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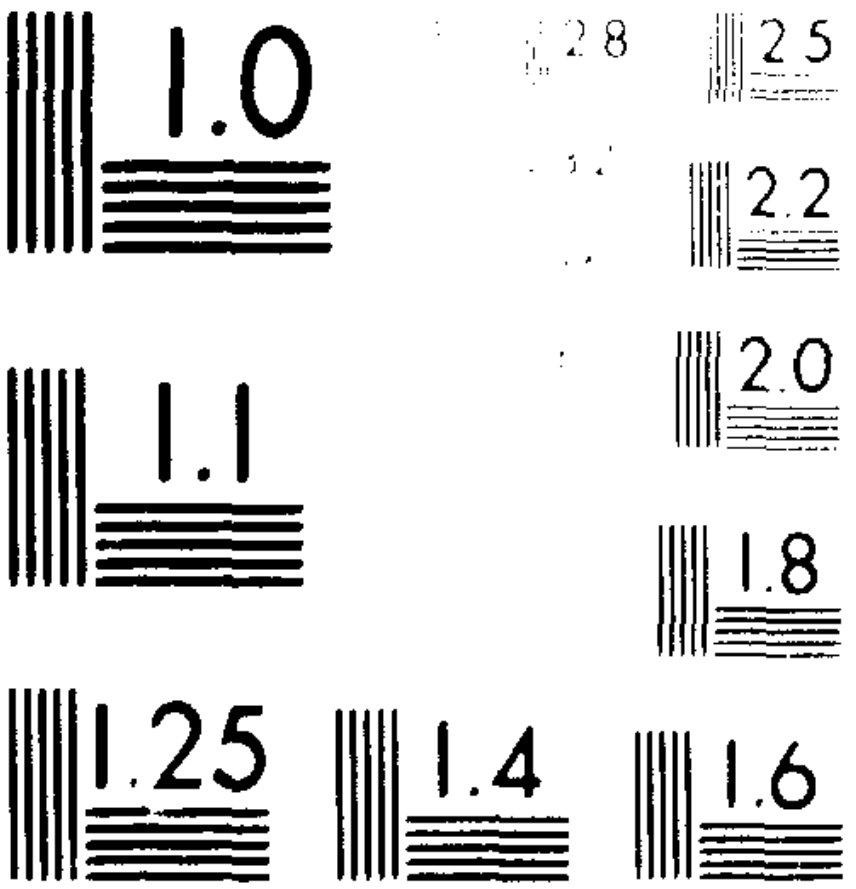
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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

REPORT

for

THE GOVERNMENT OF INDONESIA

Polymer Indonesia 80
(Plastics Week)

by

A.D. Clarke
Project Coordinator

with contributions by UNIDO Consultants:

Prof. G. Patfoort
Dr. M. Bucquoye
Dr. R. D. Evans
Prof. H. Herlinger
Mr. J. Nightingale

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1. Summary

A plastics week was held in Jakarta, 1 - 5 December 1980, under the title Polymer Indonesia 80, in which six UNIDO consultants participated, as well as several invited lecturers from **industrialized** countries. The subjects **covered** a wide range of both academic as well as practical-oriented items relating to various aspects of polymer properties and applications. Polymer Indonesia 80 was regarded as being highly successful. It brought together, for the first time, the three Government Ministries, as well as other concerned organisations and institutions with a common interest in the development of the Indonesian Polymer Industry.

Three recommendations have been made which involve five potential UNIDO projects.

2. Recommendations

The following recommendations are respectfully submitted to Government for their consideration and action. It is strongly recommended that:

1. The development of a Plastics Technology Centre (PTC) be temporarily postponed, and that the draft project document (prepared by J. Whitney in 1978) should be abandoned, and a new draft prepared at a later stage, to reflect the more current situation.

   Government should continue to liaise with UNDP office to keep them advised on the progress made towards establishing an effective co-ordination linkage among the concerned Ministries, and also between other interested parties, as well as resolving the indicated constraints (page **This would enable a more meaningful institutional framework within which the PTC project could be established.**

2. Government should make the request to UNDP/UNIDO for four small projects to assist the development and strengthening of the plastics processing industry prior to the establishment of the PTC.

   a) Technical assistance to Lemigas

      - commissioning equipment and training personnel for the polymer applications development laboratory

   b) Technical assistance to Lemigas

      - plastics in agricultural applications: preparation of guide lines for future development work

   c) Technical assistance to the Metal Industries Development Centre

      - mould design and mould making

   d) Technical assistance to the Building Research Institute

      - composites for housing

3. Government should make a request to UNDP/UNIDO for a consultation project to more fully define the future requirements for supporting and strengthening the Indonesian Synthetic Fibres Industry; and to determine the range **of functions** that a Synthetics Fibres Development Centre would need to undertake for this purpose.

The establishment of such a Centre is recommended.

3. Introduction

The project co-ordinator arrived in Jakarta on 23 November 1980 while the experts R.D. Evans, M. Buquoye, S. Nightingale and G. Patfoort arrived on 29 November, and H. Herlinger on 30 November. All experts with the exception of R.D. Evans and J. Nightingale, left Jakarta on 7 December. R.D. Evans left on 9 December and J. Nightingale on 8 December 1980.

