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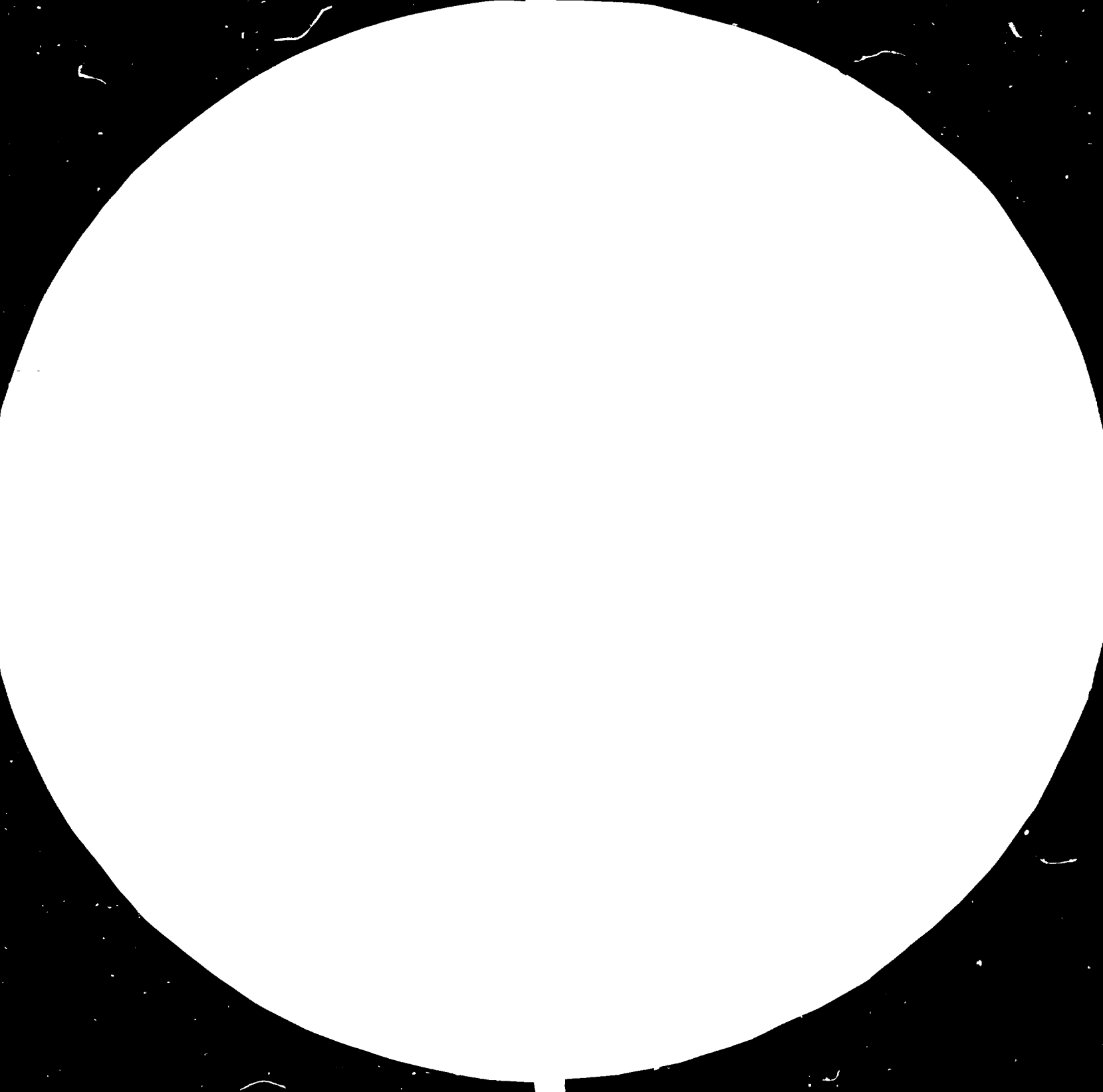
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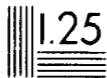


1.0 25

1.1 22



1.2 20



Microcopy Resolution Test Chart
NBS 1963-A
National Bureau of Standards
Gaithersburg, Maryland 20899

14418

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Government of the Federal Republic of Nigeria

T E R M I N A L R E P O R T

BY

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J u l y 1984

I N T R O D U C T I O N

This Terminal Report by the Expert in Mechanical Engineering at the Industrial Development Centre, Oshogbo, Nigeria, has been prepared to serve as a complementary document to the Terminal Report of the Chief Technical Adviser of this UNIDO Project No. JP/NIR/73/014.

