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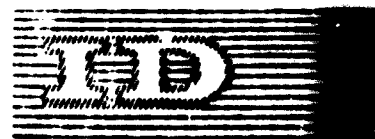
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UNIDO TECHNICAL ASSISTANCE AND TRAINING PROGRAMMES  
FOR THE PLASTICS INDUSTRY  
IN DEVELOPING COUNTRIES<sup>1/</sup>

prepared by  
the Secretariat of UNIDO

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## INTRODUCTION

The United Nations Industrial Development Organization (UNIDO) was established on 1 January 1967 by the General Assembly of the United Nations to promote and accelerate the industrialization of the developing countries with particular reference on the manufacturing sector. The Organization was also given the central role of co-ordinating all the activities undertaken by the United Nations family in this field. Its headquarters are in Vienna, Austria.

As the wide range of UNIDO activities is too numerous to be dealt with adequately in a single article, the present paper accordingly deals mainly with the technical aspects of UNIDO's work, particularly in the plastics area, carried out substantively in the Fertilizers, Pesticides and Petrochemicals Industries Section, Industrial Technology Division.

UNIDO undertakes three basic types of activities:

- a) Operational activities involving direct assistance to developing countries at their request;
- b) Supporting activities including action oriented studies and research, technical meetings and training programmes;
- c) Promotional activities through which UNIDO seeks to mobilize resources far greater than its own by encouraging direct contact between the business communities in industrialized and developing countries.

## I. UNIDO AND ITS FUNCTIONS

### A. Operational Activities (include the following services)

- a) The establishment, operation and management of industrial enterprises to promote domestic investment and increase external financing for specific industrial projects, assistance to existing industries;
- b) Building effective national organizations to administer industrial services;
- c) Preparing industrial development programmes and specific projects;
- d) Training technical personnel;
- e) Solving problems related to the exploitation and use of natural resources, industrial raw materials and by-products;
- f) Disseminating information on new technology and assisting the developing countries to apply such information effectively;
- g) Promoting national, regional and international action to achieve more rapid industrialization.

UNIDO also undertakes, at the request of the governments of developing countries, projects funded primarily by the United Nations Development Programme (UNDP), for a total of approximately US\$100,000. Under these projects, the following services are provided:

- i) Feasibility studies to identify investment opportunities and to determine the extent of available resources and markets for industrial development projects.
- ii) Helping in the setting up of research and training institutes, development centres and launching of pilot and demonstration plants.

#### Special Industrial Services (SIS) Programme

UNIDO provides assistance at relatively short notice to developing countries wishing to solve urgent industrial problems. This service is financed under UNDP and administered jointly by UNIDO and UNDP. In this programme experts are sent for brief periods at short notice to advise on the solution of urgent technical problems that could not be foreseen and programmed in advance.

#### Field Advisers

UNIDO maintains close and direct contact with the field through a number of channels. Its field advisers are in direct contact with the Governments, the business and industrial communities, and with the UNDP Resident Representatives, the accredited official representatives of the United Nations in matters of technical assistance, on specific questions relating to the industrial development and the formulation of requests for assistance.

#### B. Supporting Activities

Include studies, research, exchange of information and training designed to contribute to the effectiveness of field operations through Seminars, Work Shops, Symposia, In-Plant Training Programmes and Expert Group Meetings. This category also covers the compilation, analysis, publication and dissemination of data concerning various aspects of industrialization such as industrial technology, investment, financing, production, management and planning.

#### C. Promotional Activities

In its promotional activities UNIDO seeks to encourage direct contact between the financial and business communities in the industrialized world and their counterparts in the developing countries, thus providing an opportunity for the two to initiate a business relationship which they may then pursue alone to their mutual benefit. More details about the Investment Promotion Programme of UNIDO form the subject of another paper for this Symposium.

#### D. Financing UNIDO's Activities

Expenses for the administrative and supporting activities of UNIDO are borne by the Regular Programme of the United Nations. For its operational activities, UNIDO draws mainly on the resources provided by the UNDP and a part of the Regular Programme of the United Nations, as well as on voluntary contributions from member Governments.

