tracing paper. The prints produced will be used when the machines are placed in their respective positions and for the electrical wiring of the machines. The company is now ready to start the construction of the building according to the plant layout and have asked the Technologist to supervise the installation of machinery and equipment. After the Technologist returns from his home leave, he will follow this work further and will recommend additional production improvements when this company is located in the new building.

7. Central Mechanical Engineering Company, Ltd. - Foundry

Personnel - 140

This was one of several plants visited by the Technologist when accompanied by the Steel, Foundry and Electrical Advisors to afford the Advisors an opportunity to acquaint themselves with the Pakistani industries and some of the difficulties they are encountering.

The Technologist worked with the PIPC Foundry Advisor and this industry, one of the largest foundries in Karachi, for quotations to manufacture a cast iron pump to be supplied to East Pakistan by USOM's Health and Sanitation Division. The quotation was submitted to USOM to be brought to the attention of the Government of Pakistan for proper approval to manufacture these pumps locally. This work was never started inasmuch as GOP and USOM never finalized the production of these pumps by local manufacturers.

The Technologist encouraged this company to manufacture some

hardware products which were needed by a furniture manufacturer. This work was satisfactorily completed under the direction of the Technologist.

8. E.M. Oil Mills, Inc.

Personnel - 50

This is a very modern mill extracting cotton seed oil as well as making laundry cake soap. The Chemical and Ceramics counterparts had previously visited this mill and made necessary recommendations. The two counterparts asked the Technologist to accompany them to this mill and submit his recommendations on a mechanical problem the company had been encountering with one of the pumps.

The difficulty concerned one of the pumps which feeds hot water to the boiler. It seems that as long as the water would remain cool, the pump worked satisfactorily; however, when the water reached the boiling point, the pump operated but with no water being fed into the boiler. The Technologist checked the system and discovered the pump is only intended to be used with cold water. When hot water is used, it develops a steam lock in the cylinder preventing the water from flowing through the pump into the boiler. It was suggested how a steam release trap could be incorporated into the pump to prevent the steam lock and make the pump practical for this operation. The company has already effected this change.

9. Gujrat Steel Company, Ltd.

Personnel - 25

This company is engaged in sheet metal fabrication and the Technologist was asked to visit this shop and render advice on increasing the productivity and quality of products. Products manufactured are steel cabinets, steel furniture, safety vaults, etc.; and the company has all the necessary machinery and equipment for this type of production. It is considered one of the best sheet metal fabricating plants in Karachi. The company recently constructed a modern building in the Site Industrial Trading Estate with plans to move and house the plant in the new location.

The Technologist was requested to make a plant layout for the machinery and equipment for better and modern planning of the production lines. With several years' experience in sheet metal fabrication, and familiar with all the machinery and operations in this plant, the Technologist prepared the floor plan to include the location of different departments and machinery for better production control and material handling. The Technologist subsequently visited the new plant to check the markings on the floor for the location of the machinery and the underground wiring for the machinery in accordance with the layout. The Technologist suggested changing locations and sizes of seven doors and installing additional windows to two of the building walls to provide sufficient air and light inside the plant. The changes were effected accordingly.

The company has already shifted to its new location, and the Technologist has been approached by the company several times to give them further technical assistance in the design and manufacturing techniques of some of their products, study the operations further, make recommendations to improve quality and increase production and continue his program to train some of the key personnel in sheet metal fabrication techniques. After the Technologist returns from home leave, he will be able to continue his technical assistance at this industry.

10. Hadi Brothers

Personnel - 15

The Technologist was approached by USOM's Administrative Department to investigate quotations through local furniture manufacturers to make 30 china cabinets, 32 medicine cabinets, six bridge tables with 24 chairs and 100 kitchen cabinets. Suitable sources were solicited and the quotations were submitted for proper approval. Hadi Brothers presented the lowest bid to furnish these items; therefore, they were given the order.

Under the personal supervision and surveillance of the Technologist, this company prepared one sample of each of the units. These samples were approved by USOM and the company completed the entire order, with the exception of the kitchen cabinets which are still under production, under the careful direction and inspection of the Technologist. Some of the hardware used in the furniture was made by another plant, the

Central Mechanical Engineering Company. The completed work was very satisfactory.

11. Herman and Mohatta, Ltd.

Personnel - 200

The Technologist visited this shop to acquaint himself with the company and its functions. This place has been established for many years where the main line of production is heavy fabricating items. They have a fairly good size machine shop and foundry. The machines and equipment are very old and are not being utilized enough due to lack of orders. The Technologist was only able to render advice on several operations such as turning of fiber rolls used for textile industries.

12. Karachi Ship Yard and Engineering Works, Ltd.

Personnel - 250 (Machine Shop)

The Technologist visited the machine shop at this industry and had a meeting with the resident engineer and mechanical engineer. The Technologist reviewed the objectives of the PIPC and informed them of his activities and his relation with the industries. The industry was very much interested in the activities of the PIPC; and the Technologist's help was solicited to set up a standard in production tools such as jigs, fixtures, cutting tools, gages, etc., as well as organize a tool designing department and train one or two of their engineers in this respective

field. The Technologist suggested that in standardizing these production tools, they should be selected to serve two purposes; one, for the use of their tool shop, second, for sale and use for private industry. He also pointed out that there is a tremendous expenditure each year by importing cutting tools, since this shop is well equipped to manufacture these tools with a good savings of foreign exchange. The suggested program was immediately started.

The Technologist submitted to the mechanical engineer a preliminary program for the tool engineering office and asked him to make a survey of all the square shank tools used in this shop, to standardize this type of tool initially with a few samples made for testing purposes. The Technologist also submitted to the mechanical engineer a list of minimum office equipment required to set up this tool engineering department.

It is the opinion of the Technologist that by establishing this department, and his close contacts with this work shop, he will be able to serve the industries to a greater extent by having some of their production tools and equipment made at this shop under his supervision to have quality workmanship, since this shop has all the necessary facilities to manufacture these tools. Some of the production tools that the Technologist has recommended to industries are not made properly due to lack of proper machines and facilities; but through this shop, these items can be made with standardization and quality. The Technologist feels that this contact will be one of the best ways

to help industries in general in his field of activities.

The company assigned two mechanical engineers with several years of practical machine shop experience to the Technologist to train them in the field of tool designing. The department has already been started by the Technologist and the necessary office equipment including drafting machine and drawing boards have been made available. The two engineers started their training program with the Technologist by drawing several cutting tools and layouts. The tools will be made and tried in the shop. Plans were then in operation to expand this department, considering it very essential for better engineering control of the work being done in the machine shop. The Technologist introduced several jobs from other shops under his general surveillance to be produced at this shop; however, the work did not progress satisfactorily at first since this type of work was new to the company. Better organization is now being maintained to handle this kind of program.

On subsequent and frequent visits made by the Technologist, he continued his training program in the field of tool design. Additional tools have been designed by the two trainees and some of these tools have been manufactured by this shop. The Technologist highly recommended to this shop the use of carbide tools, and the engineer in charge fully agreed with this recommendation and has started manufacturing these tools. The Technologist submitted a complete list of carbide tips and quantities to be purchased. Upon the request of the

company, the Technologist completed a list of technical books to be purchased for the use of this office and also a list of steels to be used for the manufacture of shanks for the carbide tip tools.

This company has already manufactured several parts which were requested by other industries, which work was conducted under the supervision of the Technologist. The respective industries were not equipped to manufacture these parts. It is the firm opinion of the Technologist that this type of service to the industries will be of great help in achieving the objectives of the Technologist's program and of the PIPC.

The Technologist had a meeting with the management in connection with the future planning of the newly-organized Tool Design Department. Very much interest has been shown and this department is already included in the organization chart. This department is now a permanent division of the company to serve the machine shop. A new man has been assigned to head this department, and the Technologist was asked to submit an organization chart to be incorporated in the overall chart of the company. This organization chart has been submitted and the management has further asked the Technologist to guide this department while it is in its developing stages. Such work will be resumed after the Technologist's return from home leave.

13. Machine Tool Industry

Personnel - 45

The Technologist was approached by the general manager of this plant to call there and render advice on further industry development. Upon visiting this industry, the Technologist observed that machine tools were not being manufactured; instead, this company is engaged in manufacturing aluminum utensils and sheet metal drums for paints. All the machines used for production are outdated and obsolete. It would be almost impossible to recommend any changes on the present machines where little effort could be made to improve production and quality.

It was recommended to the company that unless they acquire some new machinery and equipment for the production of their present product, the future of the company cannot remain sound and secure. Inasmuch as this company has been approved by the Government to manufacture machine tools, it was recommended that items in this line be produced. The company should make every effort to secure designs on small lathes, drill presses and punch presses. The Technologist has assured them of his help to prepare a list of machinery required to manufacture the above three items. This type of production will prove more beneficial to the company and will certainly prove of greater value toward industrial development. The Technologist will continue his efforts to follow the progress of this shop further.

14. National Aviation Service Company

Personnel - 45

This company repairs and services aircraft and automobiles, and recently started fabricating steel filing cabinets and wrought-iron furniture. Still more recent, a portable gas burner is being manufactured and plans have been in operation to manufacture gas stoves.

The Technologist was asked to help improve this company's products in quality and help improve production. One of the first operations detected by the Technologist was a worker using a hack saw for sawing the slots in the cross-shaped burners - there are 24 slots in each burner. The Technologist then noticed an old milling machine and it appeared that this machine had never been in operation. He immediately sketched a temporary milling fixture and an arbor, and two workmen were assigned to manufacture these tools, as well as clean and put the milling machine in working order. Inasmuch as this company had no slitting saws, the Technologist contacted the Allwin Engineering Company and made arrangements to borrow one saw for demonstration purposes. Allwin also had approximately 14 cutters in their stock room which needed sharpening; and since Allwin has no way of sharpening these saws, the Technologist made further arrangements with the Pakistan Air Force Work Shop to sharpen the cutters. This service was performed without charge; four of the cutters were given to the National Aviation Service Company and the rest were returned to the Allwin Engineering Company.

The Technologist set up the temporary milling fixture using a

single cutter. Twenty-five places were cut the first day against four a day by the old method.

During the next few years, there is every assurance of a heavy demand for gas burners and stoves; and this company is in a good position to manufacture gas stoves. The company has been manufacturing three models of single, double and triple gas burner units. The component parts of all three burners are different and are presently made by hand. This is time-consuming and the finished product is not satisfactory and lacks uniformity. The Technologist has standardized the component parts of these burners and has suggested that about a dozen new dies be made in order that the parts be made by presses already available at this shop rather than by hand. This is increasing production, improving quality and also making some of the parts of these burners interchangeable. Further work on the part of the Technologist has been a better design of steel cabinets and a new larger model of a gas stove which the company will contemplate to manufacture. Some of the suggested dies have already been completed; however, since the company is short of skilled fitters, it will take a longer period than intended to finish all the recommended tools and dies. One notching die for the body of the gas burners is complete and is now in operation and working satisfactory. Two more notching dies are in the process of being manufactured, and these should be completed shortly.

The Technologist suggested to the owner of this shop the essential importance of acquiring a six foot press brake to form and notch some

of the large panels used in the gas burners and the steel filing cabinets manufactured by this company. The Technologist further suggested a design for this machine to be manufactured by this same shop.

15. National Cycle Company

Personnel - 20

The Technologist visited this industry at the request of the owner. This company is engaged in the manufacture of bicycle spokes, nipples, nuts, etc., and has modern automatic German machines to manufacture these parts. The company recently purchased several used screw machines from Germany and the Technologist advised on the tooling method to manufacture these bicycle parts. He will continue his efforts to be of further service to this industry.

Pak Tool Company - 16.

Personnel - 15

This is a general purpose machine shop. The Technologist was approached by the owner and was asked to visit this plant and make recommendations for making a plant layout to improve his production and flow of materials. The Technologist found this shop to be an extremely old building with great risk involved. Even when entering the premises, it appeared that the roof was ready to collapse. The building was full of scrap steel with only a few lathes operating in one corner. Needless to say, the Technologist felt it was wasted effort and time to do any

planning for this shop in its present condition. He suggested that a new roof be constructed and concrete flooring be laid out; then, a better planning could be suggested and eventually effected. The Technologist will exert all efforts to continue to follow the progress at this industry.

17. Pakistan Air Force Work Shop

Personnel - 24

This is a well-equipped and organized tool room and production shop servicing aircraft engines and making a few spare parts when necessary. The Technologist has made contacts with this shop to make use of its facilities to manufacture special tools which he recommends to the industry under his surveillance; and in those cases where a particular industry has no facilities to manufacture these tools, they can be made at this shop. This shop has fully cooperated with the Technologist to allow him to use their machine shop, heat treat and inspection facilities for the work brought from other industries.

