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07847

Distr.
LIMITED
UNIDO/EX.31
11 January 1978
ENGLISH

UNITED NATIONS INDUSTRIAL
DEVELOPMENT ORGANIZATION

REPORT OF THE MEETING OF THE REPRESENTATIVES OF SELECTED
RESEARCH AND DEVELOPMENT INSTITUTIONS ENGAGED IN ADAPTATION OF
IRON AND STEEL TECHNOLOGY FOR DEVELOPING COUNTRIES*.

Jamshedpur, India 28 November - 2 December 1977

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INTRODUCTION

1. As recommended by the First Consultation Meeting of the Iron and Steel Industry which was held in Vienna from 7 to 11 February 1977 (Ref: Aide-Mémoire No. ID 223/2, August 1977) it was decided to hold a working group meeting to which representatives of Iron and Steel Research and Development Institutes of both developed and developing countries were invited. At the invitation of the Government of India this meeting was held at the National Metallurgical Laboratory, Jamshedpur, India from 28 November to 2 December 1977. The list of participants to the meeting is shown at Annex A.

2. The participants were welcomed by Professor V. A. Altekar as the Head of the host institution on behalf of the Government of India and the Council of Scientific and Industrial Research.

3. Professor V. A. Altekar was unanimously elected Chairman of the Consultation Meeting. Mr. B. R. Nijhawan introduced the subject and elaborated on the agenda contained in the aide-mémoire.

(a) The possibility of, and the necessary arrangements for, involving institutes concerned in providing the relevant information and assistance to the developing countries in the field of the adaptation of iron and steel technology;

(b) The need for establishing an international technical and development centre to provide impartial technical advice to the developing countries in establishing steel plants and to provide related consultancy services;

(c) The problems of alternative technologies in the production of steel and utilization of fuels.

4. After explaining the background of the present meeting and the implications of the Working Agenda, Mr. Nijhawan invited the delegates to bring out any other relevant items that could be considered for discussion. To meet this objective, he suggested a general discussion on the subject before the agenda items were taken up. It may be mentioned that the venue, viz. the

National Metallurgical Laboratory, had been specially selected because it represented one of the finest examples of indigenous efforts for development of facilities for adaptation of technology in the field of metallurgy, and India could provide the basic ingredients for the adaptation of iron and steel technology.

5. In addition to these items of the agenda, the following additional activities were also arranged by the host organization:

- (a) Visit to the National Metallurgical Laboratory
- (b) Visit to the Works of the Tata Iron and Steel Company Limited
- (c) Visit to Heavy Engineering Corporation Complex and other facilities at Ranchi.

GENERAL COMMENTS

6. During the general discussion, the delegates welcomed UNIDO's initiative and referred to the facilities available in their institutions in particular, and their countries in general.

7. The general comments that preceded consideration of the specific items of the agenda related to the overall experience in developed and developing countries.

8. The present status of development of this industry in developing countries and the targets envisaged by them as a group as well as individually, complying with the Lima Target, require considerable development efforts and application of technological progress in this sector. Therefore, the research and development capabilities need to be further augmented suitably through strengthening and establishment of institutions for developing and improving the skills in all the areas and at all levels.

9. Although progress depends to a large extent on the indigenous efforts of developing countries, the importance of bilateral and multilateral co-operation, including the special role of the international organizations like UNIDO, have been amply emphasised. This involves considerable inputs in terms of finance particularly

towards capital, in view of its highly capital-intensive nature, which, in a developed country is taken care of by the established companies; whereas in developing countries the general experience has been that the funding has to be from the government side.

10. The problem, therefore, has to be viewed and tackled on dual facets, viz. optimization and improvement of the existing technologies to meet the specific requirements and the environment of the developing countries contributing towards efficient utilization of the inputs and selection of the most appropriate technology and adaptation of technology to suit the available raw materials and other resources indigenously.

11. In the light of the various important aspects enumerated, the participants considered that the items under the agenda were quite substantial, and the topics highlighted in the working paper as well as the background paper, as thought-provoking, laying emphasis on the crucial areas for policies and for efforts at governmental level including scope for international co-operation.

12. The participants appreciated the valuable role played by UNIDO in rendering technical assistance to developing countries who had sought their assistance on specific issues and the dynamism shown in their continuous expanding role.

SUMMARY OF DISCUSSIONS AND RECOMMENDATIONS - Agenda Item A

The need to provide relevant information and assistance to the developing countries in the field of adaptation of iron and steel technology

13. The general consensus was that there exists a need for an effective mechanism to share information on the adaptation of iron and steel technology because it is felt that there is a gap in the exchange of technical information particularly amongst developing countries themselves which should be bridged for the benefit of all concerned.