#### E. Organization of UNIDO's Work

The UNIDO headquarters staff are responsible for maintaining liaison with and organizing technical assistance to the developing countries, as well as for carrying out supporting activities. Technical assistance activities in the field are normally carried out by internationally recruited experts.

Where the problem is particularly complex or otherwise beyond the scope of an individual expert, a consulting company is sometimes engaged based on international bidding procedures. Such companies are frequently called upon to make feasibility studies.

UNIDO headquarters maintains a roster of individual experts as well as consulting companies. Expertise in a particular subject is usually required. Although there are a few posts of a general survey nature where a high level of broadly based experience is useful.

#### F. The Range of UNIDO Activities

The work of UNIDO is undertaken by three substantive divisions, and the Technical Co-operation Division, with the necessary supporting and administrative facilities provided by the Division of Administration, Conference and General Services. The Technical Co-operation Division is entrusted with the co-ordination and administration of the operational programme, the implementation of country projects and maintenance of contact with the field.

The three substantive divisions of the UNIDO Secretariat have responsibility for the following groups of activities:

##### Industrial Technology Division

Mechanical and electrical engineering;

Metallurgical Industries;

Construction and Building Materials;

Chemicals, Pharmaceuticals, Pulp and Paper;

Fertilisers, Pesticides and Petrochemicals;

Light Industries (textiles, food processing, tanning and leather, and others);

General industrial techniques (carrying out activities of a multi-disciplinary nature which are common to all industrial sectors, such as environment, packaging and industrial design).

Industrial Services and Institutions Division

Industrial legislation, patents and trademarks;  
Industrial research and supporting institutions;  
Industrial information and promotion;  
Industrial training, management and consulting services;  
Small-scale industries and industrial estates.

Industrial Policies and Programming Division

Industrial planning and project programming;  
Industrial policies, financing and investment promotion;  
Promotion of export oriented industries;  
Industrial development surveys.

The paragraphs below describe some of the principal areas related to the plastics industry in which UNIDO is involved:

**II. UNIDO'S TECHNICAL ASSISTANCE ACTIVITIES RELATED TO THE PLASTICS INDUSTRY IN DEVELOPING COUNTRIES**

World production of plastics increased more than four times during the last decade from 6.9 million tons in 1960 to 30 million tons in 1970. New applications, new and improved materials, favourable fabrication economics and rising consumption in developing and developed countries are among the most important factors contributing to this situation. It is expected that during the 1980's, more products will be manufactured from plastics than from any other materials including steel. This situation will be particularly effective in the building, packaging, agriculture and transport sectors. Such a rate of increase will require a volume of investment on the part of the plastics fabrication industry that is likely to exceed the total of all upstream capital requirements including raw materials, intermediates and polymer manufacturing plants.

In many developing countries, plastics have entered the front rank of those basic materials necessary for economic and industrial development. With annual consumption growth rates frequently in excess of 20 per cent/annum and in many cases met by the fabrication of imported materials, the production of polymers from petrochemical origin is at present confined to a relatively limited number of developing countries, but in a number of instances these plants are being expanded and new plants are being installed. Such a dynamic situation has amply justified the holding of the present Symposium on Plastics Industries in a Developing World. One of the objectives of the Symposium is therefore, directed towards assisting the plastics



industries of the developing countries to achieve orderly, efficient and rapid development in production, fabrication and the use of plastics. In this respect, the opportunities presented by the Symposium for the inter-change of views and experiences between specialists and industrialists of developing countries and their opposite numbers in the developed countries through lectures, demonstrations and discussions should prove effective. Of major significance will be the UNIDO Investment Promotion Programme which is held during the Symposium and immediately afterwards at the INTERPLAS International Plastics Exhibition and through plant visits in the U.K. It is hoped that the event itself and the benefits to be derived from it will exceed those normally gained from attendance at a conventional Symposium.

#### G. UNIDO's Operational Activities related to the Plastics Industry

From the above, it can be seen that there is a steady increase in UNIDO technical assistance projects in many developing countries. These projects cover market studies and feasibility reports on the establishment of additional plastics production facilities, application of plastics products, the establishment or strengthening of Centres for plastics technology and Institutes to improve technical service facilities for the benefit of local plastics industries. Other areas receiving UNIDO attention include quality control, testing and standardization of plastics products and the training of plastics technologists.