The report covers the period May, 1979, when the Expert joined the Project, up to July 27th, 1984, when the Project was terminated.

Achievements

The most important achievement of the Project has been the giving of practical technical assistance to small-scale enterprises. Valuable and appreciated though this service was, it would have been more complete and effective if the workshops at the Oshogbo Industrial Development Centre had been equipped with machine tools and if funds had been available to cover operating expenditures. Nevertheless, with their wide professional experience and innovative approach, the UNIDO Experts were able to resolve most problems. Many of the enterprises assisted by the Project had been established under the Small-scale Industries Credit Scheme operated by the individual State agencies. The owners of these small firms invariably sought technical guidance for starting up the business from the very beginning.

Although the purpose of the Project was to give guidance on the selection of plant and equipment as well as its installation, operation and maintenance, in most cases the selection of machines had already been made by the time the UNIDO expert was called in. For the first year of his assignment to the Project, the Expert in Mechanical Engineering worked with two Nigerian counterparts: Technical Officer T.A.Omosebi(metal) and Technical Officer S.E.Odezime(electric) When these two officers voluntarily left Government service, the counterpart support for the Expert, Mechanical Engineering, was less than satisfactory.

The following selected examples of the work of the Expert are given so that the value of the Extension Service provided by the Expert and his colleagues may be judged.

2.01 Industrial Development Centre, Akure, Ondo State.

The Director of IDC, Akure, requested technical assistance for a new laundry and dry cleaning business in Akure. The

Expert and his two counterparts traced an electrical fault in the sophisticated automatic control of an oil-fired steam boiler. They were able to correct this fault and they gave advice to improve the layout of other items of the laundry. The Chief Industrial Officer, Ondo State Ministry of Industry and Co-operatives, was concerned about the running of another laundry and dry-cleaning business in Akure. With a counterpart provided by IDC, Akure, the Expert visited this plant and gave recommendations for correcting the boiler installation and the steam supply system in the factory. He also advised immediate attention to the dangerous state of disrepair of the boiler. On a follow-up visit, after the owner had defaulted on his loan, and had taken no action in following up the Expert's advice, the Expert had to submit a technical report to the State Ministry which resulted in the plant being shut down pending examination by a Government Factory Inspector.

2.02 Trio Chemicals, Oshogbo

The Expert and his counterparts worked with the General Manager of this new enterprise to unpack, assemble and erect the extruder, take-off tower and bagmaking machines purchased for the manufacture of Low Density Polyethylene film for making bags and plastic bread wrappers.

Right up to the end of the Project, the Expert was always on call by this successful business to help solve problems requiring machine modification, repair and the manufacture of spare parts using local resources.

2.03 Arubuola Enterprises, Oshogbo.

This small-scale manufacture of aluminum furniture, long established in Oshogbo, had ordered special-purpose machines for the manufacture of aluminum doors and windows. This equipment had been shipped in the knocked-down condition. The Expert and a counterpart from IDC, Oshogbo, assembled and

installed six special-purpose machines at the company's new factory. Three machines required supporting structures to enable them to interface with other machines in the flow line. The Expert designed and organized the construction of these items. Towards the end of the Project, the owner had secured a bank loan to purchase raw materials that had become available locally and was expecting further help from the expert in putting the new machines in production.

2.04 Joint Efforts

The Expert and his UNIDO colleagues were able to increase the effectiveness of the Extension Service by pooling their expertise and working jointly on solving industrial problems. In sawmilling and furniture making the Expert worked closely with the three UNIDO Woodworking Experts who were on Post at different times. The Expert helped repair several types of woodworking machines.