This project was a Plastics Week, 1 - 5 December 1980, which had been promoted locally as 'Polymer Indonesia 80'. It consisted of three parts, each of which was located in three separate locations within Jakarta. The first day was held at Gedung Departemen Perindustrian Lantai 5, Jl Kebon Sirih No.36, Jakarta, and was the official opening with one technical paper. The second and third days were devoted to a Polymer Symposium held at Gedung BPPT - MENARA PATRA, Jl. M.H. Thamzin 8 Jakarta, while the fourth and fifth days were devoted to a workshop held at Hotel Wisata International, Jl.M. H. Thamzin, Jakarta.

The organisation of Polymer Indonesia was undertaken by a specially formed committee in which members of Ministry of Industry, Ministry of Mines and Energy, Ministry of Research and Technology, Lemigas, Pertamina, all took an active part.

4. Findings

a) Polymer Indonesia 80

This was a successful plastics week. It succeeded in bringing together for the first time all the interested parties including the separate Ministries, Pertamina, Lemigas and the plastics manufacturer's trade associations. There was an attendance of 160 - 200 persons at the sessions.

b) Plastics Technology Centre (PTC)

From discussions it became clear that there is a positive requirement for an independant Plastics Technology Centre (PTC) to strengthen the plastics processing sector of the polymer industry. The Centre needs to be very practically oriented. Current needs are to assist processors increase productivity and quality, trouble-shooting, expansion of existing markets and development of new market areas - including industrial applications as well as increasing food production through the use of plastics in agricultural applications. There is also a need to train industry personnel in plastics technology.

Experience shows that considerable time can be saved if a PTC can be built on to a suitable existing organisation/institution which could then be expanded. Analysis of UNDP assisted institutional projects also shows that the active involvemnt of the industry on the Governing Board of such institutions, and preferably also with a financial involvement, are one of the pre-requisitives for ensuring the success of the institution achieving its objectives.

In Indonesia it would appear that there are many Research and Development Centres established to cover a wide variety of industries and all are fully funded by Government. In addition, they are organised on a Civil Service basis and salary levels are low compared to the relevant industry they serve. In consequence, it is not always possible to recruit the high calibre of key personnel required, but when they are recruited they are often poached by the industry they serve.

The success of a PTC depends on the quality of its personnel, and much more attention needs to be paid to recruit and maintain high calibre practical-oriented key-staff. Government are now aware of these various constraints and a period of time will be needed to permit the necessary consultations and deliberations to be made between the various Ministries and Departments concerned - not only to resolve these points, but also to determine an effective co-ordination linkage with all the interested parties, so that the needs of this industry are satisfactorily strengthened for its future expansion.

In these circumstances it is strongly recommended that the development of a PTC be temporarily postponed, and that the draft project document (prepared by J. Whitney in 1978) should be abandoned and a new draft be prepared, at a later stage, to reflect the more current situation. Government should continue to liaise with UNDP office to keep them advised on the progress made towards establishing an effective co-ordination linkage among the concerned Ministries and also between other interested parties, as well as resolving the indicated constraints. This would enable a more meaningful institutional framework, within which the PTC project could be established.

In the meantime there are certain other matters which require attention. The pilot plant and test equipment, valued at more than 600,000 US dollars, situated in the Polymer Application Laboratory of Lemigas, lies idle and un-commissioned for more than 3 years. There is a need to get this equipment into working order not only to stop its deterioration and consequent loss of investment, but it could then be used to undertake some limited programmes of testing and perhaps some active work in application development with the co-operation of the processing industry and with co-operation of the Technical Service Laboratory of Pertamina. The commissioning of the equipment, plus supply of auxiliary equipment (cooler and compressed air) and training personnel in the test proceedures, could be executed through a small project for this purpose, entitled 'Technical Assistance to Lemigas'.

Visual presentation of some plastics in agricultural applications aroused much interest and subsequent discussions indicated that this subject should be examined in more detail relative to the specific situation of agriculture in Indonesia. Before any application development work is undertaken it would be necessary to devleop some guide-lines. This examination of Indonesian agriculture and the preparation of guide-lines for potential application development work could be executed through a small project. As such application development work is normally time related to specific cropping periods, it is necessarily a long process taking 3 to 5 years to complete. Since the petrochemical project is planned to be on-stream with polymer production in 1983/85 period, development work of this new market area ought to be started as soon as possible. The guide-line project, referred to above, should therefore be undertaken during 1981.

It is strongly recommended that Government should request UNDP/ UNIDO for two small projects:

1. Technical assistance to Lemigas - commissioning of equipment and training of personnel for the polymer applications development laboratory;

2. Plastics in Agriculture - preparation of guide-lines for future development work in the use of plastics in agricultural applications as a means of increasing food production.

Notes of visits made by A.D. Clarke are attached as Annex A.

c) Mould design and mould making

This important auxiliary industry for plastics processing is at a very early stage of development. Only joint-venture plastics processors and international companies such as Phillips have access to the necessary expertise for mould making. It is understood there are three or four engineering firms who have expressed interest in making moulds for plastics processors, but who lack the expertise.

In his report Mr. J. Nightingale points out that the Metal Industries Development Centre (MIDC) at Bangdung has recently made some compression and injection moulds, but lack the knowledge and expertise to design components and moulds which are prerequisites for mould making. The equipment at the Centre is excellent for mould making, and only mechanical polishing machines for mould polishing are lacking.

To widen the knowledge of MIDC in relation to mould-design and mould making, it would be appropriate for some selected staff to visit the Central Institute of Plastics Engineering and Tools (CIPET) at Madras, India. This UNIDO/UNDP supported Centre has been established for about 13 years to train personnel in mould design - mould making, and uses English as its working language. It is the only Centre of its type in the world and has been recently extended to undertake material and product testing, thus widening its activities towards that of a plastics technology Centre.