Examples of some recently completed and current technical assistance projects are listed in Appendix 1.

#### H. Training Programmes in Plastics Technology and Meetings (Symposia and Seminars)

In addition to awarding individual fellowships to qualified personnel from the plastics industry in developing countries to enable them to undergo a course of practical training at a factory or an institution of plastics technology in an industrialized country, UNIDO also organizes a group training programme in plastics technology. For the fourth successful year the Government of Austria, the Austrian Plastics Industry and the Laboratory for Plastics Technology will be working closely with UNIDO to train engineers from developing countries in modern plastics technology in Vienna.

The nine week programme beginning on 10 September 1973 forms part of the efforts being made by UNIDO to upgrade the skills of engineers from developing countries. The training course will include a period of lectures and discussions followed by practical training in laboratories placed at the disposal of the participants by the co-operating Institute. It will cover extensive instruction in plastics fabrication technology and testing of products and visits to plastics plants in Vienna. The trainees will then visit industrial plants in other parts of Austria as well as the Federal Republic of Germany,

the Netherlands and Japan. This will give them an opportunity to see new materials, processes and applications, to obtain technical information and to obtain licenses for new processes. It is hoped that this concentrated course will acquaint participants with new technologies which otherwise could only be acquired over long periods of training and research.

Since the first training programme in 1970, a number of countries which sent participants have approached UNIDO for assistance in setting up or developing their plastics industry. It has also been reported that several companies which offered host facilities for plant visits by the UNIDO participants have successfully completed business negotiations including the sale of machinery and know-how.

As stated previously UNIDO meetings such as seminars and symposia are normally organized to include technical discussions, investment promotion and examination of possible UNIDO assistance in specific areas. One such example is the Symposium on the Development of the Plastics Industry in Latin America, held in November/December 1972 at Bogota, Colombia. More than 200 experts, consultants and observers from 20 Latin American countries and 14 countries outside the region attended this two week symposium organized by UNIDO in co-operation with the Government of Colombia, the Colombian Plastics Association and the Latin American Plastics Institute.

Besides enabling subjects such as the transfer of technology, recent developments in plastics and the role of UNIDO's technical assistance to be examined, the meeting also provided an opportunity for the discussion and initiation of new ventures between partners from developing and advanced countries.

At the end of the symposium, participants were in agreement that its main objectives had been achieved. These were to discuss the transfer of technology among Latin American countries themselves and with representatives of the industrialized world, UNIDO's technical assistance and investment promotion.

Among the projects considered to be necessary were a Plastics Technology Centre, the establishment of training and quality control facilities and a plastics application and spare parts pool including the leasing of moulds. It was also suggested that UNIDO develop closer co-operation with the Organization of American States (OAS), the Latin American Free Trade Association (LAFTA), the Andean Group, the Central American Common Market (CACM) and the United Nations Food and Agricultural Organization (FAO) on matters connected with the development of plastics.

Agriculture, the Government of Romania, which has a population of 20 million, in which agriculture contributes 25% to the national product. It has a Centre for co-operation with America, which is actively engaged in agriculture to improve crop yields, soil fertility, water conservation, harvesting and the processing of crops, soil conservation and the cultivation of cereals, etc. The Centre has also been set up to facilitate the reproduction of plants and animals, and consideration, and experiment, currently being carried out by the UNIDO/Romania Joint Petrochemical Development Centre, were discussed. The possibility which emerged was that of pre-bridging complete units, though questions such as durability have still to be considered.

A part of the Report is devoted to confidential business talks for the purpose of promoting possible investment or other forms of co-operation. More than 200 of these talks were arranged with a view to concluding contractual arrangements such as joint ventures, licensing contracts, sub-contracting and co-operative agreements.

#### I. UNIDO and Government Co-operation (UNIDO/Romania Joint Centre for Chemical and Petrochemical Industries)

A joint centre for co-operation in the chemical and petrochemical industries for the benefit of developing countries was established in May 1972 in Bucharest. The Centre has the three-fold purpose of facilitating the transfer of technology and technical information, the expansion of direct contacts with industrial circles in developing countries and the promotion of training and research.

