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Expert Group Meeting on the Role and Promotion
of Subcontracting in Industrial Development

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SUB-CONTRACTING IN ENGINEERING INDUSTRIES 1/

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SUB-COMMITTEE ON ENGINEERING EDUCATION

10- Introduction

It is universally acknowledged that the growth of industry in a modern economy increases with its development; in which case, the expansion needs of industry would be increasing significantly and become manifestly indicative of industrial development.

Although the role of engineering education in the industrialization process is well understood, you have recognized the attention of the Government and the industrial departments to the expansion of engineering education. It is expected that the products, which, however valuable, could be present a small amount of a very wide spectrum of engineering articles.

It is noted that the initiative of LKDD/UNEP in organizing the recent Group Meeting on the Role and Promotion of Education in Industrial Development has opened up new perspectives for the engineering industries. If education is important in developing industry in general, it is an even more vital factor for developing the engineering industries in particular, as may be seen from a perusal of the following documents submitted to this Meeting, namely:-

1B/W5 41/2
1B/W6 41/3

ID/WG 41/4
ID/WG 41/6
ID/WG 41/9
ID/WG 41/BP/1

Definition of Engineering Industries.

The term "engineering industries" has been used to include those manufacturing the products classified under the following groups:-

<u>Major Group</u>		<u>Products included under group</u>
<u>S.I.T.C.</u>	<u>I.S.I.C.</u>	
35	69	Metal Products
36	71	Non-electrical machinery
37	72	Electrical Machinery and Equipment
38	73	Transport Equipment

It is noted that although the definition of sub-contracting proposed to the Meeting⁽¹⁾ deals with both (a) products, and (b) processes, yet if we were to examine (a) thoroughly we

(1) Definition of sub-contracting: Sub-contracting is a contractual arrangement between a primary company (contractor) and a secondary company (sub-contractor) for: (a) the supply by the sub-contractor, on order from the primary company, of parts, components, sub-assemblies and assemblies that are then incorporated in a product sold by the primary company, both companies being involved in manufacturing; (b) the processing of materials for the primary company - whether the materials are provided by it or not - and the processing or finishing of parts provided by, and returned to, the primary company.

would doubtless recognize that the "products" to be supplied by the sub-contractor would be manufactured (processed) according to the contractor's specifications (on order). In other words, the contractor is sub-contracting for certain processes which the sub-contractor has to carry out.

Since the number and type of products included in these groups multiply from year to year, it has become extremely difficult, without electronic devices, to follow their course. Perhaps the time has come for those concerned with developing the engineering industries in the emerging countries to examine the matter both product-wide and process-wide.

The basic manufacturing processes in the engineering industries are:-

- Casting of metals
- Powder metallurgy
- Extrusion of metals
- Forging processes
- Stamping and forming
- Welding processes
- Machining processes
- Heat treatment
- Protective coatings
- Assembly methods
- Plastic molding
- Wood working

These processes involve two concomitant operations, namely:

Patterns making

Tools, Jigs, Fixtures and Die-making

In turn, these processes and operations require the following services:-

Physical testing

Chemical testing

Calibration of measuring instruments.

Technical and Technological documents.

Again, all engineering products, whether simple such as parts, or complex such as jet engines, are the result of one or more of these processes. UNIDO could promote a general classification of engineering industries according to processes involved. Such "business" classification is most useful when planning for the development of the engineering industries.

The Importance of Sub-Contracting in Developing Industries

Sub-contracting is one of the most effective means of solving the main problems of the engineering industries in developing countries, which problems relate to the under-utilization of capacity and the non-availability of appropriate technology. When properly developed, it will lead to the employment of idle capacity in the engineering section, especially in the production of parts that have hitherto been imported. It will also be instrumental in spreading the use of new technologies, only available to large companies, on a wider base to sub-contractors.

4.- Measures to Promote Sub-Contracting in Engineering Industries in Developing Countries

Any trend towards self-sufficiency of the engineering enterprise should be reconsidered, with a view to recommending that large enterprises confine themselves to very limited processes, and provide sub-contractors with certain technological services, such as:-

Foundry Patterns

Special tools, Jigs, Fixtures and Dies

Special complicated processes such as heat treatment

Technical and technological documents.

These enterprises should employ technologists who are specialised in the sub-contracting processes, even if these processes are not carried on within their enterprises. They should maintain adequate and up-to-date information about sub-contractors, classified according to the processes which they undertake.

There should also be specialised extension centres (a) to deal with separate operations, e.g. one for casting of metals, another for welding and so on; and (b) act as a Sub-Contracting Exchange.

5.- Tool Room: Special Tools, Jigs, Fixtures and Dies

The advancement of the engineering industries in developing countries is greatly handicapped by the difficulty of obtaining special tools, jigs, fixtures and dies, at the proper time. This difficulty is mainly caused by the inadequacy of tool rooms in developing countries. Not only

are tool rooms scarce in these countries, but those in existence are almost invariably located within the large enterprises and serve part of their requirements in special tools.

In most developing countries, the production cycle of a special tool in the tool room is very long because each component of the special tool, jig, fixture or die, has to be designed, manufactured and tested.

In order to shorten this cycle, early attempt should be made to produce standard parts for special tools, jigs, fixtures and dies. Thus, the productivity of existing tool rooms will be substantially increased. It may even be necessary to make that attempt prior to establishing any central tool room to serve a group of sub-contractors.

Conclusions

- 1) In view of the important role of engineering industries in the industrialisation process, special attention should be paid to them both by the developing countries and the international organisations.
- 2) Efforts should be directed more to broadening the industrial base of specialised units than to the setting up of more large engineering enterprises.
- 3) Sub-contracting is a most effective means of activating small engineering units which function, so to speak, as the roots of the industrial tree.

4) Absence of this engineering base will cause developing countries to face, within ten to fifteen years from the commencement of the industrialisation process, the problem of replacement of worn-out machinery and equipment. To effect this replacement, a substantial sum of foreign exchange must be ear-marked annually to keep the plants running, an undesirable eventuality since all available foreign currency is urgently needed for new investment, in order to raise the standard of living of the developing countries and offer their peoples increased employment opportunities.





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