The MIDC is an appropriate Institution to train personnel in mould design and mould making. A small project to provide a study tour to CIPET, the provision of mechanical polishing equipment, and a short-term expert, would enable the staff to achieve a fuller understanding of the training requirements, and thus would be able to prepare a course or courses suitable for Indonesian requirements. By this means MIDC would be assisting in the strengthening of the plastics processing industry, as well as assisting the mould-makers towards the development of an export market in mould making once the expertise had been fully achieved.

It is therefore strongly recommended that Government should request UNIDO/UNDP for a small project entitled "Technical Assistance to the Metal Industries Development Centre/Mould Design and Mould Making". This project would include a study tour to CIPET Madras, India, provision of mechanical polishing equipment, and a short term expert in mould design and mould making.

Details of 'Visits and Notes' by Mr. J. Nightingale is attached as Annex B.

d) Composites for housing

Interest in the filament winding process for composite construction of housing units was shown by many persons. The Directorate of Building Research was aware of the process but first-hand information would be more useful. It was therefore proposed that a small project would permit some three persons to make a study tour to the Centre for Industrial Chemical Applications (CIQA) in Saltillo, Mexico. The use of natural fibres in the process could also be discussed as this work is being pioneered at this Mexican Centre. After this tour, a short visit would be made by the experts to discuss a pilot construction project which would be within the activity of the PTC, but would for practical reasons be treated at the Directorate of Building Research.

It is therefore strongly recommended that the Directorate of Building Research request through Government to UNIDO/UNDP a small project entitled "Composites for housing", which would include provision for a study tour for 3 persons to CIQA in Saltillo, Mexico, and provision for experts to visit Indonesia to discuss a pilot construction project.

The possibility of technical co-operation between Indonesia and Mexico in guayule rubber and joyobex, and the use of natural fibres in composites should also be explored.

Details of 'Visits and Notes' made by G. Patfoort and M. Bucquoye are attached in Annex C.

e) Synthetic fibres

The data and statistics made available positively indicated that there will need to be a progressive increase in synthetic fibre production in Indonesia during the next twenty years.

The textile industry is well served presently through the Central Institute for Textile Research and Development, which covers both training and R & D work from yarns and other downstream processes. The Cellulose Research Institute has all the facilities required for the laboratory and pilot plant production of cellulose fibres. However, it appears that there are no specific facilities for training and development work for the synthetic fibre industry.

Visits made to various companies indicated that several are operating on a joint venture basis, including Japanese, Taiwan and German know-how, while others are completely indigenous operations. Present production is stated to be 68,000 tons per annum and this is forecast to increase to 150,000 tons/annum by 1983.

Plans are also in hand to manufacture basic raw materials for the synthetic fibre industry in Indonesia. Against this background it is evident that additional information and consultations by UNIDO will be required to fully ascertain the future requirements for the successful expansion of the synthetic fibres industry, since this was not possible in the short period of 'Polymer Indonesia 80'. It is therefore strongly recommended that the Government should request UNIDO to undertake a small project to define the future requirements for supporting and strengthening theIndonesian synthetic fibre industry; and to determine the range of functions that a Fibres Development Centre would need to undertake for this purpose.

Details of 'Visits and Notes' made by H. Herlinger and R.D. Evans are set out in Annexes D and E respectively.

5. Acknowledgements

The experts wish to acknowledge and express their thanks to all counterparts, and particularly Mr. J. Majid of Lemigas, whose help and assistance has been gratly appreciated. Thanks are also expressed to the various counterpart agencies through whose efforts the "Polymer Indonesia 80" was organised and for valuable assistance rendered to the experts.

Thanks are also expressed to the staff of UNDP office, both for their active support ot the project and to the administrative staff for their kind considerate co-operation. Finally, but not least, ackowledgements are made to Mr. M. Youseff of UNIDO for his active support and encouragement during "Polymer Indonesia 80" week in Jakarta, and also to the UNIDO supporting staff in Vienna, for their help and assistance.

ANNEX A

POLYMER INDONESIA 80

Notes of Visits in Indonesia
by A.D. Clarke

The 'Polymer Indonesia 80' was well supported at all three sections and much interest was shown in the various subjects which were presented by the UNIDO experts. Average attendance was 160 - 200.

Visits were made to the Polymer Application Laboratory at Lemigas. The injection moulding, the thermo forming machines, and the highspeed mixer, were installed but not connected to services, and had not therefore been checked for working operation. A wide range of testing equipment had all been installed but this had not been checked nor fitted out by the supplying agents. The Brabenders had been used, but lack of knowledge of practical cleaning was evident. The buildings were excellent. It appears that although the equipment was purchased conditional on the supplying agent providing a technical engineer for installation, in fact this never materialised. The equipment has therefore been lying idle for three years and un-used. Value about 600,00 US dollars.

A visit to the Pertomina Plastics Technical Service Centre was made. This was extremely well equipped with both a wide range of pilot plant process equipment and testing equipment, as well as technical graduates, many of whom had been trained overseas. Pertomina is a Government agency established by Presidential decree and undertakes a wide range of production activities in the petroleum industry. It is currently producing polypropylene, based on gas provided by the refinery operations. It is the agency through which the petrochemical industry will be developed.
There are also private sector companies manufacturing PVC polymer.