As part of its activities, the Centre convenes meetings of expert groups, offers advisory services, prepares studies and undertakes research, assists in the development and adaptation of the products of the chemical and petrochemical industries and promotes investment, joint enterprises, sub-contracting and export industries. It is hoped that this co-operation can be a precedent setting an example for other initiatives of value to the developing countries.

#### Examples of the Centre's Activities

- Expert group meetings on catalysts of fertilizers and petrochemicals production, synthetic rubbers, pesticides;
- Training programme on petrochemicals and plastics;
- Plastics in furniture;
- Demonstration plant for small-scale multi-purpose production of synthetic resins, such as unsaturated polyesters, amino-resins, adhesives and lacquers;
- Pilot project on the use of plastics in building.

## J. Co-operation between UNIDO and Industry

UNIDO's effectiveness can be expanded by developing co-operation and by successfully channeling the resources of industries in developed countries in the form of investment funds, equipment, experts, ideas, training, management, techniques and experience to developing countries. New procedures and approaches are being developed in the execution of UNIDO activities and there is increasing stress on certain types of activities, notably promotional programmes. These include the investment promotion activities and trade fairs, and the establishment of certain UNIDO Industry Co-operative Programmes. Such activities involving direct co-operation between UNIDO and industry may have a far greater impact than the traditional technical assistance type of project. UNIDO has made progress in preparing for the channelling and utilization of these development resources. Staff members are in contact with many companies in the developed countries. The Investment Promotion Programme, training courses and meetings have deepened other contacts. A base thus exists for developing co-operation between industrial circles in the developed and developing countries. It is hoped that the pace of such co-operation can be swiftly accelerated by UNIDO.

Examples of co-operation which has already taken place between UNIDO and industry in the plastics sector are listed below:

- A number of equipment and materials manufacturers have made a significant contribution to the UNIDO Training Programme in Plastics Technology by arranging special lectures and plant visits. They have also given UNIDO valuable assistance in organizing various technical meetings such as the one in Bogota.
- Supply to UNIDO of technical and economic information on petrochemical and plastics production. Many technical enquiries from developing countries to UNIDO have been dealt with by various companies.
- Preparation of studies on plastics production and utilization which are used by UNIDO in connection with its operational activities.
- Project proposals containing technical, economic and investment requirements for investment promotion programme.
- Offers of re-location of plants to developing countries;

- Advice on project identification and formulation as well as recruitment of experts to undertake specific missions.
- Provision of training facilities at manufacturing plants.

Only a brief review of the functions of UNIDO, especially in the plastics area is possible in this paper, but this indicates the breadth of UNIDO's activities. Those wishing to study UNIDO's activities in more detail are referred to Appendix 2 of UNIDO Publications on specific subjects.

APPENDIX I

EXAMPLES OF OPERATIONAL PROJECTS IN PLASTICS INDUSTRY

I. Strengthening or establishing Plastic Technology Centres (training in polymer science and plastics fabrication technology, testing, quality control, technical advisory service to industry, equipment selection, mould design and making)

<u>Project No.</u>	<u>Name of Organization and Country</u>	<u>Project Title</u>
DP/BUR/72/007	Union of Burma Applied Research Institute, <u>BURMA</u>	Applied Polymer Research Laboratory (thermo-setting plastics technology and pilot plants)
DP/CHI/72/019/01/37	Chile Institute of Technology, <u>CHILE</u>	Expansion of Plastics Division (thermoplastics)
DP/SYR/72/01/37	Plastics Products Co., <u>SYRIA</u>	Assistance to the Plastics Industry (quality control and testing)
Country Programme	Argentine Plastics Institute, <u>ARGENTINA</u>	Assistance to strengthen the Institute
Country Programme	Nicaragua Development Corporation, <u>NICARAGUA</u>	Plastic Technology Centre establishment
Country Programme	Various organizations, <u>INDIA</u>	Reinforcing fibres for plastics composites
DP/HOK/73/007/01/37	The Federation of Hong Kong Industries, <u>HONG KONG</u>	Development of Plastics Testing Services
DP/HUN/73/007	Government Organization, <u>HUNGARY</u>	Plastics processing technology and instrumentation techniques
DP/ISR/64/511	Centre for Industrial Research, <u>ISRAEL</u>	Assistance to the Plastics Division

