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# THE DEVELOPMENT OF THE PLASTICS INDUSTRY IN THE PHILIPPINES 1/

by

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## C O N T E N T S

## INTRODUCTION

Plastic materials are a product of modern chemical industry. It started when John Wesley Hyatts, inventor of celluloid, produced plastics by applying heat and pressure into a mixture of cellulose nitrate and camphor into a mold. As early as 1869, patents were granted for combs and bottoms. In 1910, as a result of several researche, production in plastic reached commercial production.

The number of products being made from plastic are increasing day by day and are becoming indispensable in our daily life. Manufacture of plastics are a rapidly growing industry which demands a wealth of new technical informations.

The Plastics Industry in the Philippines has contributed to the national economy and has developed the industrial technology.

## HISTORICAL BACKGROUND OF THE PHILIPPINE PLASTICS INDUSTRY

### A. Past Trend

After the World War II, 7 firms were listed as engaged in Plastics Industry as moulders, fabricators and laminators. In 1947 a small firm was established as a pioneer in moulding reinforced plastic tiles and furnitures, using hydraulic presses and molds made in their own shop.

In the early 50's there were about 25 manufacturing enterprises, using improved processing techniques. The industry did not flourish very much, because of the lack of proper standardization. Importation of plastic articles of very inferior quality immediately after the war created a low appreciation of plastics. As a result, the local plastics makers met a stiff consumers resistance.

Regrettable observation in the industry was the tendency of the enterprises towards duplication of products. Other problems.

1. lack of raw material supply
2. difficulty of the manufacturers to obtain financial aids
3. lack of trained men for the various segments in the industry.
4. lack of machineries and precision tools

In the following decade (60's), the industry survived great difficulties. Closer supervision for quality resulted to an increasing acceptance of plastics by the public. It rose to high developments when the manufacturers acquired better plastics processing

equipment. Aside from producing improved injection and compression moulded consumer items, it went into producing packaging products such as bottles, jars, plastic films and bags. The jute bag industry suffered much by 90% loss when the polypropylene woven bags were marketed and were accepted as a good package for agricultural products. During this period, the country had its first Synthetic Resin Plant to produce polyvinyl chloride (PVC) resins.

The Filipino-first policy of the government which encouraged the use of local products before buying imported items, resulted to the increase of plastic processing factories, with 81 registered enterprises. Although investments were over crowding in some types of products, all enterprises were reporting brisk business and heavy demand of their products.

Other development that contributed to the progress of the industry was the availability of cheaper sources of raw materials and processing equipment from Japan and Taiwan, which was before dependent upon America and Europe. Some technical know-how were provided by the suppliers of the equipment and raw materials. The manufacturers had a wider choice of material which suited the requirement of new markets.

Local demand of raw materials were met through imports from European countries, U.S.A., Japan and Taiwan, with Japan supplying almost 50%. During the years 1972 and 1973, shortage of plastic raw materials and the oil crisis threatened the competative position of the Philippine export products, using these materials, in the

world market. The situation was also due to the stoppages of operation of some plastics plants and explosion of Chisso Plastic in Japan.

B. Present Situation

Another favorable development in the industry was the incentives given by the Board of Investment (BOI) to encourage the establishment of a petrochemical complex which will favorably affect the country's economy which respect to the following:

1. Generation of foreign exchange savings and earning, exports revenues.
2. Sufficient supply of raw materials.
3. Creation of employment for thousands of Filipinos.

At present, although still lacking in technology, many enterprises have rushed into the business motivated by the idea that plastics has a wide scope of application. The industry consist the following categories.

1. Plastic Materials Manufacturer who produces the basic plastic resins or compound for raw materials.
2. Processor who transforms the plastic resins or compound into a finished solid shaped articles.
3. Fabricator and Finisher who further fashions and decorates the solid plastic.
4. Laminator who uses liquid resins, glue, plastic sheet, wood or paper to make panels by pressing them together with heat and pressure.