The Technologist was also asked by the Group Captain Senior Engineer Officer to make a study of the operations performed in this shop and give advice on improving the facilities and the operations. The Technologist has had about six years' experience in aircraft engine products and has been of great help to this shop. He has made every effort to try to devote several hours each week there to advise them on how to improve operations and train some of the key personnel on

quality production.

The Technologist has rendered service by designing two drill jigs to drill several new holes in two of the component parts of the aircraft engine which were modified. The drill jigs were completed and are now in use. The Technologist instructed the shop foreman and tool maker on the techniques of design and method of location, etc. The shop heat treated a number of tools for the Allwin Engineering Company which tools were urgently needed for the production of their rings.

This shop was encountering difficulties with the coolants used for grinding operations. The Technologist approached the Caltex Company for samples of their coolant. Caltex provided a four-gallon can of sample coolant for this purpose, and the Technologist made arrangements to perform a test using this new sample of coolant. It proved very satisfactory and this shop is in the process of placing an order with Caltex to supply this coolant.

The Technologist received an emergency call from this shop to advise on the repair of a cracked portion of the wing of one of the jet planes. According to the repair manual, a portion of this section of the wing was to be milled and then covered with aluminum sheet skin. Inasmuch as this department had no way of milling this section of the wing, the Technologist designed and improvised a portable milling attachment which was mounted on the wing and the necessary area was milled out. This was performed by the use of a cylinder head boring attachment available in this shop.

All the work on the portable milling attachment was completed under the supervision of the Technologist. He personally performed this operation since it involved much risk. The finished results were good and the efforts of the Technologist highly appreciated. This shop has decided to use this equipment as a portable end mill for other jobs in the future.

18. Pakistan Industrial Chain Company

Personnel - 15 - Will employ to 60 when in full operation.

The management of this company asked the Technologist to make a plant layout of machinery and equipment for the new building in the Sind Industrial Trading Estate and to help them set up and organize their new plant. This is a new industry being established and organized to manufacture bicycle chains. The production capacity of the machinery is sufficient to meet the demands of all of Pakistan. The Technologist first prepared a preliminary layout, submitted this to the management for approval and then finalized the plans accordingly.

The Technologist visited the plant again to check and approve the location of the machinery and equipment the company had set up from the plant layout. All was located in accordance with the plant layout with the exception of two machines; however, the Technologist agreed to the location change. The Technologist recommended additional machines for the tool room which can be purchased locally. The company has purchased this new machinery. The management is very grateful to the Technologist

for his plant layout and list of additional machinery recommended.

This plant will have a trial run as soon as the raw material is available and at which time the Technologist intends to devote several days to help adjust the tools and machines before starting the final production. It is the opinion of the Technologist that this plant will be one of the most modern and well organized plants of its kind.

The owner of this company visited the Technologist on many occasions to seek further advice on various technical problems in connection with the manufacture of chains. The Technologist recommended changes in the future production schedule and also suggested this company work very closely with the Industrial Research and Development Center in Lahore to help in the manufacture of their required dies. Subsequently, the production engineer of this plant visited the Lahore Center primarily to inspect the facilities there and will use this source in the future.

19. Pervez Industrial Corporation, Ltd. - Chamak Shoe Polish

Personnel - 35

The Technologist was requested to visit this industry and advise on the improvement of a few operations to increase productivity.

The Technologist submitted two new designs for automatic die feed of coil strips for punch press operations to increase production and cut the cost of material. The feed attachment was completed and is working very satisfactorily.

A new design was submitted for a progressive die combining the company's three separate dies into one to make the shoe polish can key that opens the cover. The Technologist recommended that coil strip steel be used instead of strips cut from sheets, the latter method not being economical.

20. Pipe and General Casting Company, Ltd.

Personnel - 10 - Not yet in operation.

During his last assignment in Pakistan, the Technologist had called at this industry, manufacturers of 3" and 4" drainage pipes by centrifugal casting process. At the time, the company was encountering much difficulty with the pipe casting machine. The Technologist pointed out to the general manager the major problems involved.

The metal was not heated to a high enough temperature pouring. The company had purchased only one mould instead of having four to six - in this process, when the mould heats, it must be changed giving it a chance to cool. The Technologist had made another recommendation that inasmuch as the pipes are approximately six feet long, pouring should be accomplished with a long spout inside the mould; and the mould should be retracted mechanically while the molten metal is being poured.

Recently, the Technologist was again asked to visit this same plant and inspect the constructive efforts made on his original recommendations. Although his suggestions were followed, and a considerable amount already accomplished, the expected trial run has not taken place

as yet. On subsequent visits, the Technologist has exerted all efforts to have a trial run on the centrifugal casted pipe; however, no further progress has been made by this company.

The Technologist has made many visits to this plant and has offered numerous recommendations in the way of improvement; however, the follow-up on these recommendations has been very slow and discouraging to the Technologist. It is the opinion of the Technologist that no qualified personnel are available at this plant to operate this equipment and that the plant will not prove to be a successful venture.

21. Texwood Corporation

Personnel - 30

This company is engaged in manufacturing bobbins and shuttles for textile industries; and the general manager of the company approached the Technologist and asked him to prepare a list of machinery and equipment for manufacture of textile spare parts. The Technologist compiled such a list including the necessary standard tools and this was presented to the general manager upon completion.

B.
ADDITIONAL TECHNICAL ASSISTANCE AND ADVISORY SERVICES PROVIDED -

1. Baking Oven Design

The Zelin Company (restaurant people) asked the Technologist to render advice on a design for a bread and cookie baking oven utilizing Sui gas. The Technologist completed the design of this oven and submitted this to the company for approval. This company is interested in having a sample of the baking oven made; and the Technologist was contacted to get several quotations before the work is started. Three reliable companies have been solicited to submit quotations. After the manufacturer is selected, the Zelin Company has asked the Technologist to supervise the construction of this item. This work has not been completed as yet.

2. Copra "Dehydrating" Oven Design

The Technologist was approached by Mr. G. H. Rahim to render advice on a dehydrating oven. Mr. Rahim intends to have about ten of these ovens built in East Pakistan where he will locate his dehydrating plant. The Technologist prepared and completed the design for such an oven and Mr. Rahim decided to have one full size oven made. The Technologist subsequently assisted the interested party by contacting several reliable companies to submit quotations to build this unit.

The furnace was completed and on display at the Pakistan Industrial Exhibition in Karachi. Mr. Rahim asked the Technologist to accompany him and personally inspect the furnace before making final payment on the unit. The model was found to be satisfactory with the exception of the

exhaust fan on which the Technologist recommended a new design. This will be incorporated shortly and the unit will be shipped to East Pakistan and installed for operation. If it proves satisfactory, Mr. Rahim intends to place his order for additional units.

Kohinoor Mantle Manufacturers - 3.

The Technologist visited this plant accompanied by the electrical engineering counterpart of PIPC. The company is engaged in manufacturing pressure lamps, pressure stoves, blow lamps and gas mantles. The company has several acres of land in the Sind Industrial Trading Estate and have already completed the construction of several new buildings on this location. This industry intends to transfer all facilities from Karachi to S.I.T.E. The Technologist was asked to make a floor plan for different departments and indicate suitable location of the machinery. He was also asked to supervise the installation of machinery. The Technologist is in the process of making a model production plant of this shop with proper planning and guidance during the erection of the machinery and equipment.

4. Pakistan Industries, Ltd. - Re-Rolling Mill

This was one of several plants visited by the Technologist accompanied by the Steel, Foundry and Electrical Advisors to afford the Advisors an opportunity to acquaint themselves with the Pakistani industries and some of the difficulties they are encountering.

The Technologist accompanied the Steel Advisor to call at this plant and make recommendations on a shear used for cropping the two

ends of a channel in production at the time of their visit.

The channels are about 20' long; one end of the channel is cut and then several workmen turn this channel 180° to cut the opposite end. It was first suggested by the Steel Advisor that after one end was cut, the channel should then be pushed through the shear blades to cut the opposite end without turning it 180°. With the prevailing condition of the shear, this was not possible nor feasible as there was not sufficient clearance between the upper and lower knife of the shear resulting in a mechanical disadvantage. Inasmuch as the shear has two cutting edges, and only one is used at a time while the other remains a spare, the Technologist suggested that one cutting edge be eliminated to allow enough clearance for the channel to be pushed through and then brought into position to be cut.

5. Star Rolling Mill

The Technologist accompanied the Steel Advisor to visit this plant and make recommendations for better use of the billet cut-off shear. The shear at this shop was operating too fast to be practical for this operation; and to correct the condition, it was recommended that the ratio of the pulleys on the motor be changed to reduce the speed of the shear. The Technologist did not think it necessary to slow up the shear, indicating it would create a mechanical disadvantage and would lose its shearing effect. The Technologist noticed that the gaging and feeding of the shear was performed on the side during the time the shear is in operation. This method is not practical and can

always create trouble. It is almost impossible to gage the billet through the shear when it is in the "up" position and be able to get the proper length before the shear moves to its "down" position.

The Technologist suggested that the feeding and the gaging of the bar be performed in front of the shear and the bar be placed on a roller with horizontal and backward and forward movements. When the car is in the proper position, and is already gaged, it can then be rolled into the shear when in the open position.

C. MISCELLANEOUS

1. On his arrival to Pakistan, the Technologist immediately started locating suitable office space and facilities to house the Pakistan Industrial Productivity Center. The Technologist worked with the contractors to help design the furniture and guide the work while under construction. With the usual handicaps such as insufficient or delayed Governmental expenditures and procrastinated work of the contractors, it took over seven months to complete the preparatory work. However, all facilities were made available for occupancy before the arrival of the U. S. Advisors; and all the staff members of the Pakistan Industrial Productivity Center have been utilizing these quarters and facilities since completion and initial occupancy.

During this period, because of the importance involved in recruiting better qualified candidates, the Technologist had several meetings with the officials of the Ministry of Finance and Ministry of Industries requesting them to change the status of the counterparts from Assistant Deputy Directors to Deputy Directors. He also stressed the importance of having the Director and Deputy Directors appointed prior to the arrival of the U. S. Advisors. These two factors were carried out accordingly.

2. The Technologist devoted a portion of his time to help the U. S. Advisors affiliated with the Pakistan Industrial Productivity Center get settled upon arrival in Karachi. He established a program by initially preparing a list of industries in East and West Pakistan,

particularly in the Karachi area, with industries in their respective categorical fields. He planned, coordinated and guided their industry visits to help make their programs more effective. The Technologist arranged appointments with the various industries and personally accompanied the Advisors in visiting some of the major places, to afford the Advisors an opportunity to familiarize themselves with the Pakistan industries and realize some of the difficulties they are encountering.

3. The Technologist prepared and submitted to the Director of the Pakistan Industrial Productivity Center a list of inspection gages and tools (to be included in the 1958 PIO/C) to help him inspect and check the work accomplished in the industries. This inspection will enable him to show the industries the meaning of quality control.

4. The Technologist had a meeting with the Health and Sanitation Department of USOM for the purpose of utilizing Pakistan industries to manufacture equipment required on International Cooperation Administration's financed projects. It is the firm opinion of the Technologist that some of the items appearing on Project Proposal and Approval Commodities (PPAC) can be manufactured by local companies under the supervision of the Pakistan Industrial Productivity Center's Advisors. If arrangements can be made with the ICA and the Government of Pakistan to furnish raw materials to local industries to manufacture some of the items appearing on PPAC, it will save a considerable amount of foreign exchange. This subject has been discussed with the Health and Sani-

tation Department, Procurement Section and Industry Division of ICA for careful consideration. The three mentioned ICA divisions are in full agreement with the proposed idea, but thus far no action has been taken.

5. The Technologist conducted a meeting with several bicycle manufacturing industrialists and a representative of the Pakistan Cycle Industrial Co-Operative Society Ltd. to suggest the forming of an association in the bicycle industries to promote better manufacturing of bicycles and bicycle parts locally. The bicycle industry representatives are very much interested in forming such an association and are also planning to maintain close ties with the companies engaged in manufacturing bicycles and bicycle parts in East and West Pakistan. The Technologist feels that working through an association, he can cover a wider field and work a better consulting and training program. This program is under consideration.

6. On numerous occasions, industrialists visited the Technologist at his office to discuss prevailing problems confronting them at their respective places of business. They called to seek such advice on current technical problems and possible expansion of their plant facilities. In some cases, where specifically needed, lists of machine tools, equipment and materials with specifications were submitted for their reference and use.

III. SURVEYS - Conducted for the Industrial Survey Organization, Government of Pakistan.

The Industrial Survey Organization, Government of Pakistan, requested the Pakistan Industrial Productivity Center Advisors to survey various plants, for the Survey Office to be guided by the reports submitted by the Advisors in order to determine and justify such items as issuance of import licenses. Where expansion of plant facilities were anticipated, such findings were reported to the Survey Office furnishing the necessary criteria.