ANNEX B .

POLYMER INDONESIA 80

Visits and Notes
by J. Nightingale

I.T.S.

Obviously a well run plant, but the impression was gained that some of the technology was unchanged since the plant was started.

Lemigas

The labotatory buildings are adequate for the next 5 - 10 years, depending upon allocations of equipment and technological growth. The injection and vacuum forming machines need checking and bringing into commission, with the training of at least two, and preferably three, operators who can operate both machines. A check must be made that adequate supplies of electricity, cooled water and compressed air are available. It is estimated that the latter two services could be provided for US $ 35,000 - 50,000 depending upon origin and capacity.

Metals Industries Development Centre, Bandung

Facilities here consisted mainly of a well equiped machine shop, a metrology laboratory, a foundry, a pattern shop, and a welding shop; all with trained personnel engaged in daily assignments for industry. These consisted of testing and development work, and selected items of work that gave experience to the workshop personnel, and set standards for local engineering shops to follow.

The machine shop was equiped with medium to small machines that convered horizontal, and vertical milling, die sinking, copy milling and turning, surface, profile and cylindrical grinding, a jig-borer and spark erosion (E.D.M.). Supporting the E.D.M. machine, are facilities for making graphite and copper electrodes. They had 23 - 25 local operators, and the whole Centre staff is based on 14 Belgians and 3 West Germans.

The M.I.D.C. was able to organise a symposium early in 1980, when 16 papers were presented on aspects affecting E.D.M. machining.

The workshop makes compression moulds and a few injection moulds, and is capable of extending either should the need arise. Expertise that is lacking is the knowledge of experience to design components and moulds.

The only equipment necessary to bring the Centre up to a well equipped medium-sized U.K. tool-room, is mechanical polishing machines. There could be bought in the U.K. for about US $ 5,000 and the personnel would allow quieter and therefore lower cost polishing.

The welding ship consisted of both gas and electric welding,(includes M.I.G. (Metal Inert Gas)), and oxygen cutting equipment. They have also a trailer truck which allows them to take all types of electric welding to sites on exhibitions. They are skilled in welding the usual ferrous alloys, cast iron, aluminiums, and stainless steels. For the latter they fabricated the pipe lines to utilize the energy of the thermal springs which contain highly corrosive chemicals. The welding shop is to be extended to twice its size.

The metrology laboratory, which also contained the jig-borer, is held at a constant temperature, and among other duties, ch cks measurement standards for local industries.

Supporting the workshops were well equiped metallurigical and chemical laboratories.

ANNEX C

POLYMER INDONESIA 80

Visits and Notes

by G.A. Patfoort and
M.E. Bucquoye

Programme

The experts arrived in Jakarta on Saturday 29/11/1980 and left Indonesia on Sunday 7/12/1980.

The experts would like to express their gratitude to the Indonesian Authorities, especially Lemigas for their kind reception and the organization of their stay in the country, in particular Mr. J. Majid.

Visits were organized in Jakarta to:
- polymer symposium
- polymer workshop with participation of the expert team
- Director and board members of Lemigas
- Lemigas polymer laboratory
- P.T. Indonesia Toray Synthetics (**polyester or PA fiber**)
- KARUNA: PP fibres and bags
- P.T. POLYARN Manufacturing Industries (PP fibres and **sacks**)

On 4 and 5 December, the polymer workshop was organized. Organization was perfect and participation/researchers, producers, manufacturers from Government and private institutions and industries) was very important. Interest of participants was obvious and evident; the workshop was for them a welcome and interesting event.

The experts Bucquoye and Patfoort visited on Saturday the Directorate of Building Research in BANDUNG and the Geological Research and Development Centre. In the Directorate of Building Research, they met the Director Mr. Karman Somawidyaya and some technical staff members. Of course the rotational building method was already known through the lectures of the workshop, but an interesting and extensive discussion took place about the possibilities of the system on Indonesia.
The conclusion was that the method has to be experimented in Indonesia, but details of a programme have to be fixed up later on.

Mr. Somawidyaya wants to send 2-3 persons to the experimental plant in Saltillo (Mexico); one architect, one engineer and one representative of the Ministry of Industry. After the visit of the Indonesian professionals to Mexico, they will have a practical feeling of the construction method and the composite materials. This first contact would be followed by a visit of 2 weeks of the experts to Indonesia in order to discuss the practical realisation of a pilot construction project.

Two channels were considered by Mr. Somawidyaya for the realisation of this project:

1) using the frame of the existing building project of Indonesia with UNIDO and including the new programme;
2) set up a new small project and propose it to UNIDO through U.N.D.P.

Director Somawidyaya will make contact with the actual UNIDO project manager on Indonesia and he requests also more information through UNIDO, Vienna, before he will present his request.

After the visits to Building Research Institute, the experts went to the Geological Research and Development Centre and met Director Mr. H.M.S. Hartono. The aim of this visit was to have a first contact in view of a co-operation in the fields of materials, necessary in the formulation of composites. Mr. Hartono's reaction was quite positive.

Observations

From the numerous contacts the experts had after the lecture in the workshop, the following may be distillated:-

There is a general lack of information in relation with polymer processing. It seems that the very important distinction between polymeric raw material science and fabrication and polymer processing and manufacturing is not clear. The polymer symposium was not the convenient way to eliminate this ambiguity.