The Expert assisted the UNIDO Leather Expert by making parts for a shoemaking machine.

In a joint effort with the UNIDO Expert in Industrial Engineering, the Expert helped repair a diesel engine for a concrete block making business with new parts ordered from England.

2.05 Mechanical Engineering and Foundry Engineering.

Mechanical Engineering and Foundry Engineering are so closely related that the collaboration of the Expert in Mechanical Engineering and the UNIDO Foundry Expert was so extensive as to warrant separate treatment in this report in the following further examples.

1. The Expert helped in the design and construction of an

experimental foundry cupola, utilizing 40 gal. oil drums. This cupola was first tested using charcoal as the fuel. The two UNIDO Experts and P.O. Onare, Higher Technical Officer (metal) from IDC, Oshogbo carried out the tests at Abayomi Foundry, Ibadan.

2. Amukude Technical Trading Co. Offa, Kwara State

This small-scale business had imported foundry plant from India but the suppliers had failed to furnish any information necessary to assemble, erect and operate this plant. The owners were in desperate need of technical advice. On several visits to the site, the UNIDO Experts in Foundry and Mechanical Engineering were able to identify the many items of equipment lying in the field. They made complete foundation and erection drawings of a foundry cupola and a rotary melting furnace that had been shipped from India. Towards the end of the Project, the two UNIDO experts supervised the erection of these two furnaces. The withdrawal of UNIDO expert assistance is going to adversely affect the success of this important small-scale industry.

3. Foundry Seminars

The two UNIDO experts collaborated in mounting a Foundry Seminar which was presented in the six States and at which the Expert in Mechanical Engineering presented papers on machinedesign using grey iron castings, the machine shop in relation to the foundry and discussion on his experience in cupola design and construction in Pakistan.

4. Metalworking Centre in Sokoto

The two experts collaborated in making machine lists and cost estimates together with plant layout drawings and building specifications for a Foundry and machine shop complex in response to a request from IDC, Ilorin on behalf of the Sokoto State Department of Industries.

2.06 Prototype Woodturning Lathes

An outcome of the co-operation of the Expert in Mechanical Engineering and the Woodworking Experts has been the design and manufacture of prototype woodturning lathes designed to meet the needs of the furnituremaking industry and capable of being manufactured in Nigeria using local resources.

1. The Expert in Mechanical Engineering designed the first lathe in 1981. This was of all-metal construction with a one horsepower motor and a headstock giving three spindle speeds. The prototype machine was successfully manufactured in Lagos State by Nakel Engineers (Nig) Ltd, a small workshop that owned only three machine tools. This workshop has received continuous assistance from the Expert on other matters.

2. In recent times import restrictions on steel bars and plate for machine construction and on such items as ball bearings have put constraints on further product development. In view of these difficulties the Expert in Mechanical Engineering and the Woodworking Expert currently in Post joined forces in the design of a simple, single speed woodturning lathe of mainly wooden construction and of extremely pleasing appearance.

The two experts and T.O. Apelehin, Higher Technical Officer (Wood) have built two prototype models of the wooden bed lathe in the mini workshop at IDC, Oshogbo. This is equipped with craftsman tools and four power tools belonging for the most part to IDC, Oshogbo. The two machines have attracted considerable interest particularly from the participants of woodworking seminars held at IDC Oshogbo.

2.07 Training Activities

In matters of training, the Expert in Mechanical Engineering has presented papers at the Foundry Seminars on subjects concerning design and machine shop organization. He has distributed a paper on the Selection, Installation and Maintenance of Industrial Machinery with a special section

on the installation and care of steam boilers and steam supply systems.

The Expert has also given demonstrations of metalworking at IDC, Oshogbo and at Nakel Engineers, Lagos and Lawud Metals in Oshogbo.