The Technologist called at a number of the most important industries to complete the requested surveys and the work involved was time-consuming. The Technologist's two counterparts usually accompanied him in conducting the surveys in the Karachi area. Detailed time and motion studies were made to determine the production capacity of industries and raw material requirements and these were carefully and accurately tabulated. In all cases, it was ascertained the production was approximately 40 to 50% of the production capacity due to lack of raw materials. Adequate import licenses were not issued due to lack of foreign exchange on the part of the Government.

Standard practice used to determine and compute the production capacity of any plant was obviously based on efficiency of production and bottle neck operations. At each plant the operations were observed and necessary data was collected. Subsequent meetings were usually conducted with the management and key technical personnel at each

industry to discuss the difficulties encountered including the problem of unavailability of licences to purchase necessary machinery, equipment and raw materials to improve the quality of products and simultaneously increase production.

In surveying the three bicycle units, the Technologist conducted a seminar with the management and skilled technical personnel, numbering about 30, to discuss various ways how these units can produce better quality items and accordingly reduce the sales price.

The Government felt it was very important to solicit the services and professional know-how of a foreign advisor to conduct these surveys. Needless to say, but thoroughly in compliance with such thinking, the Technologist submitted views and comments on an impartial basis and any criticism offered by him was always meant to be constructive. The Technologist was extended every courtesy, assistance and cooperation by both the top management and shop supervision in all the industries visited and surveyed.

The Government is exerting all efforts to extend support to many of the essential industries to help further progress and development and help the economy of the country.

III. SURVEYS CONDUCTED

Company Name and Products Manufactured

KARACHI

Allwin Engineering Company - Vehicle Spare Parts
Hysesons Steel Mills, Ltd. - Steel Pipes
Khan Brothers Trading Company - Hurricane Lanterns
Metalex Corporation - Ceiling Fans and Electric Motors
Paramount Industries - Hurricane Lanterns
Sind Industrial Corporation - Hurricane Lanterns

LAHORE

Batala Engineering Company (Pakistan) Ltd. - Engineering Co.
Capital Industries, Ltd. - Bicycle Industry
Pakistan Bycle Industrial Co-Operative Society, Ltd. - Cycles
Sartaj Industries, Ltd. - Cycles

Machine Tools Manufactured at
Industries Listed Below -

Ahmad Din-Siraj Din & Sons
Brimra Engineering Works
Crown Engineering Works
East India Engineering Works
Friends Engineering Works
Jamal Din Sons & Company
Kalyam Foundry and Engineering Works
M.A. Din and Sons
M.A.S. and Company, Habibgani
M. Hasan Din and Sons
Noor Engineering Works
O. K. National Industries
Patti Scientific and Engineering Works
Sunrise Engineering and Foundry Works
Zam Zam Engineering Works

GUJRANWALA

Friends Engineering Works
Hayat Foundry Works
S. M. Engineering and Metal Works

SEALKOT

Ch. Fazal Din and Sons

IV. EVALUATION OF INDUSTRIES

Pakistan Industrial Credit and Investment Corporation, Ltd.
(PICIC)

Inasmuch as the Pakistan Industrial Productivity Center advisors are well qualified to review and render necessary comments on qualifications of industries where applications to the above source (PICIC) for loans have been made, the advisors were requested to visit various industries listed by the Corporation and help determine the justification for loan, technical soundness and management and operating know-how in connection with this proposed program.

Consequently, the Technologist was requested to survey a number of industries to determine justification as to the following was the industry qualified to maintain suitable machinery and facilities; and in this respect, when purchasing additional machinery and equipment, was price sufficiently competitive, within reasonable range, and quantity and type of equipment justified was industry qualified on technical know-how, where expansion of plant facilities or establishment of a new plant, in setting up and operating the plant to manufacture additional or new products.

In order to orient himself and ascertain the proposed program of each respective industry with pending application for loan, the Technologist carefully studied each case file before proceeding with the actual survey. During this period, in conducting the surveys, the Technologist found it advisable to offer sound recommendations either to the industrialists or to PICIC in connection with the particular

problems involved.

The possibility to initiate a new enterprise was discussed with the Technologist by several industrialists. If similar units were found already in existence in Pakistan and meeting the requirements of the country for that particular product, advice given to PICIC and the industrialists usually discouraged such new venture. Concerning the purchase of additional machinery and equipment, in those cases where the number of commodities exceeded the actual need, the Technologist advised the industrialists to reduce the quantity of items. Or, in other cases, recommendations were made to balance the present machinery and equipment on hand by purchasing the additional required items to make the industry a better established enterprise.

Often times, it was suggested the industrialists solicit and engage the services of a foreign concern for at least two years to set up the facilities and train local personnel to operate the plants on a modern production basis. If importation of the foreign technicians was not available, it was then suggested that one or two of the key men be sent abroad for further training in their particular field and make them more cognizant of the production techniques and methods found abroad. After completion of each survey, an individual detailed report covering the industry visited was submitted to the general manager of PICIC for a final decision in granting the loan to that industry.

IV. Pakistan Industrial Credit and Investment Corporation, Ltd.

Applications for Loan

Industries Surveyed by the Technologist

1. Allwin Engineering Company
Manufacturers of Vehicle Spare Parts
2. Landhi Engineering Works
Manufacturers of Textile accessories
(Subsidiary of Dawood Cotton Mills)
3. Pakistan Cycle Industrial Co-Operative Society, Ltd.
Manufacturers of Bicycles and Bicycle Spare Parts
4. Texwood Corporation
Manufacturers of Bobbins and Shuttles
5. Yusufzai Trading Company
Manufacturers of Wire Heald and Steel Reed

V. SEMINARS

The Technologist, accompanied by Dr. Rexford Hersey, Management Advisor for the Institute of Public and Business Administration, University of Karachi, held seminars in the following industries to allow the advanced management class of the Institute to study at first hand some of the practical problems of business and determine how well practice and theory agree. The program consisted of a tour at each plant, to study the production methods, followed by a seminar conducted by one or more members of the firms' administrative staff. In each plant, separate and respective problems were studied. The seminars were conducted on Saturdays starting at 9:30 a.m. and continued for about three hours. In each industry, the students were expected to ask questions and later submit a report on two specific points previously selected.

AGENDA FOR SEMINARS

- February 7 - Dawood Cotton Mills, Ltd.
1. Sales management and development.
 2. Training - both supervisory and employees.
- February 14 - Glaxo Laboratories
1. Quality control.
 2. Costs - local and import..
- February 21 - Hashimi Can Company, Ltd.
1. Automaticity in handling and manufacturing..
 2. Transportation (manufacturer to consignee)..
- February 28 - General Motors Corporation
1. Union relations..
 2. Records keeping and budgetary control.
- March 7 - A. & B. Food Industries
1. Training (employees)..
 2. Inventory control.
- March 14 - Hysesons Steel Mills, Ltd.
1. Safety.
 2. Equipment and improvement.
- March 21 - Azad Friends and Company
1. Sales management and development..
 2. Layout and equipment..

VI. CONCLUSIONS

Throughout his assignment, the Technologist has had continued encouragement from both the officials of the Government of Pakistan and the industrialists, substantiated by the acceptance and application of his advice and recommendations. The Technologist has always displayed impartiality and sincerity in imparting his technical knowledge and assistance to the industries under his general surveillance. Needless to say, it has been gratifying to realize the great confidence shared by the industrialists and the receptive manner in which the technical assistance rendered to them is accepted.

The work of the Technologist has covered a broad field of engineering production and machine tool shops in safety, production planning and processing, plant layout and material handling, quality control, designing and making of jigs, fixtures, dies, gages, cutting tools, special machines, etc., as well as training of key personnel and upgrading semi-skilled workers. When necessary and requested by the industries, the Technologist supplied specifications for machinery, equipment and materials to be purchased by them.

The most important results obtained by the Technologist, and by utilizing the existing machinery, equipment and man power, have been improving quality, increasing productivity and reducing cost of production. This work has been accomplished by redesigning some of the manufactured products to eliminate excess materials and unnecessary operations.

The engineering or production industries equipped with machine tools are essential for the economy of any country, particularly undeveloped countries lacking foreign exchange, since these industries can manufacture and supply the basic machinery, equipment, tools and spare parts which are badly needed by other industries such as transportation equipment, agricultural machinery and spare parts, textile spare parts, power equipment, etc. Without these, the development of a country can be impaired. Engineering and production industries also develop key personnel and semi-skilled workers always badly needed by undeveloped countries for better planning, better quality controlled products and sound industrial development program.

It has been noticed that during the last few months, the production in most industries visited by the Technologist, has slowed down considerably due to lack of raw materials. Cut down in production has caused unemployment, and with production curtailed, some industries are working at less than half of their capacity. This is creating much hardship on all concerned and slowing down the industrial development program. These industries operated at a higher capacity in the past because they were able to purchase needed material from the local market.

In those cases, where the industries are established on a sound basis and are exerting all efforts to produce quality products, the Government of Pakistan, with possible solicited help of USOM to provide more commodity aid, should plan a program to furnish these industries the raw materials, machinery or spare parts required by them to

increase their productivity.

Throughout his assignment, the Technologist placed major emphasis on upgrading personnel and semi-skilled workers using on-the-floor demonstrations and instructions coupled with technical advice and counsel to management. This also served as a training period for the counterparts, to make them cognizant of all the consulting techniques and advisory services performed by the U.S. Advisors. Floor plans were designed to demonstrate the initial stages to better planning and organizing a new industry or expanding existing facilities.

On arrival in Pakistan in April of 1957, the Technologist immediately started organizing the offices and facilities for the Center, ordering the office equipment and furniture, to have this completed before the arrival of the other U.S. Advisors and before the selection of the counterparts, to provide them all with adequate facilities. This work was time-consuming.

In addition to rendering assistance to the industries and training personnel, on many occasions, the Technologist assisted the Industrial Survey Organization by surveying some of the major industries to determine the production capacity and raw material requirements.

In connection with pending applications for loans (both rupee and dollar), the Technologist also helped the Pakistan Industrial Credit and Investment Corporation, Ltd. to evaluate industries and determine their technical soundness and justification of their machinery. This additional work was also time-consuming.

The Technologist regrets that insufficient time does not permit him to extend his services to still a wider field of activity and be able to devote a longer period at each industry and train his counterparts sufficiently enough to carry on the program in the future without assistance from the Technologist.

VII. Pakistan Industrial Productivity Center
SUMMARY AND RECOMMENDATIONS

Although the Productivity Center has accomplished its purpose to a certain degree, its major progress in the industrial development program of Pakistan has not fully satisfied the Technologist. There have been a number of problematic contributing factors to create a disturbing element.

The total number of U.S. Advisors listed in the original PPA have not been supplied resulting in understaffing of the project. During the past year, USOM has contemplated consolidating and merging Projects 086 and 033 and the FY-59 PPA was completed by USOM's Industry Division to justify this change; however, no assurance has been made that this arrangement will take effect. Obviously, this has started a state of confusion and has delayed recruitment of additional U.S. Advisors for both projects. In Project 086, there are already three Pakistani counterparts working under a handicap since no U.S. Advisors have been made available.

Inasmuch as the Technologist originated and implemented this project, and is thoroughly educated on the objectives and functions of the Center, he is obviously keenly and genuinely interested in the program planning, organization and continued progress and success of the Productivity Center. The Technologist has entertained great

aspirations with his many plans and ideas to introduce and promote better understanding of the activities and objectives of the Center to the industries. The people in the Government of Pakistan have fully appreciated the efforts and work of the Technologist and his sincerity to help the progress of the Center to play an important part in the industrial development program.

On the other hand, the Government of Pakistan was also initially slow in providing a permanent Director and the counterparts to the Center. The Government still has not given the Productivity Center Director complete responsibility and authority to administrate the functions of the Center. The standard business practice of "chain of command" has not been properly exercised by the Government of Pakistan inasmuch as both the U.S. Advisors and their counterparts receive instructions from various departments in the Ministry of Industries, GOP, without first consulting the Director's office. If these conditions continue to exist, the program of the Center will undoubtedly be subject to misunderstanding and possible criticism,

It is the Technologist's suggestion that USOM select one of the Advisors to serve in the capacity of Project Advisor and act as the Chief of the project; and that the Government of Pakistan establish this Center as an autonomous unit in the Ministry of Industries and permit the full time Project Director his necessary authority and responsibility to administrate this project. An advisory body could be appointed by the Government of Pakistan to assist the Project

Director on consultation matters.