As we know, even in Europe, the large chemical plants that have in hand raw material production have an important influence on literature, information and education in the polymer field. So, historically the polymer technology was developed by chemists and their influence on the mechnaics of polymers, product design and processing technology is still very important. It is only in the very latest years that the mechanical part of polymer technology has received its full development and that it became clear that the same difference exists between raw material and polymer processing as between metallurgy and mechanical processing of metals. So the description of the present European situation by French and German lectures has certainly not cleared up the ideas.

So, until now, the control laboratory of Lemigas, education and training and the information in written or spoken language about polymer processing, pechanical, physical and design properties of polymers was neglected.

For many participants of the workshop it was even difficult to realise that polymers may be a useful construction (instead of replacement) and structural material. In the opinion of the experts, the necessary intellectual infrastructure especially in the private sector to understand the meaning and the function of a control and testing laboratory, does not exist.

An education programme in the form of training courses or fellowships would be one of the first points to realise in the establishment of a polymer centre.

In the field of waste treatment, the following remarks may be important. In the case of industrial waste, the quantities are important. But thanks to low salaries, most waste is recycled in one or another way. In the case of landfell with domestic waste, it seems that plastics plays a negative role, when it is used as compost fertilizer in landfelling techniques. If it was possible to give any commercial value to the plastics part in domestic waste, it would probably be possible to avoid this problem. It was however impossible to obtain information about the amount of plastics on urban and industrial waste. Investigation would be advisable.

Recommendations

- Advice as soon as possible (Mr. Somawidyaya, Director of the Directorate of Building Research/Ministry of Public Works) in Bandung, in what form he has to present a request for the initiation of a construction project with the rotational system

- In view of the establishment of a polymer centre in Indonesia, training facilities have to be organised on all levels, as well for the mechanical, physical and design properties of polymers as for their processing and quality control

- The preceeding ideas could be developed as follows: formation of a team in the different disciplines that can **function as a teaching team** on the different levels in the present education system. So the new disciplines would become self-supporting in a very short time, and would permit the development of product design, processing, evaluation and testing needs of the raw material technology

- Technical co-operation among developing countries in the exchange of views on guayule rubber, **jojoba** and the use of natural fibres in composite materials will be most useful between Indonesia and Mexico.

ANNEX D

POLYMER INDONESIA 80

Notes on Indonesian Synthetics Fibre Industry
by H. Herlinger

Due to the further growth of fibre demand more fibre producing plants in Indonesia will be built.

The forecast is: 150 000 t of synthetic fibres in 1984. The present production is about 68 000 t/y.

The present plants are partly run by Japanese personnel.

Indonesia will in future also produce its own raw materials for fibre manufacture.

During this mission it was found that there exists no training and development centre for the synthetic fibre industry.

In Bandung we visited the Cellulose Research Institute, which has all the facilities for the production of cellulose fibres in a laboratory (2 kg/batch) to fibre plant scale (500 kg/batch).

We also visited the Central Institute for Textile Research and Development, which has all the facilities for research and development on yarns, fabric, textile finishing and textile technology.

We also received information on the possibilities of other textile (research) laboratories.

In no case exists a possibility for the development of fibre polymers, adoption of technology for the countries' specific problems, nor for development of fibre spinning processes, testing and applied research.

Recommendations

In one area of Indonesia a Fibre Development Centre has to be installed.

Objectives

(a) Development and adoption of technology of fibre production on the specific demand of the Indonesian market

(b) Providing of facilities for training of students for professional work in the fibre industry. This is not possible in the plants. According to experience in other countries (Fed. Rep. Germany, Great Britain) it is possible in special institutions where there exists already the close connections th the textile industry.

The experts on mission for UNIDO will work out a project proposal.

ANNEX E

POLYMER INDONESIA 80

Visits and Notes
by R.D. Evans

This report will be confined to information obtained and impressions created during the course of the Polymer Indonesia 1980.

The first company visited was P.T. Perindustrian Karung National in Jakarta. This is a company producing slit polypropylene yarn from blown film using one line produced by Reifenhauser of Troysdorf West Germany, and Henschei which is treated in Hannover West Germany. They employ approximately 600 using about 100 fly-shuttle looms. The Plastic Bag Association has only 16 members in contrast to the very large number of bag producers as indicated in the official statistics. This could be due to not differentiating between woven sacks and plastics film used for production of bags.

Most of the fertilizer bags are produced by two large producers of urea fertilizers. Other bags are produced for tin, minerals such as tin and sand and tea picking bags. Rice and sugar are apparently reserved for the jute, jute yarns, and jute bag industries.
It is clear that polypropylene tape yarns can be used to produce both rice and sugar bags but this is a policy decision made by the Government. In addition, this company produces blue leno woven bags for fruit and vegetables such as onions. The blue tape yarns are produced from polymer surface coloured with pthalo cyamine blue pigment in a Henschel high speed mixer.

In addition Karung produces shaded cloth, erosion control polypropylene fabrics and synthetic fibres bale wraps and a small amount of narrow primary carpet backing. As well as fly shuttle looms the company has a new Torié insular loom and plans to purchase additional Torié looms.

In general this company has little in the way of purchasing equipment and in this respect would welcome some additional testing facilities. The total amount of polypropylene consumed by the bag industry is approximately 12,000 t/y.

