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REPORT OF THE

WORKSHOP

ON INSTRUMENTATION POLICIES

WITH SPECIAL EMPHASIS ON

REPAIR AND MAINTENANCE

Budapest Hungary 12-16 October 1987

in co-operation with

TESCO

Organization for International
Technical and Scientific
Co-operation

&

MTA/MMSZ

Instruments and Measuring Technique
Service of the Hungarian Academy of
Sciences



October 1987



THE PARTICIPANTS OF THE WORKSHOP

SUMMARY OF DISCUSSIONS

1. Introduction

The Workshop has had five days of intensive discussion on the problems of managing the very valuable national stocks of scientific instruments held in developing countries. These instruments, which are fundamental to much industrial, medical and scientific work, are essential for national development. Many hundreds of instruments, with a total value amounting to thousands of millions of dollars, are in use in developing countries, but it is known that in many cases they are broken down or not working correctly, and that man-power and facilities to repair them are lacking. The purpose of the workshop was to review the causes of this unsatisfactory situation and to identify measures to improve it.

2. Programme of the Hungarian MMSZ

The Instruments and Measuring Technique Service (MMSZ) of the Hungarian Academy of Sciences is a substantial independent institute which has attacked this problem in a novel way. It has demonstrated that a logical approach, based on careful registration of the national stock of instruments and a series of measures to keep it in full and effective use, can produce outstandingly effective results. By holding the workshop in the headquarters of MMSZ this experience was made immediately available to the participants and formed the basis for the conclusions formulated later in this report.

The system developed by MMSZ is based on the following "modules":

- i) National register of all instruments of value exceeding US\$ 2,000.
- ii) Maintenance and repair services.
- iii) Rental service making instruments available for limited periods for special purposes.
- iv) Consultancy on the selection of instruments.
- v) Measurement techniques service, making instruments and expert staff available for specific measurements.
- vi) Development of new special purpose instruments.
- vii) Education and training.

3. Conclusions of the Workshop

The Workshop based its discussions on a consideration of the applicability of these modules to the instrumentation problems of developing countries.

In summary, its conclusions were:

1. The module systems of MMSZ, known as the Stokum System after its originator, the Director of the MMSZ, is a powerful means for optimizing the utilization of a national stock of scientific instruments. The present organization cannot be immediately copied in its entirety in a country at an early stage of development, but it is a model and approach to be worked towards, and its elements may be applied selectively in accordance with the circumstances applying in each case.
 - i) A National Register of Instruments is an essential basis for national planning in this field. Such a register could well use the procedures and software developed by MMSZ. It would be useful not only to national planners, but also to International Agencies concerned with development work. Because of this latter aspect it would be useful to use standardized formats, definitions, etc.
 - ii) Maintenance and Repair Services must be available nationally, and may well be initially concentrated in many countries in a central organization. Setting up such an organization should have first priority, preceding even the Register of Instruments, because its existence is evidence that the problem has gained official recognition and its success is essential to the introduction of further modules.
 - iii) Renting is a valuable way to make best use of a stock of instruments, which otherwise may in some cases remain grossly under-utilized. However, most participants considered that it should be attempted only after other modules have been in successful use for several years.
 - iv) Consultancy on Selection of Instruments is a useful service, but requires a stock of data and experience which can only gradually be build up. For example, MMSZ maintains a catalogue library and computerized technical specifications relating to more than 100,000 types or model of instrument. While each National Instrumentation Centre (NIC) should begin to accumulate such data it is evident that external sources of information (which could include those of MMSZ) must be drawn on for many years.
 - v) Similarly, a Measurement Techniques Service is seen as a valuable but late development of a new NIC.
 - vi) Development of Special Purpose Instruments or measuring methods is important for the operation of an instrumentation service but is necessary for the retention of high quality and dedicated technical staff. It underlies consultancy and measurement services. It should not be neglected, even at the beginning, although for some years may exist at little more than token level.
 - vii) Education and Training were identified by all participants as of prime importance. Several concrete proposals were put forward. They included:

- Development, in UNIDO-sponsored projects, of a system of Progressive Training Programmes. Successful courses would be repeated at regular intervals and new courses at more advanced level would be introduced.
 - MMSZ may be encouraged, with UNIDO sponsorship, to extend the training side of its activities.
 - Training programmes may be implemented at well established National Instrumentation Centres (NIC) with UNIDO sponsorship.
2. Service and Operating Manuals are often lacking, but are needed for effective use and maintenance of any complex instrument. Proposals made in this field included:
- Boycott of manufacturers who do not provide suitable(*) manuals.
 - Help by UNIDO to obtain servicing manuals and information not readily obtainable from some manufacturers.
 - Manual libraries to be held at NICs and RICs, with indexes circulated between them, possibly in uniform computer format.
3. Getting Spare Parts was identified almost universally as a very serious problem. It is evidently not easy to resolve, as it has been written and spoken about in development circles for many years. Proposals made in the Workshop included:
- Issue of "UNIDO coupons", analogous to the existing system of UNESCO coupons.
 - Coordinated action by International Organizations.