A projected program for at least two years should be arranged for each section of the Center. This program should be arranged by the Advisors and their counterparts with consultation by the Project Director and Project Advisor and the advisory body. Nominal fees should be charged for the technical services of the Advisors to make their industry visits more appreciated and psychologically give the Advisors more prestige. It is to be understood that the fees charged will not recover all the expenses of the Center for at least the next several years as this is not intended to be a profit-making organization.

In those cases where orders have been placed with Pakistani industries by the Government, the Productivity Center can assist the Government to control the production and maintain the quality of production. The Productivity Center can also suggest to the Government certain items and spare parts currently being imported and assist them to manufacture them locally and with quality control.

The functions of the Productivity Center should be more of technical, management and information assistance both to the Government and private industry, as proper technical know-how and management are very much lacking in the industries of Pakistan.

More publicity must be given to the Productivity Center through different sources to make industries and the Government more cognizant

of the activities and existence of the Productivity Center. The functions of the Center should be performed like "team" work with other Governmental and autonomous agencies to guide better its progress, in order that duplication may not exist in their activities.

The people in the industries are skilled artisans but still lack technical know-how in production tool design and processing of sequences of operations. This can be overcome by their taking advantage of the facilities and services readily available at the Productivity Center to better the design of present production tools and change some of the sequences of operations to improve quality and increase production.

VIII. GENERAL RECOMMENDATIONS

As a result of the Technologist's extensive industrial experience and observations in Pakistan , he recommends that increased technical and economic aid be extended to small and medium size industries for a long time to come. The foreign technicians selected for Pakistan must be flexible in their ideas and methods of giving advice to this country's industries. The industrialists must be made aware of the basis of present circumstances as the conditions in Pakistan are unique and one must refrain from adopting solutions based strictly on Western standards.

To develop the existing and new industries on a more sound economy, and to get most out of present capital investment, a constant inflow of know-how for the operations and improvement of existing and new plants is essential. It is advisable to reach into the vast experience existing abroad by means of cooperative arrangements with foreign institutions and industries or foreign aid programs.

Training of specialists (in all levels) abroad should also be intensified, always having in mind either a definite program of study in a school or an intense training period in a given plant (technical tourism is to be avoided). Students sent abroad to receive their engineering degrees should be encouraged to remain after their graduation to work in their respective field for a minimum of one to two years before they return to Pakistan. This practical training will give

them a better perspective toward their chosen profession and will also help develop the industries of Pakistan with more sound judgment. When trainees return to Pakistan, position placement should be made available with substantial compensation commensurable with their qualifications to provide the needed encouragement and incentive. In this past, this has not been practiced.

To stimulate the appearance of a healthy metal consuming and manufacturing industry, greater attention needs to be given to quality control of metallurgical parts, uniformity of dimensions and physical characteristics, and compliance of these characteristics with adequate specifications. Specifications covering metals and metallic products should be standardized and elaborated. Cooperation with foreign institutions should be encouraged, with a view to improving the products and methods of Pakistan's metallurgical industry. Of course, the above statement could also be applied to other industries in Pakistan.

Support should be given to laboratories or institutions both Government or private doing industrial research and training providing general technical services and giving assistance to the industries. New plants, particularly large in size, should be created only on the basis of the technical experience of specialized firms (Pakistan or foreign) or individuals.

To develop an industry like machine tools with an infinity of

technical ramifications requires the constant availability of technical knowledge. In a country just beginning to develop a farflung industry such know-how must be imported, until such time as its engineers with practical know-how have become numerous enough and experienced enough as to be independent. New industries must not be encouraged to be initiated when already there are a number of the same industries existing in Pakistan and working at much lower capacity of the plant due to lack of raw material. Those industries where the raw materials are either all or partially available locally and are good for the industrial economy of Pakistan, should be given priority.

The Government must be cautious of those industries that are jeopardizing the quality of products manufactured to cut down the production cost, which method is already being practiced by many industries. Precautionary measures must be taken to alleviate this disturbing element and attempts made to control better the quality of production.

If the Government has authorized the industries to manufacture and import raw materials to a specified number of units per year, as a result of the limitations of foreign exchange; and if the industries are able to redesign their products to improve and simplify the design, and eliminate unnecessary operations and parts to conserve raw materials in order to produce more units with saving of materials, industries should be extended such authority. If the industries find that with the new design, they can produce additional units and increase

their production, except for the possible need of a very small percentage of specific raw materials, such cases should be given careful consideration. If justified, the industries should be allowed to import the additional raw materials. This will obviously create incentive as well as constant competition with other similar industries to improve their designs. This will tend to increase production, reduce cost, create more employment as well as develop the economy of Pakistan and save foreign exchange.

It is to be understood that already there are too many industries manufacturing the same products; and only a few of these industries have a certain amount of know-how and are sincere in their efforts. The Government should encourage such industries, more so than those only operating because the demand is greater than the supply and are able to market their products regardless of quality. These haphazard units will certainly not help the industrial development of Pakistan.

More authentic and impartial quality control must be enforced in industries by the Government particularly for those products to be purchased by the Government or are being manufactured for export purposes. Government should try and encourage the local manufacturer to produce items currently ~~be~~ being imported. The Government should make attempts to place larger orders and allow the manufacturer to import sufficient raw materials to maintain a reliable and steady production which will tend to reduce overhead and cost of production. This will undoubtedly save foreign exchange, create more employment and will also develop more economical units.

APPENDIX "A"

LETTERS OF APPRECIATION

Telegram: PAKINPROC

Phones: 37381, 37382,

37383, 37384, 30567



PAKISTAN INDUSTRIAL PRODUCTIVITY CENTRE

DEPARTMENT OF SUPPLY & DEVELOPMENT
GOVERNMENT OF PAKISTAN—MINISTRY OF INDUSTRIES

HABIB SQUARE, BANK HOUSE No. 3,
BUNDER ROAD, KARACHI-2, PAKISTAN

March 25, 1959

Mr. George D. Thomas, Chief of Production Specialists and Machine Tool Technologist, has been working with me since July, 1957. This Centre owes him a lot for its establishment. The lay-out plan of this office was given by him. He is a tireless worker, with ample drive and initiative. In short, he is resourceful and versatile. His technical assistance to factories has been praised in no uncertain terms on all hands. The Government authorities concerned have also appreciated the promptitude and earnestness with which he has performed the jobs entrusted to him.

In view of the meritorious services rendered by him, he has already been recommended for a further term of two years after the expiry of his present one. I can unhesitatingly recommend that in case his services are placed at the disposal of this Centre once again, with his solid background and wide experience of Pakistan industries, he will be able to take up the thread to give a final coup de grace to his splendid mission.

A handwritten signature in cursive script, appearing to read 'A.R. Khan'.

(A.R. Khan)

Director,

Pakistan Industrial Productivity Centre.

Metalex Corporation

MANUFACTURERS OF ELECTRIC FANS, MOTORS, METAL BOXES & ALLIED PRODUCTS

OFFICE AND FACTORY:

GURAM KHAN STREET, LAWRENCE ROAD
KARACHI-3 (PAKISTAN)

No. 43/634/59

Dated 31st March, 1959.

James A. Killen, Esqr.,
Director,
The International Cooperation Administration,
Quamar House,
K a r a c h i .

Dear Sir,

It gives us special pleasure to record with appreciation, the services rendered to us by Mr. George D. Thomas in improving upon the quality of our MILLAT Ceiling Fans.

The meritorious services of Mr. Thomas deserve special praise when we look to the crude methods of processing resorted to by us in early 1953. Cutting blades of the fan with scissors, would be sufficient example. Our statement may not be assumed as an hyperbole when we say that most of the work was done by hands in those days.

After making a careful study and taking stock of the indigenous machinery installed in our factory with special reference to the semi-skilled and unskilled labour Mr. Thomas devised ways and means for the improvement of the following.

1. Die for Blades.
2. Die for blade clamps.
3. Dies for Grease Cup.
4. Dies for making making holes in regulators & blades.
5. All other dies for the parts of our fans.
6. Suggestions as to making of tools.
7. Suggestion to use copper ingots instead of copper sheets for making rotor rings, which avoided unnecessary labour and inaccurate fittings.

He was so engrossed in the improvement of our products that he took trouble to work in the factory for a number of days. He went from worker to worker teaching them the efficient methods and imparting to them the technical knowledge of the correct use of tools on the Lathes.

As a result of the marvellous work done by Mr. Thomas our workers realised the intricate use of the modern tools and the technical aspects of their job hence the figures of production have gone up and the over head expenses considerably reduced.

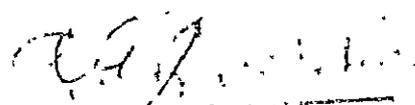
This corporation feels proud in announcing that Mr. Thomas' perserverance and sincere efforts have played an important part in bringing its products to the level and position it enjoys at present.

For the time being Mr. Thomas has concentrated all his activities to the improvement of covers and blades of ceiling fans. His efforts are soon to bear fruit in the shape of higher production at lower cost.

We are pleased to note that services of such experts as Mr. Thomas will earn for Pakistan its deserving place in the commity of most advanced industrial countries.

With best regards, we remain,

Yours faithfully,
for METALEX CORPORATION


(ABDUL GHANI JUNANI)
MANAGING PARTNER

MOTOR PARTS STORE

SPECIALIST IN:
Reconditioning of Industrial & Automotive Petrol & Diesel Engines, ARC & GAS Welding
MANUFACTURER OF:
PISTONS, RINGS, CYLINDER LINERS, ENGINE BEARINGS, VALVES & ROAD SPRINGS

L BANK OF INDIA LTD.
IB BANK LTD.

Ref. No.....
Ref. No. MP/20/21

Foundry & Heavy Repairs
COUNTRY CLUB ROAD,
KARACHI

OPP. TAJMAHAL CINEMA,
BUNDER ROAD,

KARACHI **1953**

The Secretary,
Ministry of Industry & Commerce,
Government of Pakistan,
KARACHI.

Dear Sir,

We seek this opportunity to apprise you with our existing manufacturing activities in Automotive Engineering field alongwith our future progress, which is briefly outlined as follows.

We are an established and recognized Industrial unit engaged in manufacturing various automobile parts of quality and high workmanship which have proved a right replacement, which helped a large number of Automobile and Industrial Engines to remain in service as the performance of our parts was highly satisfactory, in consequence thereof the demand of indigenous parts has been growing daily, although we have never been able to utilize our production capacity in full, which was retarded owing to want of basic raw material, which have not been made available in quantity to meet our requirements even in fraction and result thereof was that we could not make the progress with desired pace, though development so far made was under the extremely difficult and reverse circumstances.

Besides, the above there was also a big factor in this direction which all along the time time hampered our pace of development with desired speed and that was the Technical know how and latest working methods, which we lacked badly in past, but are now very pleased to record here the appreciation of technical help, which we have been able to receive through the I.C.A. expert Mr. George D. Thomas attached to Industrial Productivity Centre, who has been now a days assisting our Industry in a number of project, which would help us steering our factory on most modern lines, the present scope of his activities is extended to-

Training of our staff by practically demonstrating them the various special operation, which are involved in manufacturing of parts.

Advising on handling machine tools and their care alongwith ways and means to make their best use, resulting in enhanced production with least labour.

P.R.O.

MOTOR PARTS STORE

41013

SPECIALIST IN:

Reconditioning of Industrial & Automotive Petrol & Diesel Engines, ARC & GAS Welding

MANUFACTURER OF:

PISTONS, RINGS, CYLINDER LINERS, ENGINE BEARINGS, VALVES & ROAD SPRINGS

Bankers
L BANK OF INDIA LTD.
IB BANK LTD.

Ref. No.....

Foundry & Heavy Repairs
COUNTRY CLUB ROAD,
KARACHI

OPP. TAJMAHAL CINEMA,
BUNDER ROAD,

KARACHI, 16th May 1950

Ref. No.....

From your page-

Building up Jigs, Fixtures and Special Attachments in solving the various intricate machining problems with our present machine tools, which would have otherwise been imported involving a lot of foreign exchange.

We have every hope that after the Attachments are put into operation there will be marked increase in production and quality, which would yield good result in overall saving in Foreign Exchange as well as widening up scope of employment.

We are sure that if Government continued to help us in coming few years too, our industry would be one of its kind in whole country, capable of meeting Nation's demand to a great extent, as we are interested in to build up over here the possible machine tools under the guidance of Foreign Machine Tool expert, this will help to a great extent in relieving our Country's already tight currency position from being further burdened.

Besides, the above help Mr. Thomas has also been working on a floor plan of our new factory, now under construction in Sind Industrial Trading Estate, where the entire machinery will be installed under his guidance, we also proposed to install additional machine tools which will be procured later on for large scale production and according to our progress the production will be manifold and number of employees will be doubled as soon as the new factory goes into production.