The second company visited was P.T. Indonesia Toray Synthetics, a producer of nylon 6 continuous filament and polyester staple at Jangerang, West Java. As indicated by the name this is a joint venture company between local industries 60% and Toray Industries of Tokyo Japan 40% . The plant produces 20 tons/day of nylon 6 and 40 tons of polyester staple. Nylon 6 is continuously polymerized, extracted with water and melt spun into 40, 70, 100 and 210 denier yarns using surface driven take-ups. Yarn is drawn on draw winders. Equipment apparently was made to a large extent by the Engineering Department. of Toray.

Polyester is batch polymerized using terephthalic acid imported from a Mitsui Group Company and from I.C.I. Polymer is extracted on back to back units and 2 deniers 1,5 and 2, are produced. Tow stretching equipment again was from Toray.

Housekeeping was good and the production was well organized as would be expected from a Toray Company.

With the exception of about 15 Japanese the remainder of the staff is Indonesian. Training apparently is well organized and apparently I.T.S. has few problems. Although this plant would not have the economics of a large American plant it is a good operation.

The next plant visited was P.T. Polyarn Manufacturing Industries located in Jakarta. It is a producer of woven polypropylene bags. This is a very poor plant with no maintenance, very poor housekeeping and extremely poor labour utilization. In contrast to Karung which uses PP imported from the U.S. this plant uses polymer imported from France. Bags are sold for transporting rice from the farm to the mill and also for animal feed. Quality is low and we actually saw one worker ironing bags with a hand iron to remove wrinkles.

A visit was made to the Institute of Textile Technology at Bandung. The Institute has about 900 students with about 50 advanced students studying for the M.S. Equipment covers the textile industry from yarn preparation through weaving and knitting to dying and finishing. There are limited facilities for garment manufacture and a new course in fabric design has been offered for the first time. Equipment is of variable ages. There was insufficient time to evaluate their programme.

Apparently one of the main thrusts of UNIDO efforts in Indonesia is the creation of a Synthetic Fibre Research Institute. In my judgement this decision should be reviewed very carefully. There are presently 7 synthetic fibre proudcers in Indonesia with a total capacity of 320 tons per day. These include:

1. P.T. Kuraray Marrunggal Fibres Industries
   (Kuma Fibres)

2. P.T. Indonesia Asahi Chemical

3. P.T. Indonesia Toray Synthetics

4. P.T. Teijin Indonesia Fibre Corporation

5. Texmaco

6. Sulinda

7. Yasinta

The first four companies obviously have access to technology arising from major fibre producers in Japan. Sulinda (Yasunlitex) supposedly is using technology from Taiwan with a plant from Zimmer in Germany. This company has imported a technician(s) from Taiwan as a replacement for inefficient technicians supplied by Zimmer. Nothing is known of the processes used by Texmaco and Yasinta.

One of the alleged advantages of the Synthetic Fibre Institute would be the ability to train staff for the synthetic fibre plants. Obviously, this needs a very careful analysis so that the Institute, if training is one of its functions, can meet the plants' requirements for plant and plant facility maintenance, production supervision, financial and business officers and the like. The Institute must be able to show that, although it is a

research and development institution, it can meet the diverse training requirements of the industry and not just research and development personnel. The demand for the latter may be years ahead in the uncertain future.

In addition to the above plants, Government personnel have indicated that they have decided to build a TPA (PTA) plant using the Amoco Mid-Century process and that they may be considering a fibre plant. Will the Institute be prepared to supply processes and trained personnel for the conversion of DMT fibre plants ? As visualized for the coming years synthetic fibre plants' crying needs will be for production and business personnel of all types and we must decide whether a Research and Development Institute can best meet these needs.

It is recommended that UNIDO concentrate on defining the needs of the synthetic fibre industry and the accompanying textile industries. After these have been clearly defined by people who have a background in the business of producing and distributing fibres, UNIDO can possibly develop a much cleaner picture of the task which will be facing Indonesia as it moves towards improving its abilities to meet the needs of its citizens for fibres. If it is obvious that these needs can be met by the creation of a Synthetic Fibre Institiute by all means create such an Institute. However, a decision to create such an Institute without a clear definition of the problems arising from these efforts to enlarge the present existing base are premature.

Annex F

undangan

Polimer Indonesia '80

JAKARTA, 1 – 5 DESEMBER 1980

ANNEX F

POLYMER INDONESIA 80

December 1st 1980

Opening ceremony

Speeches by: Director General, Ministry of Mines and Energy
Mr. Rama, UNDP Resident Representative
Minister of Industry, Hon. A.R. Soehoed

Working paper: Introduction to the development of the Polymer Industry
by A.D. Clarke

Polimer Indonesia '80

See attachment

PEMBUKAAN: *1 Desember 1980*

A C A R A

1. 08.30 – 08.45 **Laporan Panitia**
2. 08.45 – 09.00 **Sambutan Pengarahan**
   Bapak Direktur Jenderal Minyak dan Gas Bumi
3. 09.00 – 09.15 **Sambutan Pengarahan**
4. 09.15 – 09.30 **Sambutan**
   Address by Mr. Rana, UNDP Resident Representative
5. 09.30 – 09.45 **Sambutan & Pembukaan**
   Bapak Menteri Perindustrian
6. 09.45 – 10.15 **Ramah Tamah**
7. 10.15 – 12.00 **Introduction to the Development of Polymer Industry**
   Mr. D. Clarke

Panitia "POLIMER INDONESIA 80" mengharapkan dengan hormat :

. . . . . .

untuk menghadiri :

PEMBUKAAN

Polimer Indonesia '80

Yang akan dilaksanakan pada :

Hari/Tanggal	:	*Senen, 1 Desember 1980*
J a m	:	*08.30 WIB.*
Tempat	:	*Gedung Departemen Perindustrian* *Lantai 5* *Jl. Kebon Sirih No. 36* *J a k a r t a.*

- **RSVP** : Panitia "Polimer Indonesia '80"
  d/a PPTMGB "LEMIGAS"
  Tel. : 775994
  713408 pes. 110 dan 118
- **Pakaian** : Bebas Rapi
- **Registrasi** : Jam 08.00 – 08.30 WIB.

