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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

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THE PRESENT STATUS AND FUTURE PLANS OF DEVELOPMENT OF THE PLASTICS INDUSTRY IN THAILAND AND TECHNICAL ASSISTANCE REQUIRED 1/

by

Tamchai Kambhato
Managing Director
Thai Polyplastics Industry Ltd.
Bangkok, Thailand

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CONTENTS

I. INTRODUCTION

Plastics application in Thailand has been increasing rapidly. It plays an important role in the national and economic development of the country. In early stage plastic products were imported and the growth rate of such import was very high. In 1959 the imports of plastic materials were 3,603 metric tons while in 1971 these imports amounted to 102,091 metric tons, an average annual growth of 31.8 % during the past 12 years. The total value of imports of plastics in 1971 was some US$33,500,000 compared to the total imports of about US$1,339,700,00.

Along with ever increasing popularity of plastics application, local production of plastic products continued to increase. At present there are more than 400 processing and fabricating factories providing employment for several thousand people. There are also local factories manufacturing raw materials from imported monomer.

Even though Thailand may be considered infant in this field, she is expecting to have her own petrochemical complex operating in 1978. The impact of such petrochemical complex will certainly expedite the development of plastics application here. However, Thailand will have to strengthen her processing and fabricating industries so that they would be able to absorb the output from the complex. Obstacles must be encountered but in the future there lies an unlimited opportunity which will contribute greatly to economic development of the country.

II. PRESENT STATUS

Consumption of plastics in Thailand increased rapidly during the past 12 years as can be seen in the imports figure in Table I. The average annual growth rate was as high as 35 % during the first half of the sixties, and the average rate during the total period was 31.8 %.

Plastic materials mainly used included Thermoplastic material such as Low density polyethylene, High density polyethylene, Polypropylene, Polystyrene, Polyvinyl chloride, Polyvinyl acetate, Polymethyl methacrylate, Polyvinyl alcohol, and Thermosetting material such as - Phenal and urea formaldehyde glue and moulding powder, Melamine decorated sheet, Alkyd resin for paint, Unsaturated polyester, Silicone, Polyurethane and Epoxy. Estimate consumption of these plastics are shown in Table II. and Table III.

Applications of these plastic materials are as follow:

LDPE

Main application of LDPE is plastic bag, 90 % of LDPE consumed in 1971 went to plastic bag production. Other uses are for injection moulding, cable insulation and sacks for fertilizer.

HDPE

Current applications of this material are rope production, injection moulding and blow moulding.

PP

PP is used in injection moulding for about half of total consumption. Other applications are for film and tape. In the future when the problem concerning competition with local production of jute gunny bag could be cleared the production of PP woven sacks would be an important application of this material.

PS

Most of the consumption is of general purpose grade and for injection moulding. Some high impact sheets are used in lining for refrigerator while expandable polystyrene is used for insulation.

PVC

Application of PVC in Thailand is very wide. Locally produced PVC resin and compounds are used in manufacturing artificial leather, rigid pipe, floor tile, cable insulation, flexible hose, injection moulding, film, sheet, and blow moulding.

PV acetate

Application of polyvinyl acetate is mainly for paint and adhesive and it is produced locally. Some PVC/PVA copolymer are imported for floor tile manufacture and some ethylene/PVA copolymer are imported for injection moulded footware.

PMMA

PMMA is used mostly in making sign board and lighting cover. Local manufacturers are trying to apply this plastic sheet for construction material. Manufacturing of automobile accessories by injection moulding will be feasible in the future when the policy on import of automobile parts for assembling plants would turn for local production.

PV alcohol

The consumption of this material is minimal and to be used mainly as adhesive.

Thermosetting materials

Applications of thermosetting materials are specific and selfexplained. Main consumption is glue for plywood and chipboard industry.

There are more than 400 processing and fabricating factories. Most of them are concentrated in or around Bangkok Metropolis. There are seven types of processing machines or fabricators presently used in Thailand:

Injection moulding machines for shoes, toy, novelties and containers.
Extruders for plastic rope and cord, rigid pipe, flexible hose, tape, insulated wire and cable.
Compression moulding machines for electrical fittings and other miscellaneous compression moulding products.
Inflation machines for plastic bag and film.
Blow moulding machines for making plastic containers.
Calandering Machines for artificial leather and film.
Casting equipments for expandable polystyrene products and polyurethane foam.

Most of these machineries are old or obsolete and most of these factories are of small scale employing 10 people or less. However, there are about 10 % of total factories which are of significant size and use modern machineries and technology.

Local manufacturing of raw material includes a PVC resin and compound factory, using imported VCM. The capacity is 12,000 metric tons per annum and will be increased to 20,000 metric tons per annum this year. There are two factories manufacturing polyvinyl acetate with the total capacity of 5,000 metric tons per annum. Polymethyl methacrylate cast sheets are also manufactured locally by a major manufacturer with capacity of 2,400 metric tons per annum and other 4 small factories whose capacity renging from about 120 to 600 metric tons per annum. These factories use imported methyl methacrylate monomer as raw material.