Together with the UNIDO Foundry Expert he has given lectures and conducted discussions on machine design, jig and tool design, materials engineering and manufacturing processes in a training program organized by ARCEDEM in Ibadan

2.08 Technical Consultancy

The Expert has given technical advice to various Government Departments and has conducted surveys of State Workshops for the Oyo State Ministry of Industries. He has given recommendations for the manufacture of spare parts in Government workshops and has prepared machine tool and equipment lists and made shop layouts for other proposed IDC's.

The Expert gave technical literature and a design calculation for a centrifugal water pump to ARCEDEM.

In collaboration with the Chief Technical Adviser, IDC, Oshogbo, the Expert has prepared a study recommending the procurement of the equipment requisitioned for IDC, Oshogbo, in three phases. The Expert assisted in planning for the Partial Equipping of IDC Oshogbo workshops and made a detailed study for the supply of electric power to the workshops using the 250 kw diesel-electric generating set purchased by the Federal Government for IDC, Oshogbo.

The Expert has assisted UNIDO Project DP/NIR/75/012, Industrial Management Development Services, Ile-Ife by technical visits to Eruwa, Oyo State, where he made a plant layout and listed the manufacturing materials required to manufacture office pins and paper clips.

Findings

- 3.1 The UNIDO Project at IDC, Oshogbo is recognised by the business community in the six states covered by the Project as a valuable asset to the development of small-scale industry. The professional experience of the UNIDO Experts is appreciated because the technical assistance provided by this experience is not available anywhere else. The withdrawal of this expertise will bring problems to several new enterprises.
- 3.2 The lack of Government support in funding for equipping the workshops at IDC, Oshogbo is difficult to understand. In the beginning the Government spent \$ 10,000,000 on building the workshops and the hostel facility, but of the \$2,250,000 required to equip the workshops, no payment was ever made.
- On the approved suggestion of the UNIDO Experts in Post to reduce the immediate requirements to N 160,000 (US \$ 215,000) for the partial equipping of the Workshops by local purchases, the Government took no action. Yet, in 1982, at the time when this tiny contribution from the Government would have saved the the Project, the Government spent nearly \$ 1,000,000 on building four three-bedroom houses which to this day remain unoccupied.
- 3.3 Considerable State and Federal capital has been lost by the failure of enterprises established with loans given under Small-scale Industries Credit Scheme. Some of the causes of business failure included a lack of management and accounting skills, unrealistic market surveys and unprofessional feasibility studies.
- 3.4 Loans were made to new units of industries which had already reached saturation point, namely: bakeries, sawmills and concrete blockmakers.
- 3.5 The essential basic industries of metalworking were represented only by a metal-spinning shop making kitchen utensils, some very small aluminum foundries and iron foundries making cooking pots and grinding mills discs, welders making steel railings, a few small machine shops and car repair businesses.

- 3.6 Very little interest is shown by owners of plant and equipment in planned maintenance measures. It was difficult to help some enterprises just to run a clean and tidy shop.
- 3.7 Although some training in metalworking and machining is available in polytechnics and technical schools, no modern workshop practice is followed in the average small machine shop.
- 3.8 There is little understanding or appreciation in the preparation and use of technical drawings. Competent machine design engineers are hard to find.
- 3.9 The foundry industry has not been developed to any great extent. Quality control and the need for excellence in product design and manufacture are not characteristic of Nigerian small-scale industry.

Recommendations

- 4.1 A study should be made into the possibility of reviving the Project in order to rescue those industrialists who came to depend upon UNIDO Expert assistance. This may require a different approach to funding, possibly independent of Government. The recruiting of counterparts from the Federal Ministry of Industries has not proved to be suitable and the establishment of the Project at IDC, Oshogbo has brought difficulties in the matter of counterpart travel.
- 4.2 The Project should be redesigned and its objectives narrowed to concentrate on the basic industries of metalworking, foundry development, woodworking and product design and development.
- 4.3 The Project is essentially of a technical nature therefore the preparation of feasibility studies, market research and the teaching of management and accounting skills should be the responsibility of the UNIDO Industrial Development Services at Ife University and the Centre for Management Development.
- 4.4 The selection of counterpart staff should meet the requirements of the International Experts.