II. Small Scale Industry Development (establishing small plastic enterprises)

<u>Project No.</u>	<u>Name of Organization and Country</u>	<u>Project Title</u>
DP/ZAM/69/506	Small scale industries development, <u>ZAMBIA</u>	Fibre-glass reinforced plastic
DP/NIC/72/11	Polycasa, <u>NICARAGUA</u>	PVC goods
DP/THA/71/541	Industrial Services Institute, <u>THAILAND</u>	Improvement of plastics industry
DP/IND/72/019	Small Scale Industries Development Organization, <u>INDIA</u>	Assistance to the plastics fabricators
IS/NIG/71/1471	Government, <u>NIGERIA</u>	Plastics industry development
IS/PHI/71/825	Institute for Small Scale Industries, <u>PHILIPPINES</u>	Mould Design and mould making
IS/MAL/72/020	Malaysian Industrial Development Finance Corp., <u>MALAYSIA</u>	Product and process improvement
IS/MAT/72/802	Small Scale Industries Clinic, <u>MALTA</u>	Improvement of plastics manufacture

III. Pre-investment, feasibility and market studies for plastics

DP/QAT/71/503	Industrial Advisory Services, <u>QATAR</u>	Utilization of natural gas for plastics production
Country Programme	Board of Investment, <u>THAILAND</u>	Study on petrochemical industry development
DP/SRI/72/077	Ministry of Industry, <u>SRI LANKA</u>	Feasibility study for PVC production
IS/69/660	Industrial Development Corp., <u>TRINIDAD AND TOBAGO</u>	Petrochemicals and plastics marketing
IS/70/762	INDUPERU, <u>PERU</u>	Marketing and pre-investment studies for petrochemicals and plastics

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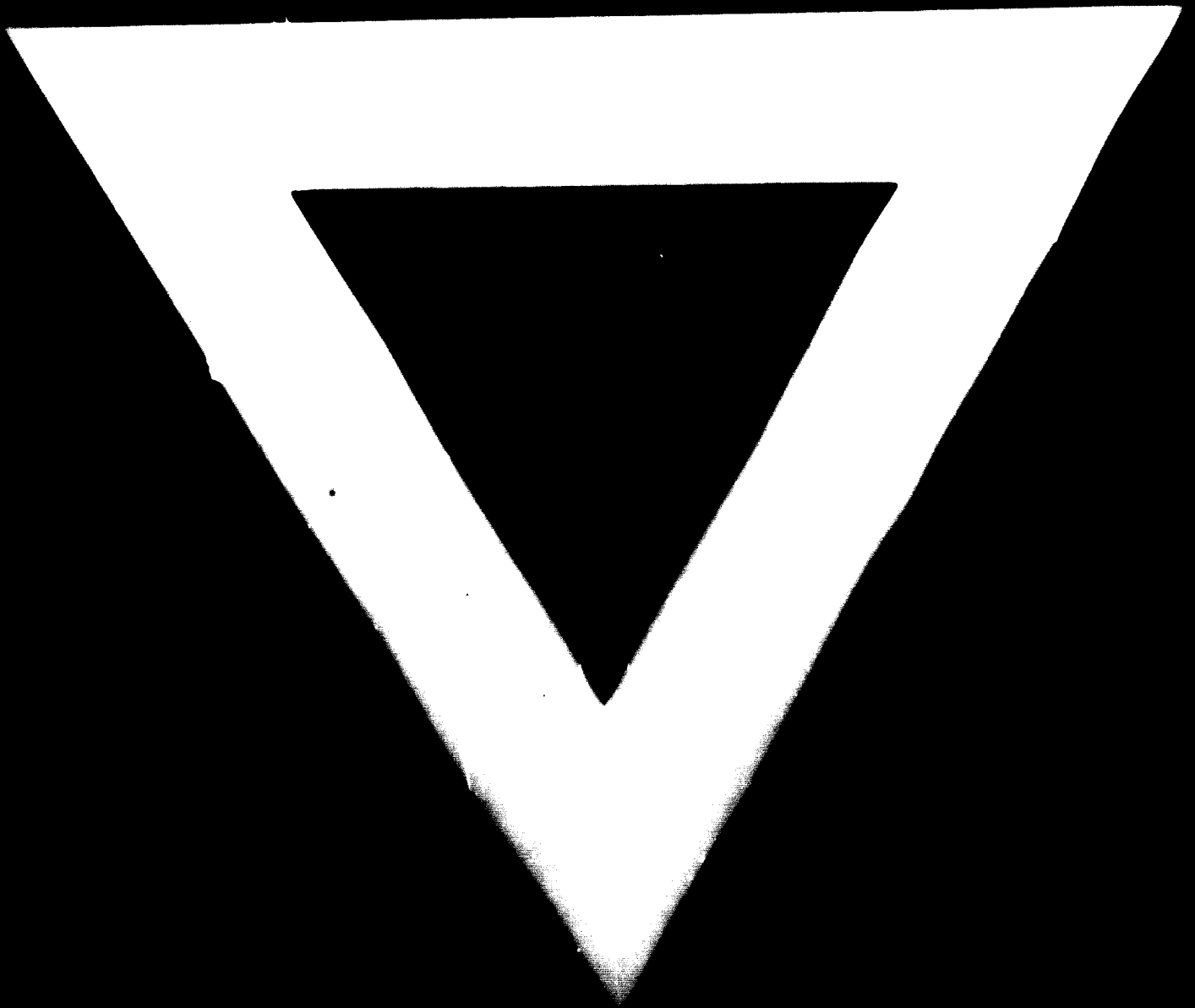
SOME UNIDO PUBLICATIONS