14. It was agreed that considerable technical information is available in respect of iron and steel technology. However, the need was felt for selective retrieval of information for the use

of developing countries, distinguishing technical information and documentation most required by them. Relative availability and abundance of information under different categories was distinguished as follows:-

(a) Published Literature:

Generally there is abundant information available through published literature but the inherent problem is that it is not systematically compiled, classified, disseminated etc., for ultimate effective utilization. It is felt that the developing countries should strengthen their own efforts in this direction. However, the need for requisite assistance of international organizations like UNIDO was felt.

(b) Information available on commercial terms:

Generally the information is available only on commercial terms which may often be prohibitive. However, the developing countries may not be fully aware of sources of such information, and to mitigate such a situation, efforts should be made at both national and international levels.

(c) Specialized information and data not easily accessible:

This information is not easily accessible in view of the following factors:-

(i) Classified and restricted nature and confidentiality of information

(ii) Language barrier (translation facilities)

(iii) Relevant information of potential value for utilization by the developing countries under their specific conditions and environments

15. There are several media and methods for exchanging technical information. However, the advantages of technical meetings to promote these exchanges was stressed.

Information network

16. The importance of developing appropriate permanent information network was highlighted at the following levels:-

- (a) Within a country: With the involvement of R and D organizations and industries. Particularly in a developing country, the need for communicating information from R and D institutes to the industry is of critical importance.
- (b) Regional or sub-regional: Elements of such communication exist in some regional and sub-regional organizations. Several advantages and opportunities for co-operative effort in these fields between developing countries were cited.
- (c) International: Since few facilities exist at present, the need for filling gaps was stressed. The relevant suggestions for active consideration were addressed to UNIDO.

Such a network can be most effectively developed if the existing capacities are inter-linked and co-ordinated according to the activities in their respective areas of interest.

17. Since the efficient operation of such a network depends on broad participation of all major sources of relevant information, concern was expressed that all efforts should be motivated to promote full participation for mutual benefit.

18. The flow and exchange of information to highlight appropriate intermediate technologies applicable to developing countries have to be strengthened in order to fill the gaps between the primitive and the most modern technologies for the developing world.

RECOMMENDATIONS

19. UNIDO should prepare a list of active R and D centres/institutes engaged in the iron and steel industry and should promote the exchange of technical information and data on a mutual basis.

20. UNIDO should distribute a comprehensive questionnaire to these centres/institutes in order to elicit relevant information pertaining to:-

- (a) Major R and D activities
- (b) Pilot Plant activities
- (c) Respective areas and potential for participation in the international exchange of information

(d) Participation in applying appropriate technologies to specific needs of developing countries.

21. UNIDO should strengthen its present activities on the industrial enquiry services and the technological data bank in order to effectively act as a clearing house for the transfer of technology to the developing countries in the iron and steel industry.

22. UNIDO should provide necessary assistance to the developing countries in establishing their document control systems relating to iron and steel technology on a national or regional basis.

23. UNIDO should convene suitable fora for technical co-operation between companies and organizations experienced in this field with special emphasis on promoting co-operation for mutual benefit.

SUMMARY OF DISCUSSIONS AND RECOMMENDATIONS - Agenda Item B

Need for an International Technical and Development Centre

24. The subject of technical consultancy services is complex. It involves the entire gamut of R and D work to successful commissioning of iron and steel plants. It was felt that developing countries with their characteristic environmental conditions and proficiency in technological fields etc. have to make efforts to develop self-reliance and capabilities to absorb specialised technology and expertise in the field of the iron and steel industry. A single international organization can hardly cope with all the technical consultancy requirements including advisory services as well as undertaking R and D work for the iron and steel industry. There was, however, a consensus for providing advisory consultancy services such as an international centre.

25. Such an international centre would be capable of providing impartial technical advice to developing countries and was justified on the following basis:-

(a) Very often the developing countries lack the necessary expertise to formulate their actual requirements pertaining to iron and steel development. As a result, difficulties are experienced in the scrutiny and selection of the most suitable offers for the supply of steel plant equipment and services.

(b) Due to lack of expertise, it has been observed that sometimes certain obsolete, unproven or inappropriate technologies and equipment have been accepted resulting in considerable loss and ultimate closure of the units.

(c) Regional centres such as ILAFA in Latin America, the Arab Steel Union, the South-East Asia Iron and Steel Institute provide useful information services in their respective regions. These centres have a somewhat limited scope for undertaking R and D activities and consultancy services. They should be able to refer to an international centre to supplement their own efforts.

(d) Resources and facilities of UNIDO to assist the developing countries in these fields are limited.

