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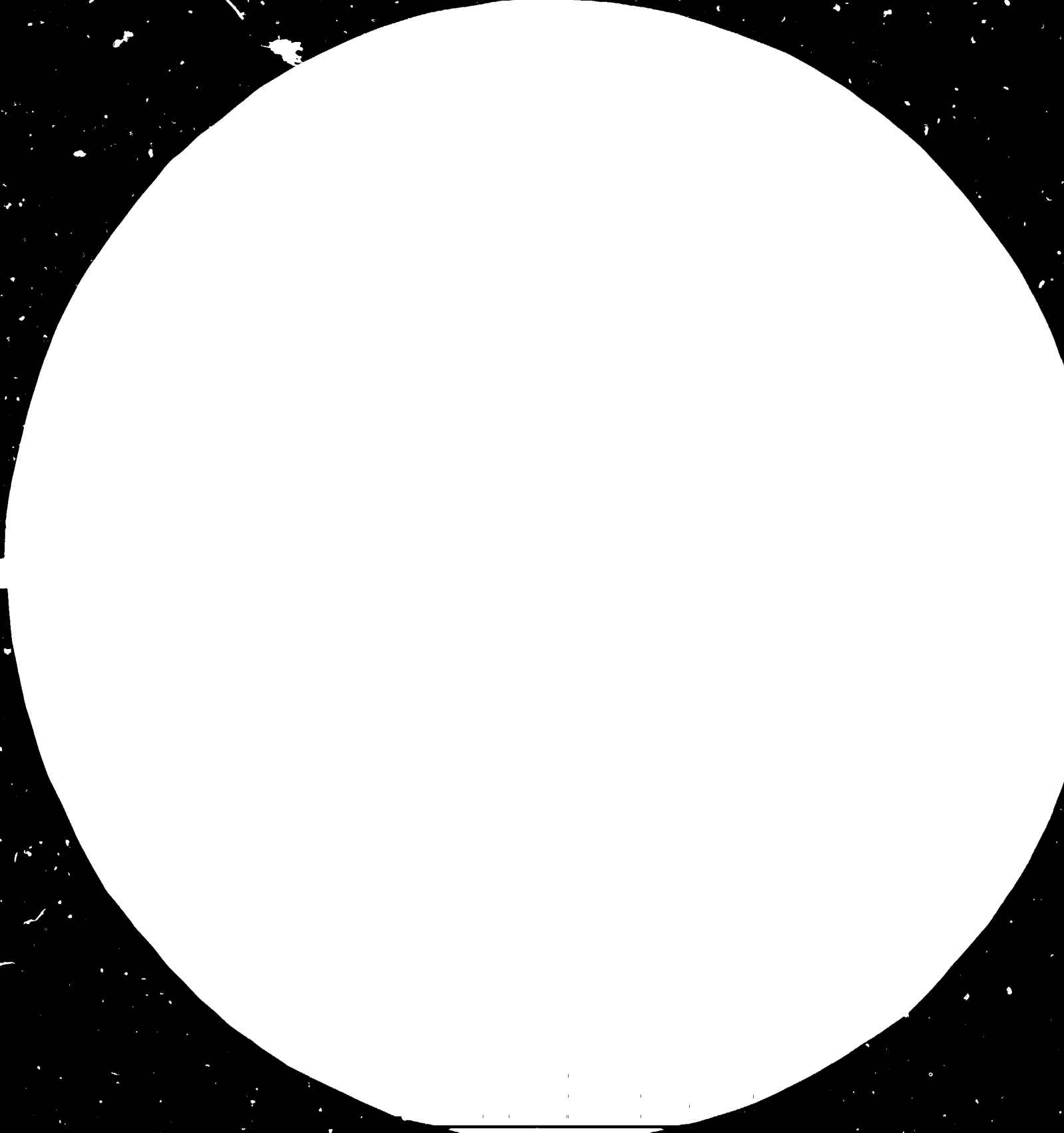
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MICROCOPY RESOLUTION TEST CHART

NATIONAL BUREAU OF STANDARDS-1963-A

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DP/ID/SER.A/461
25 July 1983
English

Vietnam.

ELECTRONIC AND OPTICAL REPAIR AND
MAINTENANCE CENTRE

DP/VIE/80/039

VIET NAM

Technical report: The preparatory assistance phase*

Prepared for the Government of Viet Nam
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of Arthur S. Henderson, consultant in
optical and electronic repair and maintenance

United Nations Industrial Development Organization

Vienna

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V.83 58789

I. ABSTRACT

This report is concerned with the preparatory assistance phase of DP/VIE/80/039 Electronic and Optical Maintenance and Repair Centre in Hanoi, Viet Nam. Such a Centre would improve the standards of installation, operation, maintenance and the ultimate repair of scientific equipment of all types used in industry, research and education in Viet Nam.