In fact we have very ambitious plan and expect that government would accordingly extend us the required assistance, which in past was not made available to us, although the Production Capacity of our industry was long ago assessed by the Survey Organisation but not yet followed by department concerned. We also expect that Government would help us in completing the existing unit, which require additional machine tools.

While concluding, we may point out here the very fact that, if Government are interested in the development of industries then they must retain services of Foreign Experts, such as Mr. Thomas, who has become thoroughly conversant with our problems and have upto some extent been able to tackle them, as it is not possible for any individual industry to acquire exclusively service of any expert, hence the present process of Aid by the Government may be continued for coming years, which will help running the industries on right line, which will enable us to make large scale production of standard quality and at a low cost.

We trust that the above would receive your immediate and sympathetic consideration.

XXXXXXXX P.T.O. Thanking you,

For MOTOR PARTS STORE

Yours sincerely,
Muhammad

PAKISTAN INDUSTRIAL CHAINS CO.

34-35, NEW FORBES BUILDING,
BUNDER ROAD, KARACHI/PAKISTAN.

CODES: A. B. C. 5TH & 6TH EDITION
BENTLEY'S & PRIVATE
TELEPHONE: 32360
BANKERS: NATIONAL OVERSEAS
AND GRINDLAYS BANK LTD.
SADDAR BRANCH KARACHI/PAKISTAN
NATIONAL COMMERCIAL BANK LTD.
BUNDER ROAD, KARACHI/PAKISTAN

November 15, 1958

Mr. Richard Plummer,
Chief, Industry & Transportation,
I.C.A., Qamar House,
KARACHI.

Dear Sir,

We wish to sincerely record the whole-hearted assistance, cooperation and technical advise rendered to us by your Officer, Mr. George D. Thomas, attached to the Productivity Centre, Habib Bank Bldg., Bunder Road, Karachi. He has time and again visited our factory, he has given us the lay-out plans for our plant and equipment and advised us on the best production methods, and the Dies and Tooling required by us. In the absence of technical expert from abroad, his help has been immeasurable, and therefore, it is meet that we express our thanks and appreciation for the assistance given to us by the I.C.A., and one of his personnel.

Yours very truly
FOR PAKISTAN INDUSTRIAL CHAINS CO.,

Abdul Mannan

Abdul Mannan
PARTNER

Mushtaq 10th March, 1959.
(PAKISTAN)

~~The Secretary,~~
Ministry of Industries,
Government of Pakistan,
Karachi.

Dear Sir,

INDUSTRIAL PRODUCTIVITY CENTRE.

This is to express our appreciation and gratitude to the above organisation under your Ministry which indeed has served the development of national industry in more than one way. We have pleasure in recording the most co-operative attitude of the officers of the organisation whenever we were in need of some technical assistance.

Ever since we established ourselves as manufacturers of Steel Furniture & Office Equipments, it has been our earnest and sincere desire to develop this industry and bring it to a respectable and progressive stage. In our endeavours in this direction we sought and acquired every possible assistance and guidance from whatever source it was available. We have no hesitation in saying that we have not been benefitted more by any other organisation, government or private, as by the above Centre which is manned by people of varied experience.

At a time when we needed technical advice most urgently in planning and setting-up our new factory at Sind Industrial Trading Estates, it was the Machine Tool Expert of the above organisation who extended his most valuable co-operation in the set-up of the new factory on modern and scientific lines. Besides, whenever we had any technical difficulty, we sought the advice of Mr. George D. Thomas which was always readily available.

We now understand that Mr. George D. Thomas of the Industrial Productivity Centre, is going back to the U.S.A. We, therefore, take this opportunity of expressing our gratitude and thanks to him through you. His services to our organisation, as indeed to many industrial units in the country, have been of great intrinsic value and we sincerely hope that our government will endeavour to retain the services of an expert like Mr. Thomas, through the I.C.A., which would greatly benefit the indigenous industry.

Yours faithfully,
For Gujarat Steel Production,

M. Hussain
M. HUSSAIN
Managing Partner.

Copy to:-
The Director:
Industrial Produc. Centre,

- Specialities :
- STEEL CABINETS
- IRON CABINETS
- FILES - FILING
- DRINKING CABINETS - CARD
- INDEX CABINETS
- SH BOXES
- CONFIDENTIAL
- FILES - PAPER
- FILES - RACKS-
- RACKS-STEEL
- CHAIRS - TABLES
- CHairs DUST
- BUCKETS &
- IRON STEEL AND
- ALUMINISED
- DUCTS AND
- IRON AND STEEL
- ENGINEERING
- WORKS

URK
20/3/59
G. D. Thomas

KARACHI OFFICE :-

BANKERS :-

Warman Kothari Chambers,
Majid Road,
PHONE :- 33949
CABLES :- TAHAMMAL

National Overseas & Grindlays Bank Ltd.,
Muslim Commercial Bank Ltd.,
Pakistan Industrial Co-op. Bank Ltd.

FACTORY :- SHAHDARA
CABLES :- BIK E
PHONES | OFFICE : 5390
Factory : 6190

Pakistan Cycle Industrial Co-op. Society Ltd., NILA GUMBAD, LAHORE (Pakistan.)

No. 10.02/ 6130

the 18th February, 1959.

Manufacturers

of



PAKISTAN
AND



SOHRAB
CYCLES
&
CYCLE
PARTS

Mr. James A. Killen,
Chief of the USOM,
Qamar House,
Karachi.

Sub: Industrial Survey.

Dear Sir,

It was only recently we came to understand the real job and assistance rendered by your worthy organization through Mr. G. D. Thomas who happened to visit to our Bicycle Factory in Lahore. The Gentleman was assigned the Job of Survey of the existing units of Bicycle Industry in Lahore as a production expert connected with Pakistan Productivity Centre. Apart from his personal convincing attitude and the valuable Technical advice he gave to the Staff just out of love and sympathy with our people and industry he gave all of us a clear impression what valuable job your mission is doing in Pakistan. We feel in our hearts that such missions of the State are making a good name for their country and by such sincere assistance and goodwill they are winning the hearts of the Pakistanis for their country. According to our opinion it will be much helpful if such an expert be provided to the Bicycle Industry of Pakistan for a few months to see to its benefit and make improvement. We are also requesting our Government to this effect.

We are,

Yours faithfully,

for P. C. I. C. S. Limited

(Abaidullah Sheikh)

General Secretary



ALLWIN ENGINEERING INDUSTRIES

MANUFACTURERS OF INTERNAL COMBUSTION ENGINE'S PISTONS
RINGS • LINERS • VALVES & GUDGEON PINS
REPAIRERS OF DIESEL ENGINES
PRE-STRESSED R.C.C. STRUCTURES

Grams: "ALLWIN"
Phones { Office : 30467
 Factory: 49312

Office: Ireland Road, (Off Lawrence Road)
Factory: 15th Mile K'chi-Hyd. Rd. Landhi

YOUR REF. NO.

OUR REF. NO. AEI/PIC/58.

Karachi 5th May, 1958.

The Secretary,
Ministry of Industries,
Government of Pakistan,
KARACHI.

Dear Sir,

Subject:- ICA. Technical Aid In Collaboration With
The Ministry of Industries, Government of Pakistan.

We are writing this letter to inform you of our appreciation for the services rendered to us by Mr. George Thomas of ICA working with the Government of Pakistan, since quite some time now.

We are presently engaged in the manufacture of very precision and intricate spare parts such as Pistons, Rings, Cylinder Liners, Gudgeon Pins for all types and sizes of internal combustion engines fitted to automobiles, Trucks, Tanks, Tractors, Electrical Generating Sets, Marine Engines, Diesel Locomotive, etc. etc. We have been working since 1951 to produce such specialized spare parts which could be compared favourably with the imported products both in quality and in price.

Long experience, research, heavy investment and hard work by the Partners (who are also engineers) has enabled us to produce very reliable products.

Continued.../2.....

Our Ref. :- AEI/PICG/58.

Dated 5th May, 1958.

Your Ref. :-

This of course has been possible with the help of the Government enabling us to procure Raw Materials, tools and machines, Technical aid etc. for which we are thankful.

The work done by the I.C.A. tooling expert Mr. George D. Thomas who has recently been attached to the Pakistan Industrial Productivity Centre, Ministry of Industries, Karachi, is really praiseworthy and wish you to know that this gentleman has helped us considerably in making jigs, tools, new machines, gauges etc. which has increased our production and improved the quality of our products. He is a very able man of vast practical experience in his line of engineering trade and we have not yet come across a better practical man instructing us in such a friendly spirit and hard work on his part.

Sir, the purpose of our writing you on the subject is to request that such aids be continued in future as we will need the guidance of men like Mr. George D. Thomas for a long time to come.

We earnestly hope that you will please request the Department of the I.C.A., U.S. Government to extend these friendly aids for a longer time so that specialised Industries in our country may flourish and get organised on a sound foundation.

Thanking you in anticipation.

Yours faithfully,
for ALLWIN ENGINEERING INDUSTRIES

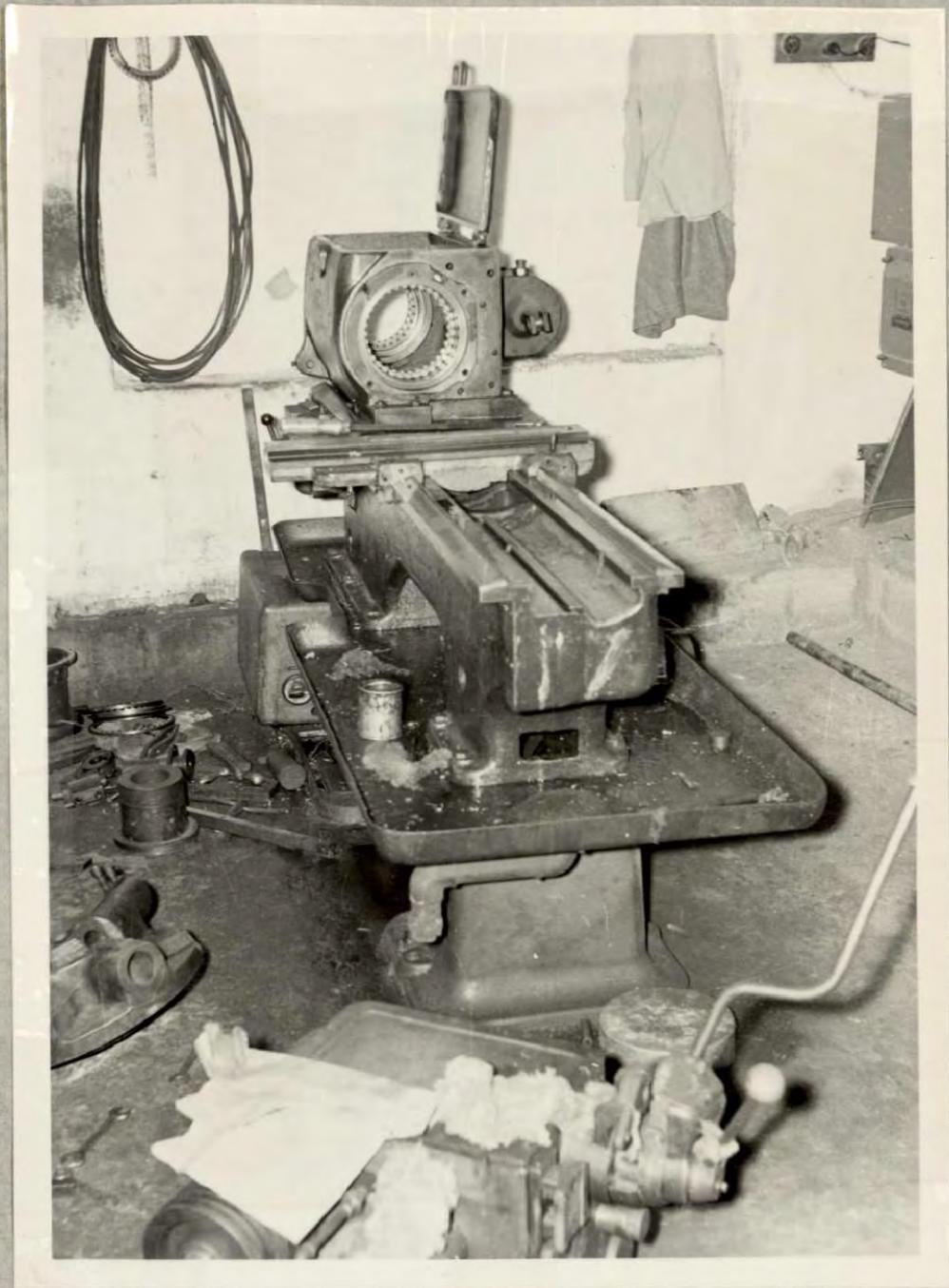

(Syed Yaqub Ali)
Works Manager and Partner.