RECOMMENDATIONS

26. The working group comprehensively reviewed the scope and possible functions of such an international centre. In elaborating on the specific proposals on this issue to the forthcoming Second Consultation Meeting on the Iron and Steel Industry, UNIDO should take into consideration the following specific observations..

27. The original concept of having a consultancy service envisaged a comprehensive input in respect of staff, well equipped R and D facilities including laboratories and pilot plants. It would not be feasible for the international centre to deploy such large resources and hence it was suggested that the proposed international centre should gradually build up its capacity in phases and initially undertake only an advisory role in orienting these activities in the fields of iron and steel industry to the developing world.

28. Such an advisory role could be effectively played in assisting the developing countries with advice on the following:-

(a) Assessing the need and the extent in the development of the iron and steel industry

(b) Assisting the developing countries in creating current awareness of problems involved in the development of the iron and steel industry exposing them to the complexity of this

problem and alternative approaches

- (c) Conducting preliminary analysis of possible projects put up by developing countries for the purpose of obtaining initial finance
- (d) Selecting appropriate processes for adaptation
- (e) Preparing techno-economic feasibility reports
- (f) Preparing necessary documents for tender enquiries
- (g) Evaluating and selecting bids received.

These new advisory functions can be performed by the centre through sub-contracting to appropriate established and experienced agencies.

29. The proposed centre could draw on the facilities to be made available under the UNIDO clearing house for technological information in this sector. (Refer to agenda item no. A). The clearing house activities could be incorporated and/or co-ordinated with the proposed centre.

30. The centre's efficiency and successful role would depend on the possibility of drawing upon the potentialities already available in the institutes and consulting firms, equipment manufacturers and thereby playing a complimentary role.

31. Furthermore the centre should encourage research and development work in those specific areas where the existing institutes lack the necessary incentive for promotion of R and D projects in this sector.

32. The centre can also identify areas in which institutes can sponsor specific projects to industries on a contractual basis.

33. The services of the centre should be made available to all levels of countries irrespective of their stages of development, in order to attract the involvement of all the major sources. By this the

participation of the industries and institutes of the developed countries could be advantageously promoted through the centre to the recipient countries.

34. The modus operandi for the establishment of the centre, its organization, funding and the ultimate character and functions will be effectively elaborated during further deliberations. The Second Consultation Meeting on the Iron and Steel Industry will, inter alia, take appropriate action on this subject.

SUMMARY OF DISCUSSIONS AND RECOMMENDATIONS - Agenda Item C

Problems of Alternative Technologies for the Production of Iron and Steel and Utilization of Fuels

35. The present status of various iron and steel making processes such as blast furnace, electric smelting, lowshaft, direct reduction and induction reduction smelting processes were referred to in the context of their application to developing countries. It was generally observed that the selection and adaptation of alternative technologies best suited to the local conditions was complex and many factors have to be considered before a process can be adopted by the developing countries. The need for the adaptation of alternative and appropriate technologies arose in view of certain deficiencies and world shortage of specific raw materials, in some cases, non-availability of metallurgical coking coal etc.

36. Various factors that must be considered in selecting the appropriate technology for iron and steel making relate to:-

- (a) Availability and quality of various raw materials and fuels and their relative costs which have a very significant effect on the viability of a technology at a particular place and point of time
- (b) Data on capital and operating costs of different alternative technologies are not easily available and vary considerably from country to country depending on the level of development
- (c) Developing countries are not always free to choose the most suitable technology. Due to financial constraint, the selection of technology is restricted to their availability

from donor countries

(d) There is a tendency on the part of developing countries to choose the most up-to-date technology which may not necessarily be appropriate for them. The technology adopted should be commensurate with the level of their development

(e) Viability of a technology in a country and its suitability for adaptation is dependent upon the totality of the various factors involved, as, for example, captive sources of raw materials, or other necessary facilities

(f) By sponsoring study tours of experts for fact finding and advisory missions to the countries seeking assistance. The findings of these missions may be published and circulated to member countries to create an awareness of the factors to be considered in assessing the suitability of a technology

(g) By providing comparative evaluation of different technologies which may be available to the developing countries. Final selection of the technology will have to be made by the country concerned keeping in view, inter alia, their financial and other constraints

(h) Decision making and installation of a project in a developing country often takes a long time which results in increased capital cost. It is necessary that efforts should be made to reduce the time taken in these activities.

37. It was agreed that in view of the complex nature of the problems concerning the adaptation of technologies for iron and steel production, UNIDO could help the developing countries in the selection of appropriate technology suitable to their specific needs. This could perhaps be one of the functions of the international technical and development centre proposed under agenda item no. B. UNIDO could also assist through:-

(a) Organising seminars, discussions, panels, workshops, dealing specifically with the technologies most suited to the developing countries, which would also be of interest

to the developed countries to meet the needs of the developing countries and identify R and D areas

(b) Disseminating information covering the results of technical assistance activities of UNIDO

(c) By assisting projects in the developing countries for the evaluation and adaptation of technologies and collecting data and information for distribution to developing countries concerned.