The duration of the mission was from 04.05.83 to 04.06.83; its objective was to :

- a) quantify the magnitude of the repair and maintenance problem,
- b) determine the organizational structure and technical facilities needed to tackle the problem, and
- c) formulate a project document accordingly.

Main conclusions and recommendations.

It seems that the Government of Viet Nam, and in particular the State Committee for Science and Technology, have recognised that the problem of repair and maintenance of sophisticated equipment in a hostile climate is a serious impediment to their planned industrial progress, and are prepared to do something about it. Any steps in this direction deserve the fullest possible support.

My main recommendations to Government authorities were :

- a) To complete the premises for the new Centre (already under construction) with the highest possible priority,
- b) To ensure that the new Centre was adequately supplied with such essential services as electric power and water, and
- c) To make the maximum possible use within the project budget of specialized training facilities for the staff of the Centre, by using short missions by the maintenance staff of major equipment suppliers in place of the conventional medium-term expert services, and by endeavouring to place their fellowship missions within similar organizations for intensive training.

II. INTRODUCTION

With few exceptions, electronic and optical equipment and instrumentation is designed and manufactured in countries with a temperate climate. Such equipment, when exported to countries with a tropical or sub-tropical climate, encounters the most hostile possible environment. High ambient temperatures coupled with high humidity, and perhaps a fair amount of air-borne dust - these are the principal killers of precision equipment. Installation in air-conditioned surroundings does much to alleviate these problems, but in developing countries failures in the electricity supply can be frequent and prolonged.

It is true that a few (very few) manufacturers offer 'tropicalized' versions of their products, but these are invariably much more expensive than their standard product line, and thus much less attractive when shopping on a limited budget.

The only long-term solution is to so improve the environment that equipment does not deteriorate: this is however a long-term solution, involving a massive investment in public services.

In the short- and medium-term a considerable improvement in the MTBF (mean time before failure) can be achieved by planned regular preventive maintenance of the equipment. This is one of the tasks of the new Electronic and Optical Maintenance and Repair Centre.

If well organized, and staffed with adequately trained technicians, it should bring many benefits to the equipment situation :

- equipment will be kept for longer periods in good working order by regular preventive maintenance,
- when repairs become necessary, these will be carried out to professional standards in minimum time,
- the industrial and industrial-based research operations using such equipment will be able to function more effectively, leading to a general improvement in the economy, and
- the development of specialized human and technical resources will create increased employment opportunities.

III. MISSION ACTIVITIES

A. Quantification

In order to obtain an overall view of the number and type of equipment in need of attention, tours of inspection were arranged to eight of the major users of the type of equipment which would be the major interest of the new Centre.

May 9 - Institute for Pharmacological Materials

Institute for Geology and Mineralogy

May 10- Cartographic Institute

Hanoi University

May 11- Institute of Hygiene and Epidemiology

May 12- Centre for Scientific Research

Institute for Tropical Technology

May 13- Institute of Industrial Chemistry

During this week of well-organized visits, a great diversity of equipment was encountered, some in good working order with trained technicians to service it, others out of service for one reason or another (principally lack of proprietary spare parts).

Some examples :

- Survey and cartological equipment including stereo metrographs
- Optical spectrosopes and spectrographs, (emission, absorption, fluorescence, infra-red, visible and ultra-violet).
- Mass spectrometers and nuclear magnetic resonance spectrometers
- Centrifuges, ultra-centrifuges, vacuum centrifuges and refrigerated centrifuges
- Absorption spectrophotometers and colorimeters
- pH meters and polarographs
- gas and liquid phase chromatography equipment
- precision balances
- aminoacid analysers
- electron microscopes

Great disparities were observed in the degree to which in-house maintenance had already been established. In some of the institutions visited, small but very enthusiastic maintenance facilities had already been set up, and it will be one of the functions of the new Centre to encourage the development of these in-house facilities by supplying spare parts and expertise where

A service of some capability has already been started by the State-owned Laboratory Equipment and Instrumentation Company, under the aegis of the State Committee for Science and Technology. This organization has the overall responsibility for the selection, importation, distribution and installation of all equipment imported into Viet Nam, and its existing staff of about 28 will form the nucleus for staffing the new Centre.

The L.E.I. Co. is currently concentrating its efforts on the renovation of new equipment which has suffered severe climatic damage during the sea voyage, transit through Hai Phong docks, and the rail journey to Hanoi. It is, however, severely hampered in its efforts by the lack of the necessary renovation equipment and test gear, and by lack of manufacturer-specific expertise in its staff. These needs were borne in mind during the project document formulation.