Polimer Indonesia '80

1. **PEMBUKAAN**

   Hari/Tanggal : Senen, 1 Desember 1980

   Tempat : Gedung Departemen Perindustrian Lantai 5
   Jl. Kebon Sirih No. 36
   Jakarta

2. **SIMPOSIUM**

   Hari/Tanggal : Selasa & Rabu, 2 dan 3 Desember 1980

   Tempat : Gedung BPPT – MENARA PATRA
   Jl. M.H. Thamrin 8
   Jakarta

3. **WORKSHOP**

   Hari/Tanggal : Kamis & Jum'at, 4 dan 5 Desember 1980

   Tempat : Hotel WISATA INTERNATIONAL
   (sebelah Hotel Indonesia)
   Jl. M.H. Thamrin
   Jakarta

4. **DISPLAY**

   Hari/Tanggal : Kamis & Jum'at, 4 dan 5 Desember 1980

   Tempat : Hotel WISATA INTERNATIONAL
   (sebelah Hotel Indonesia)
   Jl. M.H. Thamrin
   Jakarta

JADWAL DISKUSI ILMIAH

"Bahan Polimer di Indonesia"

(SIMPOSIUM POLIMER II)

Jakarta, 2 & 3 Desember 1980

Selasa, 2 Desember 1980

08.00–09.00 PENDAFTARAN PESERTA

RUANG A

09.00–09.30 ACARA PEMBUKAAN
Laporan Ketua Panitia Penyelenggara:
Sambutan Ketua Panitia Pengarah:
Pengarahan dan Peresmian Pembukaan oleh Y.M. Menteri Negara Riset dan Teknologi

09.30–0945 ISTIRAHAT

09.45–12.00 PERANAN KEGIATAN PENELITIAN DAN PENGEMBANGAN DALAM PERKEMBANGAN INDUSTRI POLIMER/PLASTIK
(THE ROLE OF THE RESEARCH & DEVELOPMENT ACTIVITY IN THE PROMOTION OF THE POLYMER/PLASTICS INDUSTRY)
Prof. Dr. Ing. W. Woebcken
(Sueddeutsches Kunststoff-Zentrum, Wuerzburg, West Germany)
Prof. Dr. M. Chatain
(Centre d'Etudes des Matieres Plastiques, Paris, France)
Prof. Dr. F. Schue
(Universite du Science et Technique du Languedoc, Montpellier, France)

12.00–12.45 ISTIRAHAT dan MAKAN SIANG

12.45–15.00 PENGEMBANGAN PRODUK/PASARAN SELAKU SYARAT UNTUK MENSUKSESKAN PERTUMBUHAN INDUSTRI POLIMER
(PRODUCT/MARKET DEVELOPMENT AS A NECESSITY FOR A SUCCESFULL, GROWTH OF THE POLYMER INDUSTRY)
Dr. L. Blom
Dutch State Mines, Netherlands
Dr. R. Schwartz
Mobil Chem, USA
Prof. Jean Brossas
Univ. Louis Pasteur of Strasburg

15.00–15.15 ISTIRAHAT

15.15–16.45 Ir. Rustamsyah (LKN–LIPI) :
Peranan Plastik dalam Industri Makanan di Indonesia
Ir. H. Tanugraha (GPKI)
Peranan Indonesia dalam karet alam dunia.
Dr. Ridwan (BATAN)
Peranan Radiasi dalam Perkembangan.
Industri Polimer.

RUANG B

15.15–16.45 Dra. S. Kami Tidja (BPBB)
Analisa dan Identifikasi Bahan Polimer.
Ir. Suparwadi (Sucofindo)
Analisa Morfologi terhadap Pengelolaan Buangan Plastik.
Ir. V. S. Praptowidodo (Dep. TK–ITB)
Analisa Sifat Termis Polimer dengan DTA dan DSC.

RUANG C

15.15–16.45 Dr. N. Kahar (LFN–LIPI)
Efek Pengerjaan Panas pada Polipropilen (Polytam)
Dra. N. Hilmy (BATAN)
The effects of Gamma Irradiation on Physical Properties of PE and PP films.
Isminingsih M.Sc, S. Teks. (ITT)
Perbaikan Bahan PP dengan cara Kopolimerisasi Radiasi.

Rabu, 3 Desember 1980

RUANG A

09.00–10.30	Dra. T.I. Pudyanto dan E. Sutisna (P3–PERTAMINA) Limbah bahan polimer/plastik. Ir. I. B. Agra (TK–UGM) Pengolahan Sampah Plastik menjadi Bahan Bakar Cair. Drs. A. Noor dan Ir. E. Johannes (Kimia–UNHAS) Masalah Air Buang Pabrik Kertas Gowa (Suatu Observasi).
10.30–10.45	ISTIRAHAT
10.45–12.15	Ir. Roekmijati (ITS) Urea–Formaldehyde sebagai Pupuk. Sunarto (PT PUSRI) Proses Pembuatan Karung Plastik Pembungkus Urea. Ir. V.S. Praptowidodo (TK–ITB) Penggunaan Resin Urea-formaldehid untuk Particle Board dari Limbah Jagung.