RECOMMENDATIONS

38. It is recommended that the identification, formulation and adaptation of alternative technologies for applications in the iron and steel industry of the developing countries should be encouraged by UNIDO and other international agencies.

39. It is further recommended that the developed countries should assist the international agencies and the developing countries in the common plan for the growth and optimum operation of the iron and steel industry in the developing world with UNIDO playing the catalytic role.

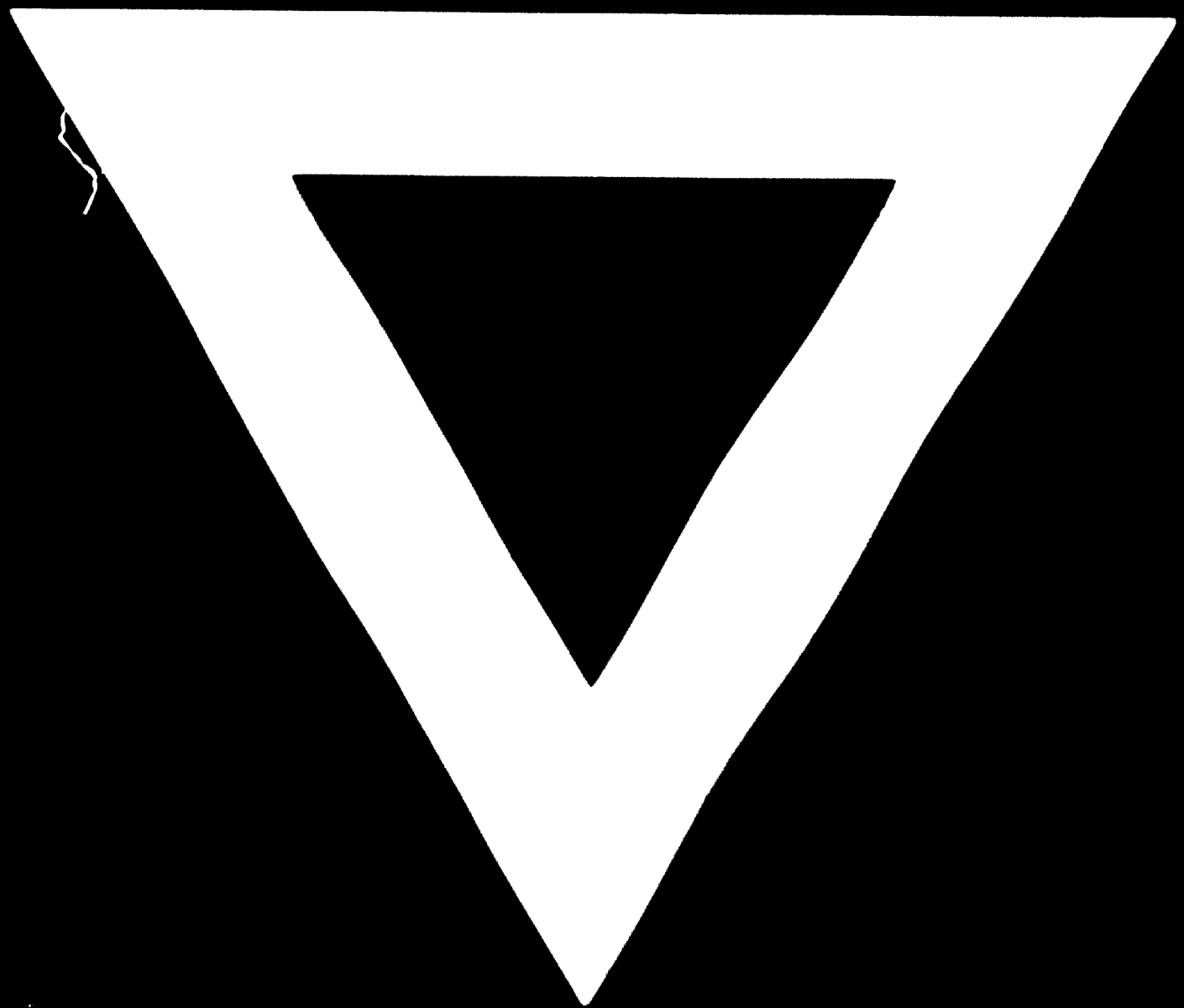
40. It is also recommended that UNIDO and other agencies, the developed and developing countries, should mutually co-operate and co-ordinate their efforts in the fields of alternative technologies including the utilization of fuels in the iron and steel industry of the developing world.

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