Copy forwarded to:-

- (1) James S. Killen, Esq., Director of I.C.A. in Pakistan, U.S. Government, Karachi.
- (2) A.R. Khan, Esq., Director of P.I.P.C., Government of Pakistan, Karachi.
- (3) M. Ismail Esq., The Director General of Development, Government of Pakistan, Ministry of Industries, Karachi.

APPENDIX "B"

PHOTOGRAPHS OF SOME ON-THE-JOB INSTRUCTIONS
AND DEMONSTRATIONS MADE BY THE TECHNOLOGIST
IN THE INDUSTRIES. PHOTOGRAPHS ALSO INCLUDE
ESTABLISHMENT OF NEW PLANTS.



A. Picture 1 - Before - Allwin Engineering Company

Machine used in Pictures 2 and 4 being reconditioned to maintain required precision for gang-parting off piston rings.



A. Picture 2 - Before - Allwin Engineering Company Technologist and partner-owner observing rough and finish turning outside diameter and rough and finish boring inside diameter of pot and cutting one piston ring at a time. (Time: 90 minutes for 36 piston rings.)



A. Picture 3 - Before - Allwin Engineering Company Technologist pointing out to his counterpart and partner-owner of company finish facing of piston rings after parting-off rings from pot one at a time as shown in Picture 1. Operation was eliminated since with new tooling shown in Picture 2, rings were faced with close enough tolerance, it was unnecessary to face ring on second operation before surface grinding faces of rings.



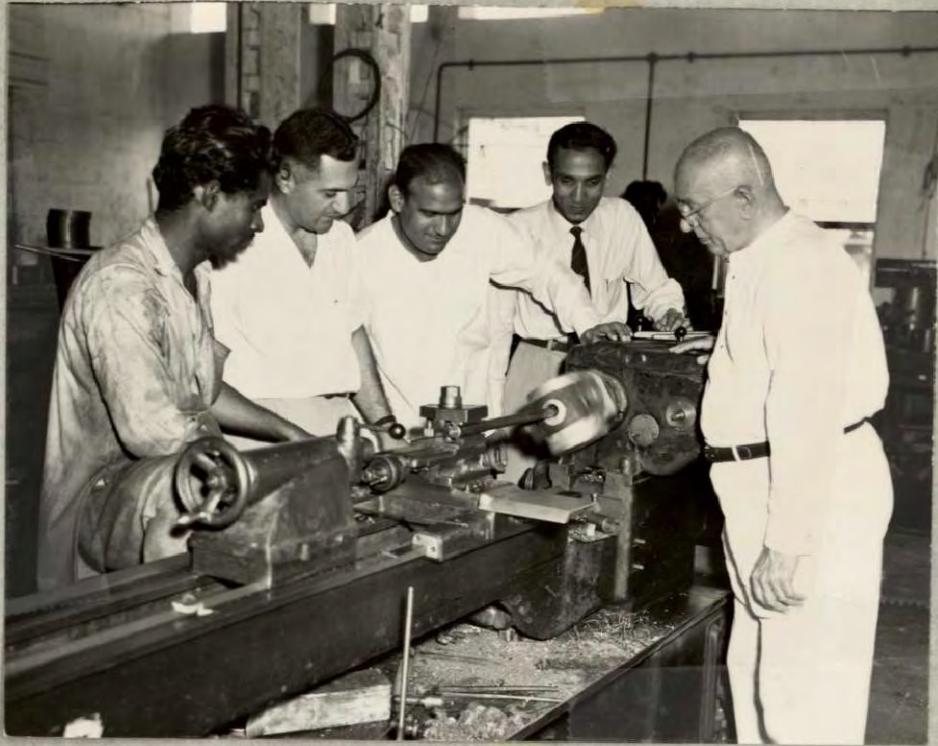
A. Picture 4 - After - Allwin Engineering Company

Technologist pointing out new tooling to his two counterparts and partner-owner of company. New tooling designed by Technologist and constructed under his supervision to rough and finish turn outside diameter and rough and finish bore inside diameter and gang part-off simultaneously 36 piston rings from pot. Operation takes approximately 17 minutes.



B. Picture 5 - Allwin Engineering Company

Technologist pointing out to his two counterparts and partner-owner of company (to left of Technologist) new tooling of cutting three ring grooves simultaneously against old method of one groove at a time. Production was increased more than 200%.



C. Picture 6 - Before - Allwin Engineering Company

Technologist, his two counterparts and partner-owner of company observe old method of boring piston pin holes - crude method with no precision accuracy.



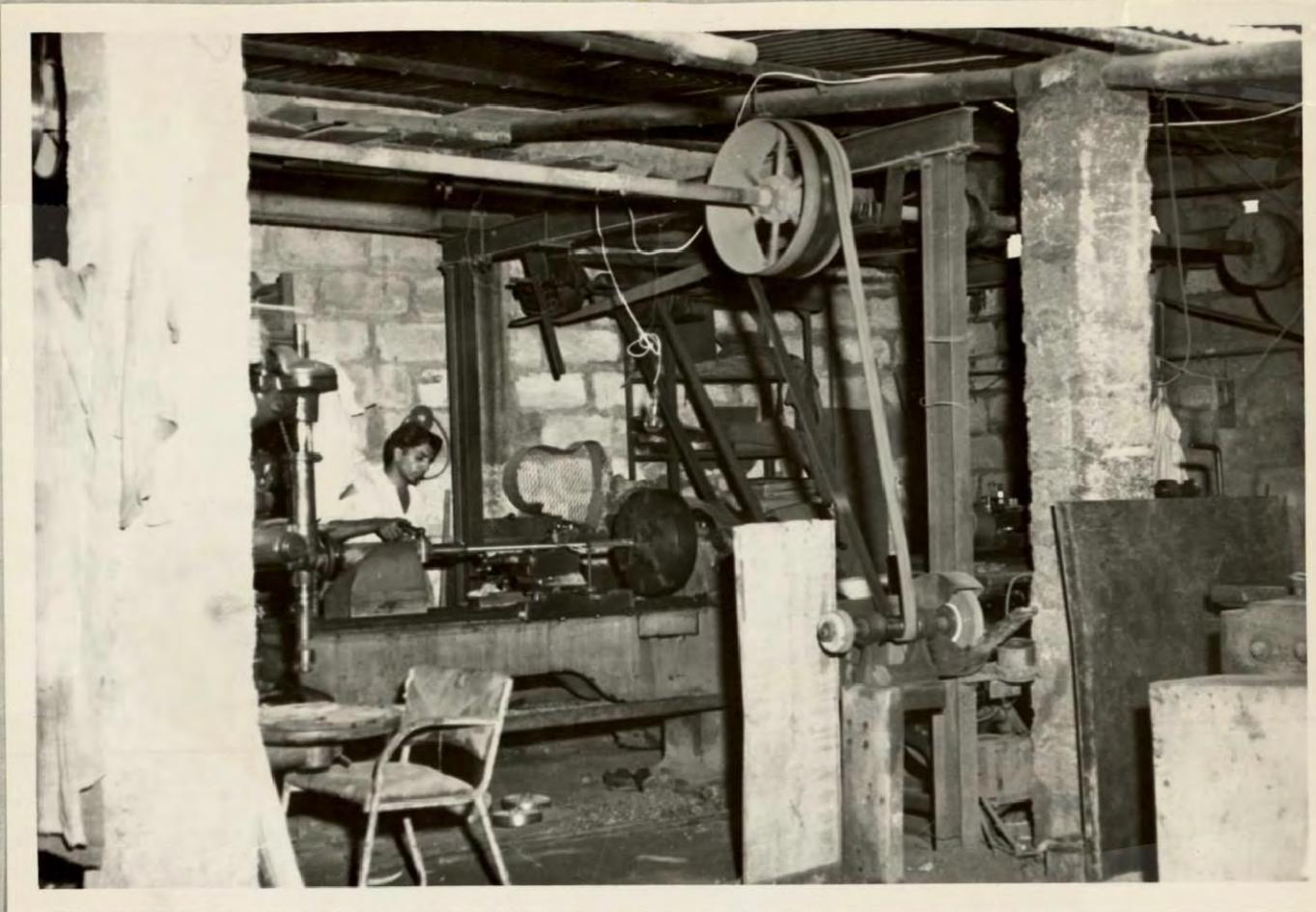
C. Picture 7 - Before - Allwin Engineering Company

Same machine used in Picture 8 before it was reconditioned. Machine never used before.



C. Picture 8 - After - Allwin Engineering Company

Technologist pointing out to his two counterparts and two owners of company (second and fourth from left) new tooling for boring piston pin holes designed and constructed under supervision of Technologist using reconditioned precision machine not used and discarded by company. Boring on six inch piston performed in approximately five minutes against previous method (shown in Figure 6) about 20 to 25 minutes.



D. Picture 9 - Before - Gujrat Steel Company

Machine shop of company prior to moving to new accommodations. Note congested area and condition of building.



D. Picture 10 - Before - Gujrat Steel Company

Sheet metal layout and assembly department of company prior to moving to new accommodations. Note congested area and condition of building.



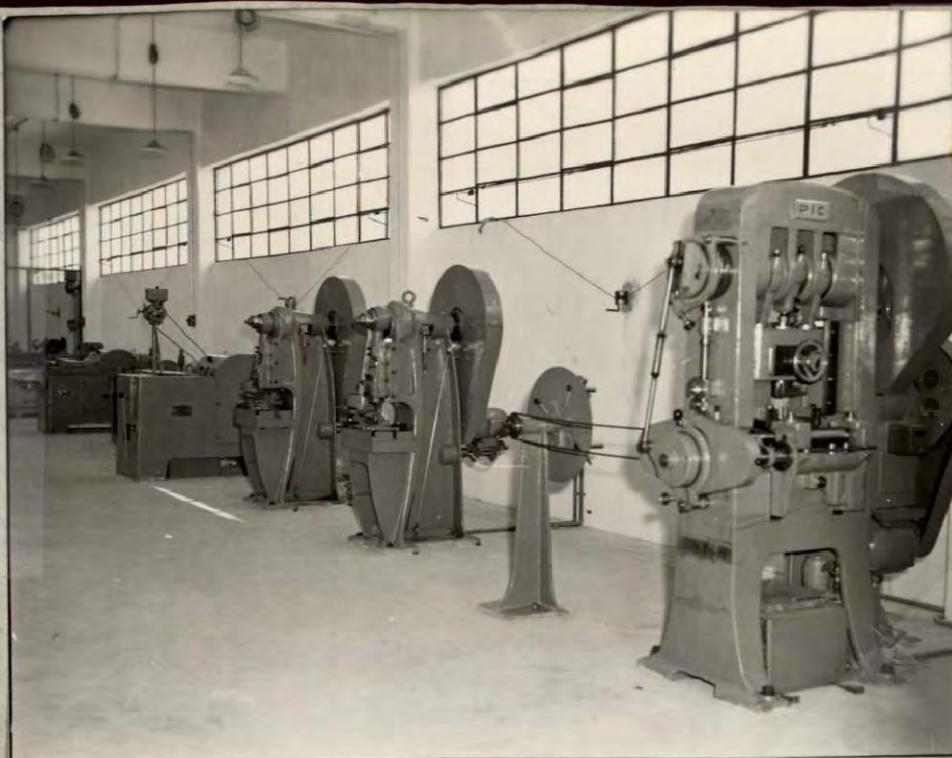
D. Picture 11 - After Gujrat Steel Company

New plant showing sheet metal and machine shop set up under direction of Technologist using plant layout designed by him for proper location of machinery and better flow of material. Background - Technologist supervising press brake operation.



D. Picture 12 - After - Gujrat Steel Company

Sheet metal layout and assembly department set up according to new plant layout designed by Technologist.



E. Picture 13 - Pakistan Industrial Chain Company (New Plant)

Start of production line for which Technologist designed plant layout and supervised placing of machines in proper locations. Only industry manufacturing bicycle and industrial chains in Pakistan.



E. Picture 14 - Pakistan Industrial Chain Company (New Plant)

Second half of production line also erected under supervision of Technologist. Background-Technologist (extreme left) showing his two counterparts and plant manager flow of production.



F. Picture 15 - Hashimi Can Company

Advanced Management Class
School of Public and Business Administration
University of Karachi

(One of seven seminars conducted)
Technologist, students and general manager (British) of
company observing can seaming machine in operation.



F. Picture 16 - Hashimi Can Company

Advanced Management Class
School of Public and Business Administration
University of Karachi

(One of seven seminars conducted)
Conference room showing students attending scheduled
seminar with general manager (British) presiding.
Technologist observing.