B. Organization of the Centre.

After prolonged discussion, it was agreed that the most effective way to organize the Centre would be to consider the content of the instrumentation, rather than the end user. As a result, it was agreed that the new Centre should comprise the following workshops and laboratories :

- Workshops
 - Precision mechanical
 - Optical surfacing
 - Glass blowing repair
 - Electroplating and metal finishing
 - High vacuum equipment
 - Refrigeration equipment
- Laboratories
 - Reception, dismantling and faultfinding
 - Electrical and electronic repair
 - Clean assembly room for optical and fine-mechanics
 - Vacuum coating
 - Calibration, test and final inspection.

C. Equipment listings

In addition, the following general facilities were agreed as necessary if the Centre were to function efficiently:

- Proprietary spare parts on an as-required basis
- General-user replacement parts
- Component storage equipment and stores records
- A drafting table and drawing instruments
- Industrial grade cleaning equipment
- Air conditioners where technically necessary
- Dehumidifiers where technically necessary

In each case, equipment was suggested and agreed as being the minimum necessary to carry out the planned function of the workshop or laboratory concerned. These equipment listings were not intended as a definitive shopping list, but rather as an indication of the amount and type of equipment required in each case. The CTA of this project will have complete discretion in this matter.

D. Training component.

This is a very unusual project, having no single specific end product, and so has some unusual features. The duration of the project was reduced from 4 to 3 years at the request of the Government. The number and duration of expert service missions has been left wide open, in order to take the best advantage of equipment suppliers who are prepared to send their service and maintenance technicians on a four-week mission (often at attractive terms) rather than the conventional medium-term expert.

Similarly with the fellowship missions - rather than a few medium-term fellowships, it is suggested that as many as possible trainees should be sent to work for a month or so in the works of as many major suppliers as possible. Whether we are concerned with motor cars or electron microscopes, there is no substitute for works training.

E. Pre-project activities.

In order to save valuable time once the project gets off the ground, I have suggested that the Government staff concerned should:

- a) list the equipment installed in the many institutions under

their control

their control, recording specifically the maker, country of origin, type number, serial number, and whether a service manual is available. (If not available, to write for one immediately.) Also to record for what on-going research or development the piece of equipment is required, or whether it is little used and available for transfer to a central pool of rare but little-used equipment.

b) start to prepare equipment and material lists from catalogues and price lists which I have agreed to send them.

c) start to prepare lists of proprietary spare parts which are the key items in the repair of key equipments.

In tackling a back-log of 30,000 pieces of equipment to be repaired, the Centre must clearly establish some priorities, and the first priority should be accorded to those pieces of equipment which are needed for important research or development.

F. Premises

The Government has already commenced construction of premises to house the new Centre: an inspection visit was arranged on May 14, during which the architectural drawing were studied. The Centre as planned will occupy two floors each of 600m², which is thought to be adequate.

It was stressed throughout the mission that every effort should be made to ensure that these premises are ready for occupation when the project gets off the ground, and during the final meeting, the Chairman of the Planning Committee said that in case the premises were not ready on schedule, he would recommend that the start-up of the project be delayed. The ResRep stressed that not only the premises, but the essential services should also be assured before any major equipment component was installed, and this was agreed.

ANNEXE 1

Counterpart staff.

On-going counterpart staff:

Mr. Thinh, Head of Services (Gen. Man.) L.E.I.Co.

Mr. Chang Staff of L.E.I. Co.

Mr. Tuan -do-

Mr. Tuan -do-

Mr. Van Vien - a tireless and most efficient interpreter.

Senior counterpart staff :

Mr. Phuc, Director-designate of the project.

Mr. Viet, Deputy Chairman of the State Committee for Science
and Technology.

Specialist counterpart staff, during specialized discussions:

Dr. Nguyen Xuan Dung, Head of Dept. of Tech. Chemistry, Univ.
of Hanoi, Head of Chromatography Section of S.C.S.T.

Dr. N. V. Buu, Faculty of Physics, Univ. of Hanoi, Head of Section
of Spectrophotometry, S.C.S T.

Dr. Nguyen Xuen Chanh, Tech. Univ. Hanoi, Head of Section of
microspectroscopy, S.C.S.T.

To these, and to many others whom I met during my many visits,
I offer my thanks for frank and open discussion of the problems
which exist in Viet Nam, and for constructive suggestions.

PROJECT DOCUMENTATION.

Following protracted discussions with counterpart staff, a Project Document was eventually formulated, and was approved in principle by both UNDP Hanoi and the assembled Government agencies at a final meeting on the 2nd June 1983. The typed draft was distributed to the Government agencies, and a photocopy of the manuscript draft was left with UNIDO HQ during debriefing.