<u>Reference No.</u>	<u>Title</u>	<u>Date</u>
ID/SER.G/42	Index to UNIDO Publications for the period 1/1/67-31/12/72	March 1973
ID/B/116	Summary Review of UNIDO Activities in 1972	13/2/73
ID/B/118	Updated list of approved Operational Projects	23/12/72
ID/B/119/Add.1	Biennial Programme and Budget of UNIDO from 1974-1975	22/2/73
ID/B/120	Medium-Term Plan of UNIDO from 1974-1977	5/3/73
ID/B/122	Report of the Executive Director	23/3/73
ID/B/127	Co-ordination of Activities of the United Nations system in the Field of Industrial Development	26/1/73
E.70.II.B.27	Report and Selected Papers presented to the Expert Group Meeting on the Development of Plastics Industries in Developing Countries, Vienna, 11-15 Nov. 1968	November 1970
E.70.II.B.23	Report on the Interregional Petrochemical Symposium on the Development of the Petrochemical Industries in Developing Countries, Baku, USSR, 21-31 October 1969	September 1970
ID/105 (ID/WG.137/70/Rev.1)	Report of the Symposium on the Development of the Plastics Fabrication Industry in Latin America, Bogota, Colombia, 20 November - 1 December 1972	March 1973
ID/SER.J/2	Selection of projects and production processes for basic and intermediate petrochemicals in developing countries	November 1969



<u>Reference No.</u>	<u>Title</u>	<u>Date</u>
ID/SER.J/3	Studies in plastic fabrication and application: <ul style="list-style-type: none"><li>- Potential plastic applications for fabricators in developing countries</li><li>- Plastics fabrication and raw materials integration in developing countries</li><li>- Establishing an integrated coatings and adhesives industry in developing countries</li></ul>	February 1970
ID/SER.J/4	Studies in the development of plastics industries: <ul style="list-style-type: none"><li>- Establishing plastic industries in developing countries</li><li>- Research and development in plastics industries</li></ul>	March 1970
ID/SER.J/5	Establishing standardization of plastics in developing countries	December 1969
ID/SER.J/6	Guidelines for the production and marketing of acrylic sheet in developing countries	October 1971





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