RUANG B

09.00–10.30	Prof. Dr. M. Barmawi (Dep. Fisika–ITB) Spektroskopi Elektron dan Pemakaiannya dalam Penelitian Polimer. Y. Samad dan Dr. N.M. Surdia (Dep. Kimia–ITB) Identifikasi PP dan PE serta campurannya dengan Cara-cara Fisik (Rapat Masa, Kelarutan, Titik leleh). Drs. B. Holil dan Dr. N.M. Surdia (Dep. Kimia–ITB) Identifikasi dan Analisa PP dan PE serta campurannya secara Spektrofotometri IR.
10.30–10.45	ISTIRAHAT
10.45–12.15	Ir. Hadijati B. Harjono (Dep. TK–ITB) Pemurnian. Identifikasi dan Karakterisasi Ataktik Polipropilen. Ir. I. Noezar D.E.S. (Dep. TK–ITB) Sintesa Poly–fluoro–(Alkyl–Methacry–late) dan Identifikasi memakai NMR dan GPC. Dr. Tjia May On (Dep. Fisika–ITB) Eksponen kritis dalam Transisi Sol-Gel.
12.15–13.15	ISTIRAHAT dan MAKAN SIANG
13.15–14.45	Ir. F. Sundardi (BATAN) Status dan Prospek Teknik Nukli dalam Bidang Polimer di Indonesia. Dr. Ir. M. Siswosuwarno (Dep. Mesin–ITB) Problematika Pembuatan Mould di Indonesia. Drs. J.G. Abednego (BP Perkebunan–Bogor) Beberapa Perkembangan di Bidang Penyusunan Kompon Karet Alam.

RUANG C

09.00–10.30	Drs. A.U. Tadjang (Kimia–UNHAS) Pengaruh Pemutihan terhadap Sifat-sifat Selulosa. Dr. Ir. Sumarno MSc (BP Perkebunan–Bogor) Masalah sifat-sifat tarikan konvensionil pada teknologi karet S. Sulianti dan Dr. N.M. Surdia (Dep. Kimia–ITB) Hubungan antara Derajat Kristalinitas dan Kekuatan Tarik dari Serat Selulosa.
10.30–10.45	ISTIRAHAT
10.45–12.15	Dr. N. Kahar (LIPI–LIPI) Sifat Dielektrika dari PP. Dr. Suparno Satira (Dep. Fisika–ITB) Mekanisme Polimerisasi Stirena secara Anionik dan Pengaruhnya terhadap Mikro–strukturnya. Marga Utama B.Sc. (BATAN) Perbaikan Sifat-sifat Fisis dan Mekanis Enam Jenis Kayu Indonesia dengan Metoda Polimerisasi Radiasi Sinar Gamma Co–60.
12.15–13.15	ISTIRAHAT dan MAKAN SIANG
13.15–14.45	Dr. The Wouw Liong (Dep. Fisika–ITB) Hubungan antara modulus kenyal dengan derajat kekristalan dan orientasi plymer semikristal. Dr. Buchari (Dep. Kimia–ITB) Dr. Ir. Sumarno K. MSc. (BP Perkebunan–Bogor) Masalah penentuan plastisitas dan viskositas karet dengan Wallce–plastimeter
14.45–15.00	ISTIRAHAT
15.00–15.30	ACARA PENUTUPAN Laporan Ketua Panitia Penyelenggara Laporan Ketua Panitia Pengarah: Penutupan.

Annex F

Panitia "POLIMER INDONESIA" mengharapkan dengan hormat :

. . . . . .

untuk menghadiri :

WORKSHOP dan DISPLAY

Polimer Indonesia '80

Yang diselenggarakan pada :

Hari/Tanggal : *Kamis & Jum'at*
4 dan 5 Desember 1980

J a m : *08.30 – 16.00 WIB.*

Tempat : *Ruang Agung, Lantai 7*
Hotel WISATA INTERNATIONAL
(sebelah Hotel Indonesia)
Jl. M.H. Thamrin
Jakarta

– RSVP : Panitia "Polimer Indonesia '80"
d/a PPTMGB "LEMIGAS"
Tel. : 775994
713408 pes. 110 dan 118

– Pakaian : Bebas Rapi

ACARA WORKSHOP

Polimer Indonesia '80

Kamis, 4 Desember 1980

08.00 – 08.30	:	Registrasi
08.30 – 10.15	:	"Industrial Application of Plastic" oleh Mr. D. Clarke
10.15 – 10.30	:	Istirahat
10.30 – 12.15	:	"Plastics Composites" oleh Mr. G. Patfoort
12.15 – 13.15	:	Makan Si
13.15 – 15.00	:	"Recycling of plastics waste" oleh Mr. M. Bucquoye
15.00 – 15.15	:	Istirahat
15.15 – 17.00	:	"Polypropylene Fibre Processing" oleh Mr. D. Evans

Jum'at, 5 Desember 1980

08.00 – 09.15	:	"Synthetic Fibres" oleh Mr. H. Herlinger
09.15 – 09.30	:	Istirahat
09.30 – 11.45	:	"Mould Design and Mould Making" oleh Mr. J. Nightingale
11.45 – 13.30	:	Makan Siang
13.30 – 14.00	:	Resume
14.00 – 14.30	:	Penutup.