III. FUTURE GROWTH AND DEVELOPMENT

The growth rate of consumption of plastic material which was very high in the past years is expected to be lower in the coming

years. However, it is estimated that [illegible] rate will continue for the next decade. [illegible] tion of plastic materials in 1976 and 1981 are shown in Table I.

The center of the market for plastics in Thailand will continue to be in the area close to Bangkok Metropolis where the population is only 6 millions compared to the total population of the country about 36.7 millions. The economic growth in metropolitan area will expand, providing a substantial and sophisticated market for the plastics. Moreover, it has been the policy of the government of Thailand to promote the decentralization. It is therefore believed that living standard in rural area will be improved, openning a much bigger market for more consumption of plastics.

Modern application of plastics will certainly accompany the increasing sophisticate way of living. Plastic pipe for gas distribution, water supply as well as drainage system will be in more demand than before. Applications for agriculture such as plastic pipe for irrigation, plastic film for crop protection will create enormous demand for plastics. Rural electrification will also expand the consumption of plastics for wire and cable insulation. The forecast figures of 210,700 metric tons in 1976 and 417,900 metric tons in 1981 should not be unreasonable figures and should be achieved as a part of market development in the coming Petrochemical Complex.

The Petrochemical Complex

After a long and tiresome negotiation of some 4 years, the Petrochemical Complex was eventually finalised in May 1973. The Petrochemical Complex consists of the ' Upstream ' which will engage in producing intermediates such as ethylene and propylene; and the ' Downstream ' who will process these intermediates into various products.

The capacity of the upstream will be about 200,000 metric tons per annum of ethylene and propylene. The downstream will undertake to manufacture 70,000 metric tons per annum of LDPE, 300,000 metric tons per annum of HDPE, 30,000 metric tons per annum of PP, 40,000 metric tons per annum of VCM and PVC, and 20,000 metric tons per annum of Alkyl benzene. The complex will be located at Sri Racha, about 120 kilometers from Bangkok Metropolis. The operation is expected to be in 1978.

The impact of the Petrochemical Complex on plastics industry will be very great. First of all with the capacity fixed for both upstream and downstream, effective market development is inevitable in order to achieve market consumption suitable to the planned production capacity. The installation of good customer service as well as quality control and encouragement of installation of sophisticated and high efficiency processing machines will be carried out. In this connection, the processing industry in Thailand may be change from labour intensive to capital intensive industry. Some problems including technology, finance, quality control, efficiency and general management may occur. Some smaller operators may have to give way to the larger ones. These problems are yet to be solved but they would only be stepping stones to success in the coming future.

IV. CONCLUSIONS

The plastics application in Thailand has been rapidly expanded in the past years and it is expected that it will keep expanding but at lower rate. The Petrochemical Complex, expected to be in operation in 1973, will contribute greatly to the development of plastics industry of the country.

However, along with this development, there are a lot of

problems to be solved for [illegible] processing and fabrication of [illegible] technical assistance. [illegible] in general them as follow but problems will [illegible] each individual case:

Training of personnel
Transfer of processing technology
Quality control technology and standardization
Product design
Procurement of machinery and equipment
Supply of technical information
General management guidance

A simple way may be done by personnel exchanging program which experts could visit and study individual problem. However, the cost of consultation must be as low as possible, if not without charge, so that even small operators would be able to apply for such assistance.

Plastics industry in Thailand will undoubtedly be expanding steadily. It will contribute greatly to the economic development of the country. It will create considerable employment. It will provide the convinience of modern living. Plastic is versatile. It is flexible and its application is unlimited - as far as imagination.

V. SUMMARY

Plastics imported into Thailand increased rapidly as much as 31.8% during 1959 and 1971. The total imports in 1971 was 102,091 metric tons at the value of US$33,300,000.

Main plastic materials used are thermoplastic materials such as High density polyethylene, Low density polyethylene, Polypropylene and Polyvinyl chloride, and thermosetting materials such as Phenal and urea formaldehyde glue and moulding powder. Total consumption of thermoplastic and thermosetting materials in 1971 was estimated at 83,500 and 12,600 metric tons respectively.

There are more than 400 processing and fabricating factories. Most of these factories are of small scale using old or obsolete equipments. About 10% are of significant size with modern equipment and technology. There are local production of PVC resin, polyvinyl acetate and polymethyl methacrylate, using imported monomer as raw material.

Growth rate of plastic consumption in the future is expected to be lower than in the past years. However, at least 15% average annual growth rate will continue. It is forecasted that the total consumption of plastics in 1976 and 1981 will be 210,700 and 417,600 metric tons respectively.

The consumption of plastic products is expected to be concentrated around Bangkok metropolitan area but decentralization would also provide bigger opportunity in rural market.

The Petrochemical Complex, commencing operation in 1978, will contribute greatly to the development of plastics industry. Ethylene and propylene of about 200,000 metric tons per annum will be produced

for manufacturing [illegible], [illegible] of the capacity c. 7[illegible], [illegible], 3[illegible] tons per annum, respectively.