G. Picture 20 - Before - After - Metalex Corporation

Showing some of the parts of old fan (left) and new fan (right). Upper and lower fan housing on right are same design using less material with no machine finish required on outside. Same housing shown on left were two separate designs using more material and complete machine finish on outside contour. Design of new blades eliminates steel mounting brackets.

Three old designs of bearing retainers were casted and completely machined consuming more material and time. With new design, one bearing retainer is eliminated and other two are stamped from scrap sheets used to manufacture blades consuming less material and very little time. Old weight of housing capacitor was 5-3/4 lbs. of C.I. and new weight is 1 1/4 lbs. of C.I.



G. Picture 19 - Before - After - Metalex Corporation

Technologist (right, Mr. H. G. Janani, owner (center), and Mr. Husain, plant manager, displaying the company's new fan (right) designed by Technologist. New fan displaces more volume of air, has better eye appeal, easier to manufacture and assemble and is lower in production cost. Following materials and parts are eliminated in new design:

- | | |
|-----------------------------------|----------------------|
| 1. 4 $\frac{1}{2}$ lbs. cast iron | 5. 39 steel washers |
| 2. 2-3/4 lbs. aluminum | 6. 18 rubber washers |
| 3. 2 $\frac{1}{2}$ lbs. steel | 7. 21 steel nuts |
| 4. 14 machine steel screws | 8. 3 steel brackets |

Old machining and assembling time was approximately twice as long as new time. Quality of new fan is superior since dies, jigs and fixtures are used to make all parts more uniform and interchangeable. New design will save company over Rupees 1,00,000 per year in labor and material alone.



G. Picture 18 - After - Metalex Corporation

Permanent mould used for casting upper and lower fan housing with good surface finish eliminating unnecessary machine finish on outside. Process eliminates use of sand-casting, increased production and lower cost of operation.

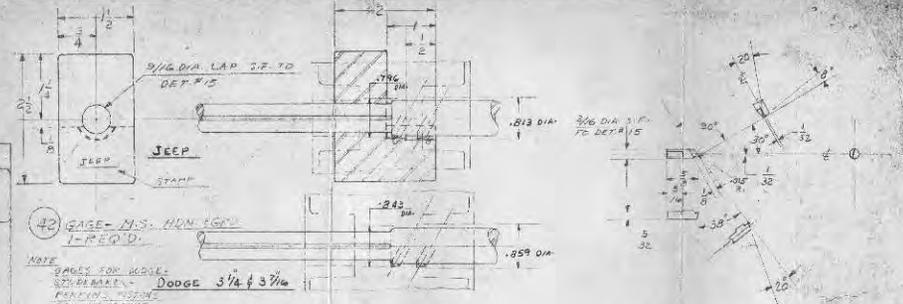
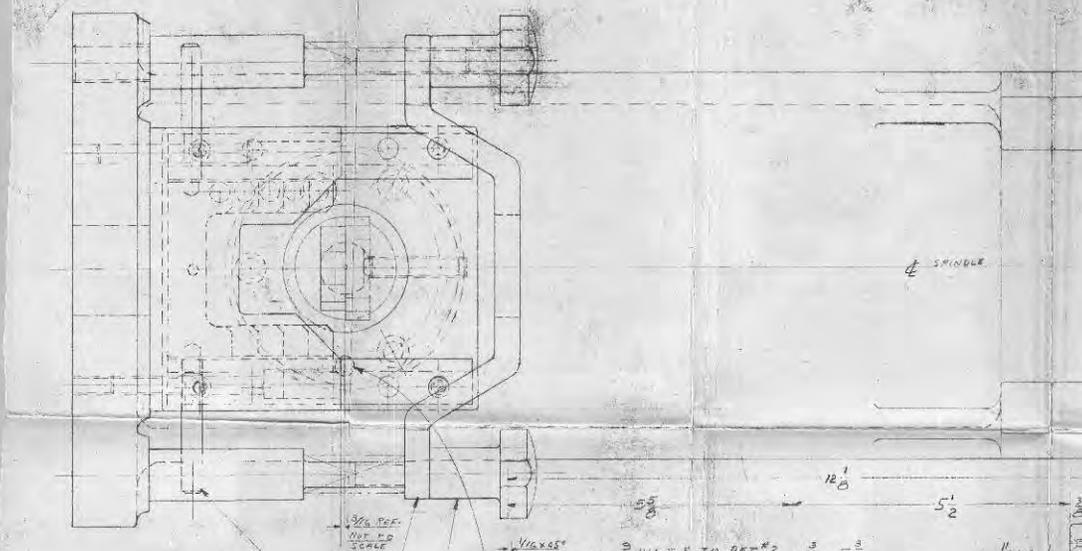


G. Picture 17 -- Before - Metalex Corporation

Technologist observing sand casting of upper and lower fan housing. Complete sand-casting operation eliminated.

APPENDIX "C"

DRAWINGS FURNISHED TO INDUSTRIES

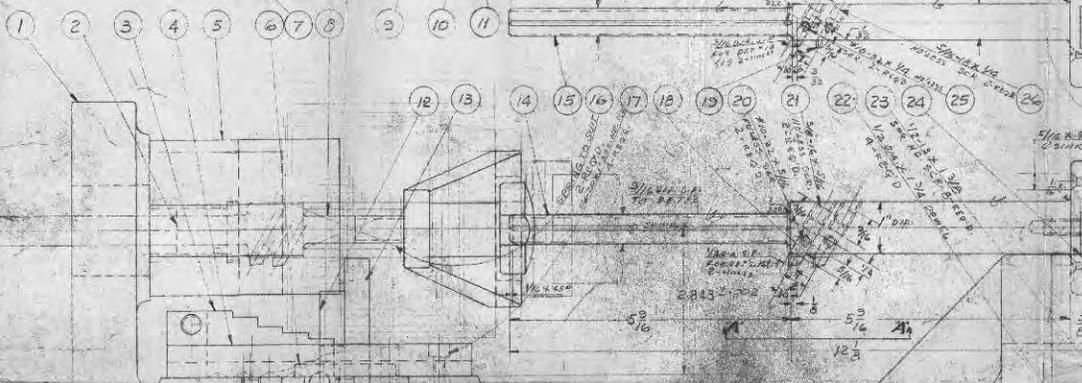


40 GAGE - M.S. HON. EDGE
1 - REQ'D.

NOTE
SPACES FOR HOLES -
STUDEBAKER -
PERKIN R-6 PISTON
PERKIN P-6 PISTON
DODGE 3 1/4 & 3 3/4
SPINDLES TO BE 1/2 DIA.

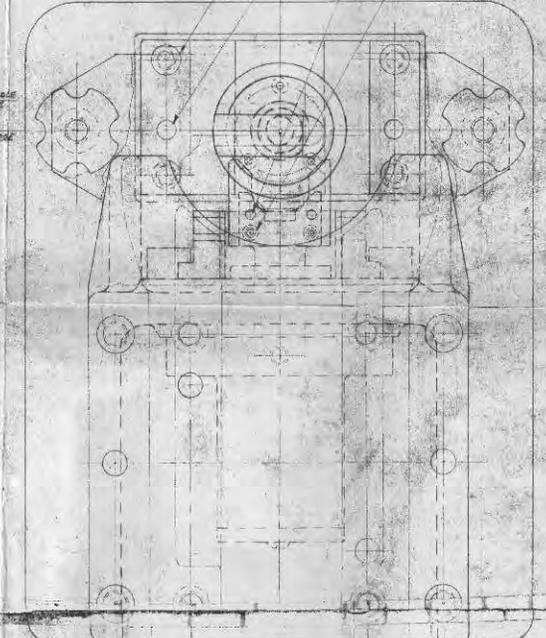
19 TOOL - 22% TUNGSTON
HON. & GRD. 2 REQUIRED

18 TOOL - 22% TUNGSTON - HON. & GRD.
2 - REQUIRED

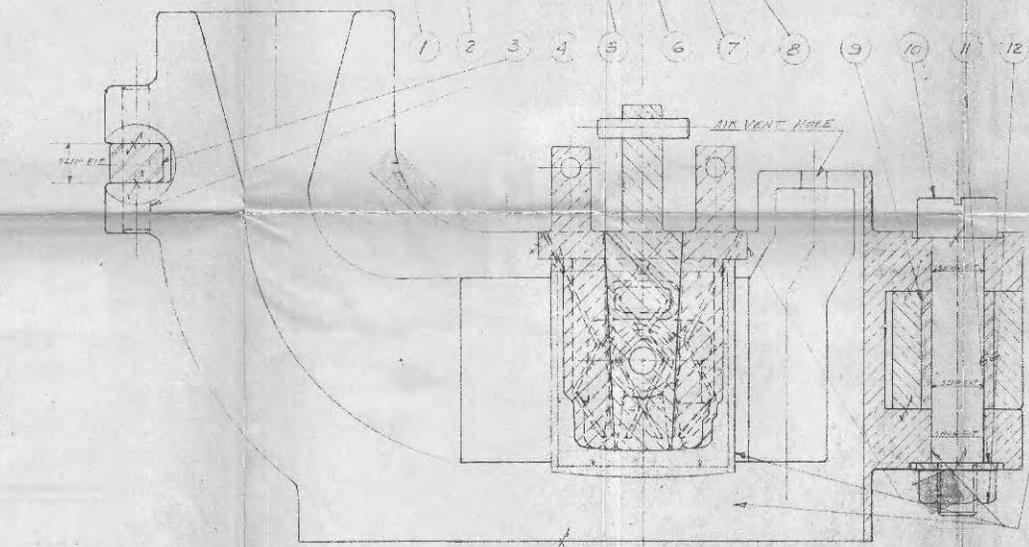
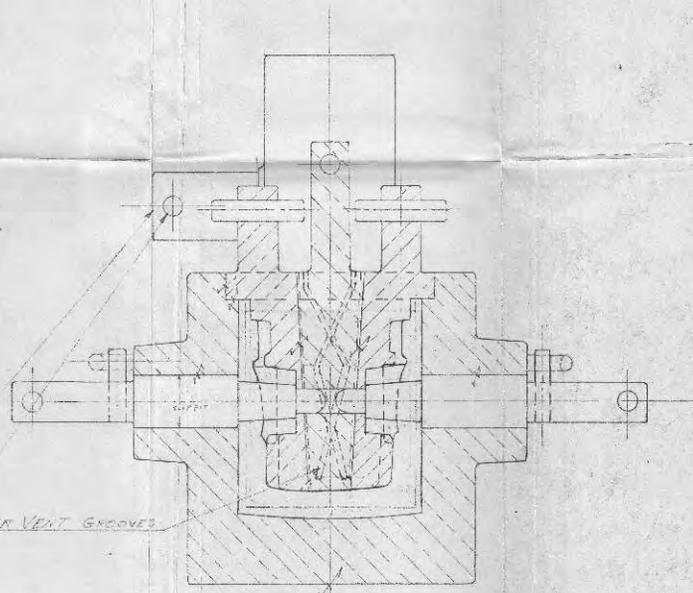
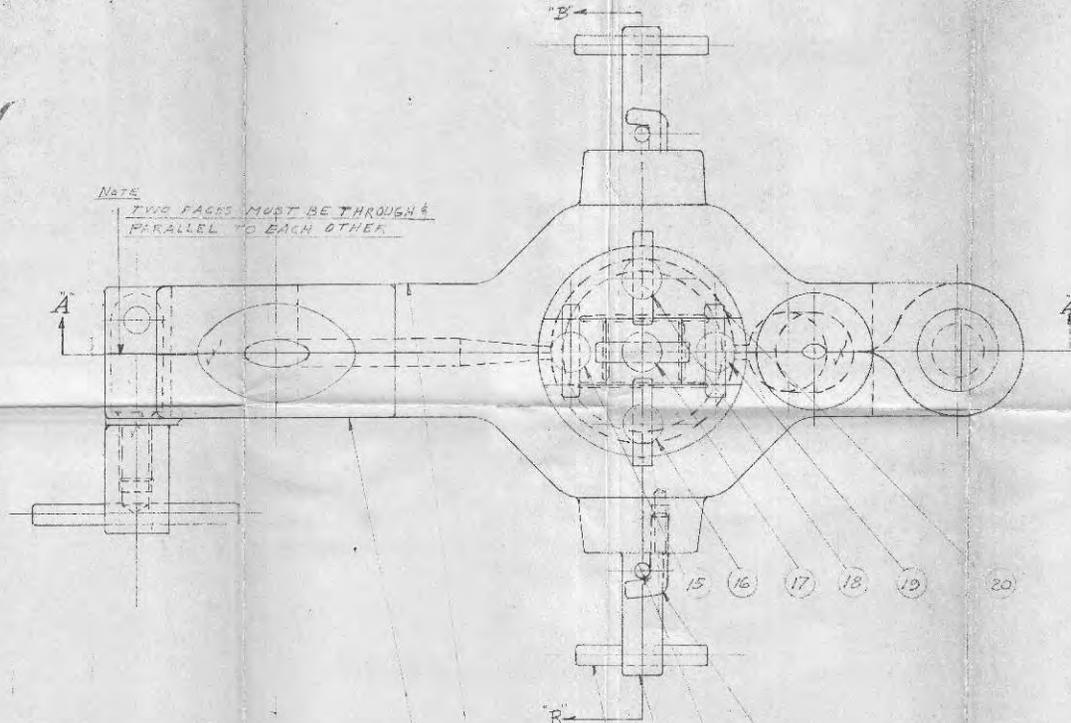