Administrative problems are to be expected, however, and participants were more ready to present examples of the seriousness of the problem than to offer viable solutions. There seems to be no straightforward answer. It may be best to look for piecemeal solutions, for aspects of the problem lying in the fields of individual organizations, and if these are successful to attempt more general solutions. MMSZ's approach is to hold bonded stocks of spares for the instruments of some 60 selected manufacturers.

4. Incentives to retain trained and skilled staff were discussed. Financial incentives through increased salary as has been applied in several organizations remain one of the most important factors. Good status and work conditions, and opportunities for some research work are also important factors. For example, MMSZ has taken positive measures, including allowing staff to use the Institute's facilities (for which they pay) in their own time to do service work by which they earn extra income.

(*) Electronic and electro-mechanical circuit diagrams and description of theory of operation; mechanical exploded views; part lists; troubleshooting, calibration, preventive maintenance and repair manuals.

5. The importance of Small Private Servicing Firms was emphasized by some participants and UNIDO was asked to find means for encouraging these. Such firms may respond to calls for service more quickly than central organizations. In some countries they are more successful than government organizations at getting spare parts; but in others the reverse is true.
6. The value of Instrumentation Workshops, on the lines of the present meeting, was emphasized by many participants. As well as informing those who participate, and alerting the international organizations to new aspects of the problem, such meetings may serve indirectly to convince government authorities of the importance of optimizing the use of national stocks of instruments.
7. It was appreciated that these measures will require funding and that money to pay for them will have to be found. They are, however, all directed towards saving money as an efficient instrumentation service keeps existing equipment in effective operation and so reduce the need for further purchases. One is thus speaking of a redirection of expenditure for the purpose of reducing overall expenditures. The value of a national stock of scientific instruments is to be measured in hundreds of millions of dollars, even in a country at an early stage of development. The measures proposed are a highly cost effective way to make best use of this investment.

4. Summary of Recommendations

The Workshop recommended that UNIDO should:

1. Emphasize to Governments the importance of instrumentation policies with special attention to repair and maintenance of instruments and develop a programme which applies a systemic approach to the step-wise improvement of the instrumentation infrastructure in developing countries.
2. Assist requesting developing countries in applying the "Stokum Method" of MMSZ of Hungary. It is understood, however, that each country would select a combination of those modules which are most applicable to its domestic conditions.
3. Continue with the organization of similar workshops at national, regional and interregional levels, provided that this is well co-ordinated with the work of other UN agencies. These workshops should observe the continuity of participation and focus particularly on national instrumentation policies, services to the industry, etc.
4. Arrange training courses on instrument maintenance, repair and operation. These courses can be organized at the premises of instrument manufacturers and/or at national instrumentation centres, and can concentrate either on a narrow group of instruments (e.g. high frequency oscilloscopes) or be of a general type (e.g. repair and maintenance of microprocessor-based instruments).

5. Assist developing countries in creating technical/technological instrument databases and in promoting the exchange of such information between instrumentation centres. These exchanges can take place directly or through UNIDO.
6. Recognizing that difficulty in obtaining spare parts is one of the biggest hindrances to the effective operation of repair services, promote national policies which allow instrumentation centres to get spare parts more easily, for example by creating a "petty cash" system which will allocate initially US\$ 1,000/year cash to be used for spare parts purchasing by each participating instrumentation centre/national focal point.
7. Taking note of the common complaint about rapid turnover of skilled/trained personnel, promote the adoption of incentives to keep them at their respective institutions.
8. Promote and support expert and/or trainee exchange programmes between instrumentation centres.
9. Take into account more carefully than at present all above-mentioned aspects of specifying, selecting, purchasing and commissioning of instruments and instrument systems provided within UNIDO's technical co-operation projects. (It was stressed by many participants that same should apply to other UN agencies.)

ANNEX I - LIST OF PARTICIPANTS

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12-16 October 1987, Budapest, Hungary

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