[illegible] capacity, certain problems will be [illegible] on the part of processing and fabrication where [illegible] may be changed from labour incentive to capital intensive. In this connection appropriate technical assistance such as [illegible], quality control, standardization, transfer of processing technology etc. would become necessary to set up a strong support for the future and larger scale development of plastics industry in Thailand.

Table I Import statistic of plastic materials in metric ton

Year	Raw Materials & semifinished products	Finished articles	Total
1959	3,291	312	3,603
1960	5,521	487	6,008
1961	6,523	626	7,149
1962	10,464	365	10,829
1963	13,644	609	14,253
1964	19,327	623	19,950
1965	24,403	711	25,114
1966	37,408	1,197	38,605
1967	47,163	1,313	48,476
1968	57,756	1,584	59,340
1969	86,264	2,440	88,704
1970	78,480	5,126	83,606
1971	97,502	4,589	102,091

Table II Estimate consumption of Thermoplastic materials in 1971

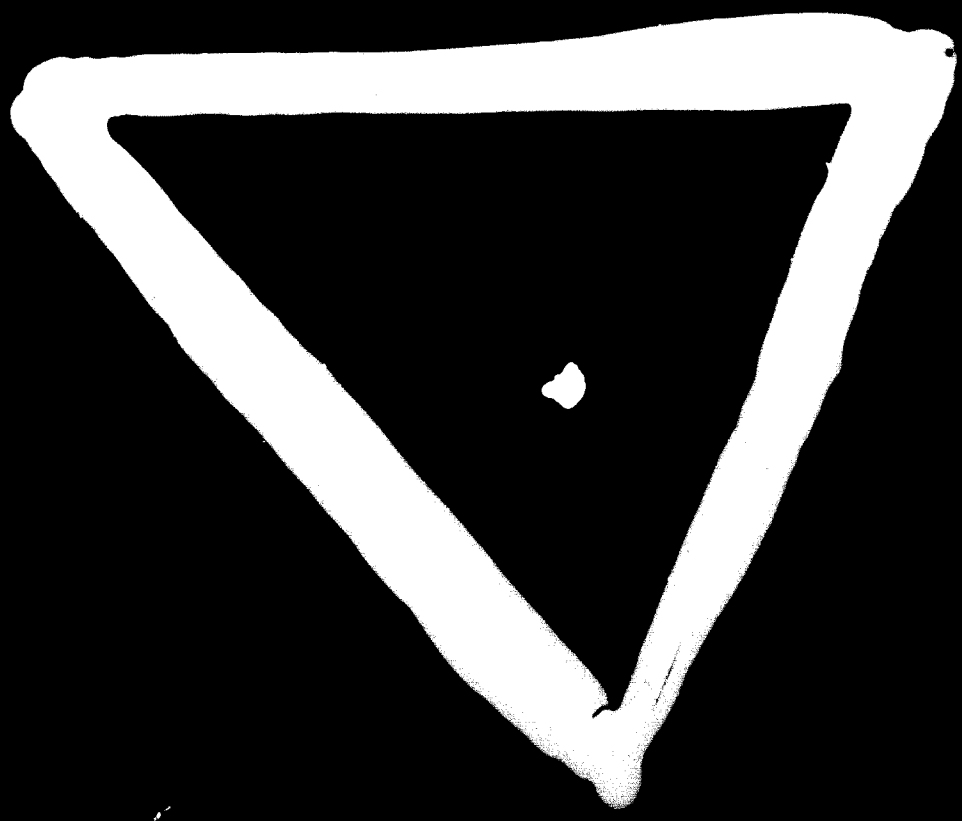
Material	Metric tons
LDPE	31,000
HDPE	15,000
PP	7,500
PS (All grades)	6,500
PVC (100% resin basis)	15,500
PV Acetate (100% resin basis)	2,200
PV Alcohol	700
PMMA	1,000
Miscellaneous	3,600
Total	83,500

Table III Estimate consumption of Thermosetting materials in 1971

End use	Metric tons
P.F. and U.F. glue	4,500
P.F. and U.F. moulding powder	3,500
Melamine decorated sheets	600
Alkyd resin for paints	2,500
Miscellaneous	1,500
Total	12,600

Table IV Forecast of Plastics consumption in 1976 & 1981

Material	1976		1981	
	Metric tons	Annual growth as since 1971	Metric tons	Annual growth as since 1976
LDPE	57,900	14%	111,600	14%
HDPE	32,600	16%	68,400	16%
PP	22,900	25%	46,000	15%
PS (all grades)	13,400	15%	26,900	15%
PVC (100% resin basis)	38,600	20%	77,600	15%
PV acetate (100% resin basis)	4,400	15%	8,800	15%
PMMA	2,000	15%	4,000	15%
Miscellaneous Thermoplastics	7,300	15%	14,700	15%
P.F. and U.F. resin and glue	19,600	18%	39,600	15%
Miscellaneous Thermosets	8,000	15%	16,000	15%
Finished articles	4,000	-	4,000	-
Total	210,700	15.2%	417,600	14.9%



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