4-DIRT GROOVES
FOR DET. 148'S

VIEW A-A



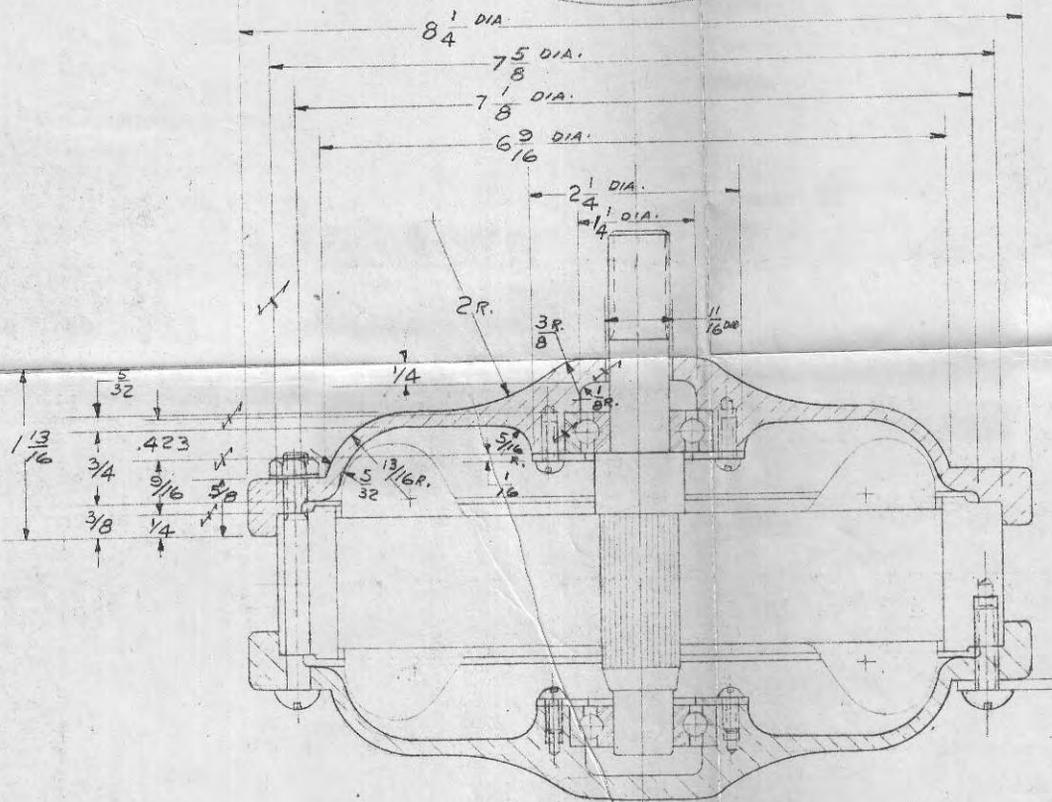
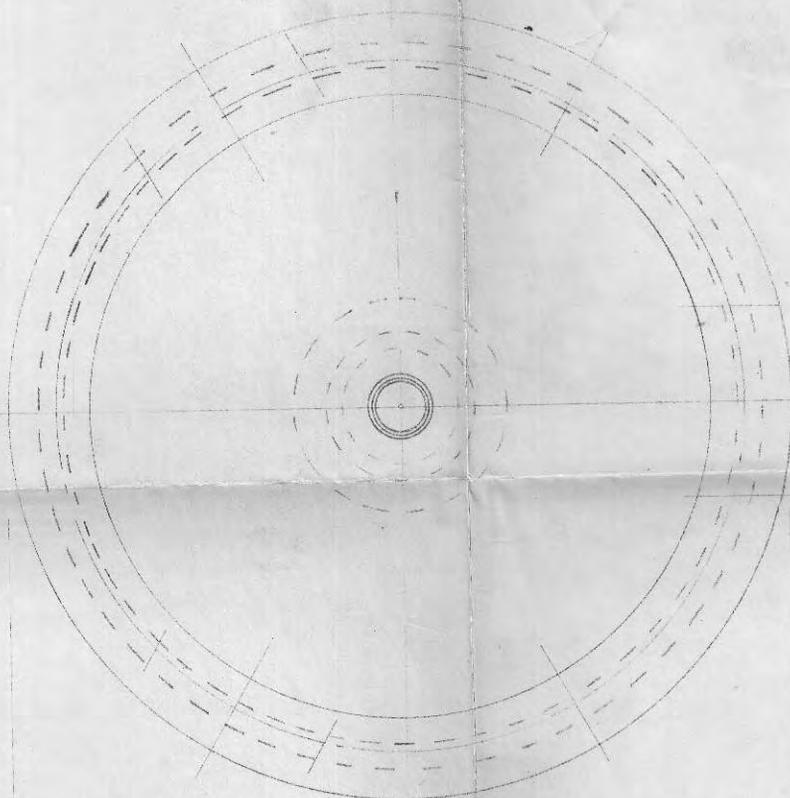
ROUGH & FINISH BORING
MACHINE FOR PISTON PIN
HOLES
DRAWN BY G.D.T. DATE 4-14-56
SCALE - FULL SHEET 1 OF 1



NOTE
BORE THESE HOLES THROUGH
AT ASSEMBLY PARALLEL TO
CENTER BORE AND TWO FINISH
FACES

NOTE
MATERIAL
DENSE CAST IRON
SCALE FOR DIMENSIONS
DIMENSIONS FOR INSIDE AND OUTSIDE
OF PISTON MUST BE TAKEN FROM SHOWN

PERMANENT MOLD (HAND OPERATED)
FOR DODGE PISTON
DRAWN BY G.D.T. DATE DEC. 20, 1928
SCALE - FULL SHEET 1 OF 1



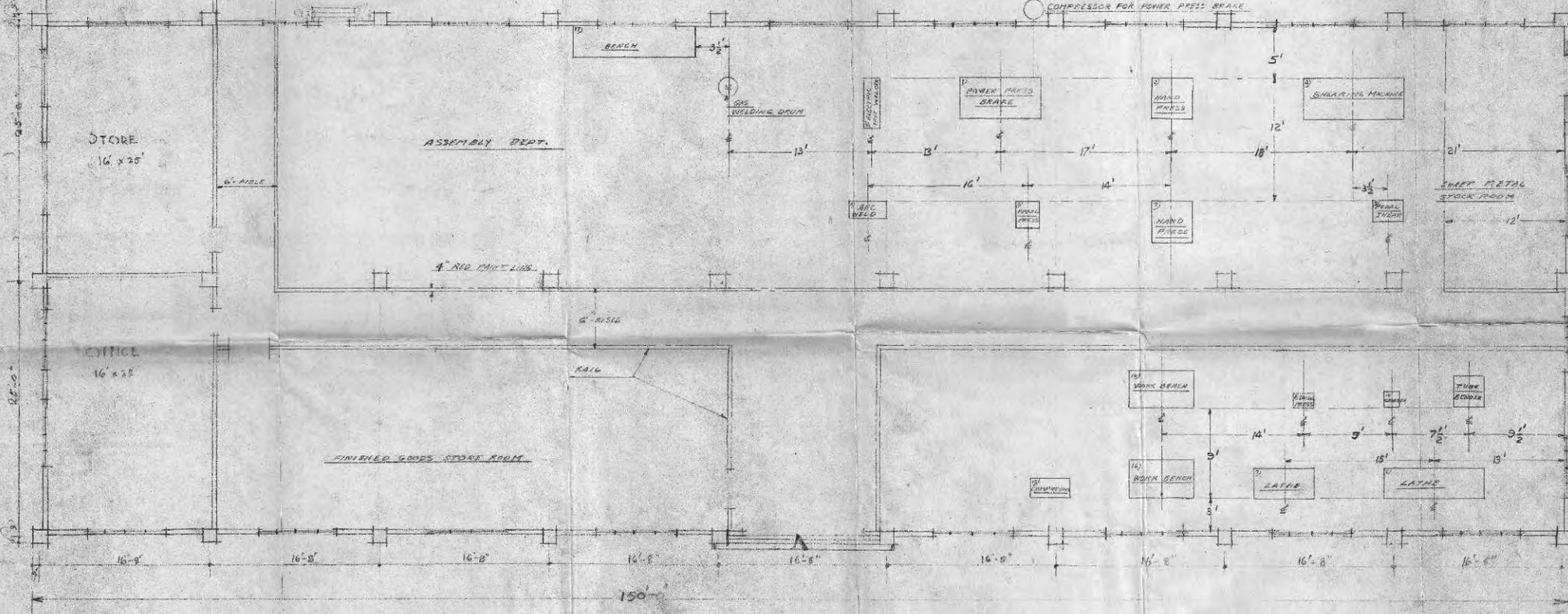
FAN

DRAWN BY C.D.T.

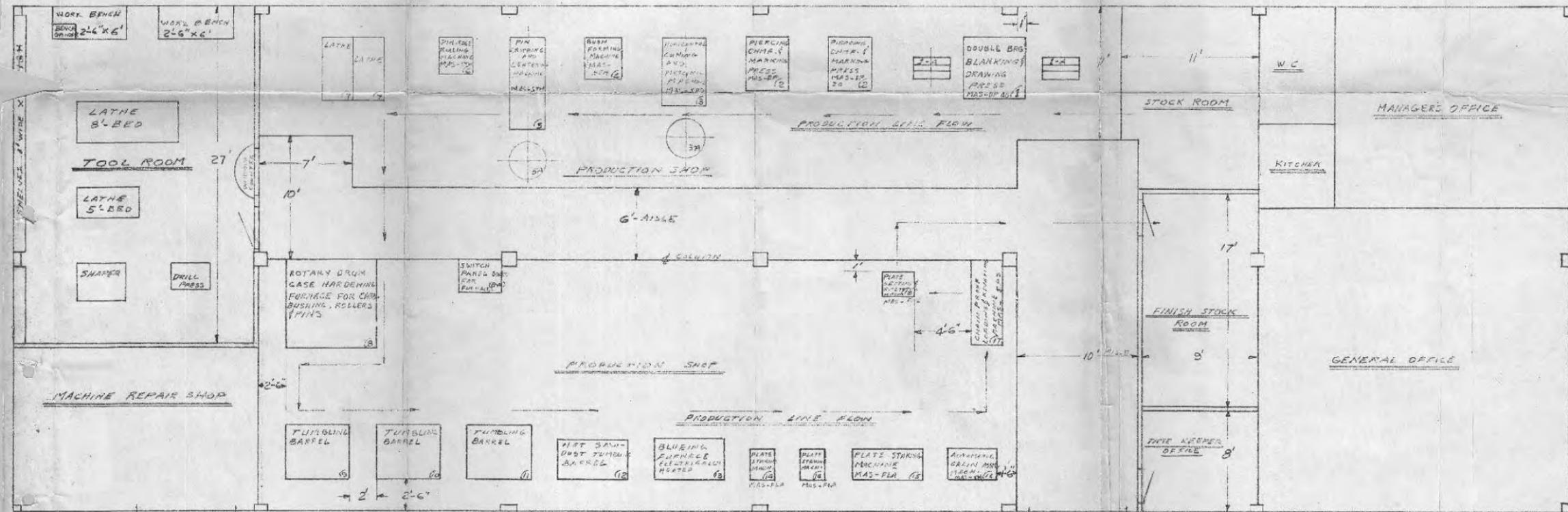
FEB. 12, 1959

SCALE - FULL

1/4" = 1'-0"
 1/8" = 1'-0"
 1/16" = 1'-0"



PLANT LAYOUT
 FOR
 GUJRAT STEEL PRODUCTION
 DRAWN BY G.D. DATE JUNE 8, 1951
 SCALE 1/4" = 1'-0" SHEET 10/1



PAKISTAN INDUSTRIAL CHAINS CO.
(KARACHI SITE)

LAYOUT OF MACHINERY

DRAWN BY - G.D.T. SCALE - 1/4" = 1' DATE - OCT. 8, 1958