The increased demands for plastic products encouraged the establishment of new processing factories. The present Plastics Industry in the Philippines is about a $ 45 million investment. There are about 260 enterprises with an estimated manpower of about 10,000; 45 % are semi-skilled workers and 25 % are skilled workers.

Some old and absolete processing equipment are still used in small scale industries. Modern equipment were imported from Europe, U.S.A., and Japan. Some injection molding machines presently in operation has a capacity of 110 ounces.

Most of the plastic raw materials are imported while some are locally produced. The current distribution of consumptions are in the application of packaging, building products, household articles, clothing and footwear and other miscellaneous usages.

## THE PLASTICS INDUSTRY IN GENERAL

This consist of the plastic processing industry and the synthetic resin industry.

### A. Processors, Fabricators and Laminators

INJECTION MOULDING - Plastic crate for beverages and foods. Cabinets, casing for appliances, containers for foods, household articles, buskets, furniture parts, screw caps, some automotive accessories, toys and other novelties. Major raw materials used by the processors are low density polyethylene, high density polyethylene, polystyrene and polypropylene. Plasticised PVC are use for foot wears.

COMPRESSION MOULDING - Melamine diner weres and other household articles are of wide variety of designs and colors. Phenolic and urea screw caps are greatly in demand.

VACUUM AND PRESSURE FORMING - Polystyrene is the principal material for refrigerator liner and food containers. Acrylic sheets for lighting fixtures, signs and displays.

EXTRUSION - Polyethylene and polypropylene are extruded into film for container liners, and packaging for clothing, food and agricultural product, fertilizer and other domestic uses. Low density P.E. for collapsible tubes. PVC pipes for drainage and electrical conduits. P.E. insulation for electrical cable. PVC flexible hose, plastic rope, plastic sheet are other cases of extrusion.

CALENDERING - For artificial leather and PVC fabric for upholstery, clothing and bags.

LAMINATING - For panels and table tops.

CASTING - For expandable polystyrene products and polyurethane foam for insulation, and polyurethane in surface coating.

MISCELLANEOUS - Polyesther foam for mattress. Formaldehyde-base polymers for adhesives, binders and laminates. Plastic frame for eye glasses are cut from cellulose sheets.

B. Manufacturer of Synthetic Resins

Some of the raw materials needed in the industry are supplied locally by the following:

1. Mabuhay Vinyl Corporation - increased its capacity to 26,000 MT per year plus 1,800 MT per year of copolymer to supply the increasing demand of PVC.
2. Philippine Vinyl Consortium Inc. - rated capacity of 10,000 MT per year.
3. Philippine Petrochemical Products Inc. - produces polystyrene of general purpose, high impact and expandable grades. Rated capacity is 7,700 MT per year.
4. Resinn Inc. - manufacturer of plastic adhesives.

5. Polyester Philippine Inc. - with a capacity of 6,000 MT per year of polystyrene of various grades will be in operating soon.

The Mabuhay Vinyl Corporation, a pioneer in the production of PVC, has a steady growth of production from 6,648 MT to 9,849 MT in 5 years. See Table I

Table I - PRODUCTION OF PVC FOR LOCAL CONSUMPTION

| YEAR | VOLUME (MT) | VALUE, FOB |
|---|---|---|
| 1968 | 6,648 | $ 2,192.00 |
| 1969 | 7,772 | $ 2,783.00 |
| 1970 | 7,119 | $ 2,150.00 |
| 1971 | 9,036 | $ 2,612.00 |
| 1972 | 9,849 | $ 2,876.00 |
| TOTAL | 38,324 | $12,613.00 |

## CONSUMPTION OF PLASTIC MATERIALS

The total plastic materials consumed for the period of 5 years ( 1968 to 1972 ) was 353,131 MT worth $ 118,850.00 FOB. The consumption increased yearly as shown on Table II. During the year 1971 and 1972, the demand was more than 50 % of the total consumption for 5 years. Consumption has a geometric growth of 14.6 %. Among the types of plastic materials consumed, low density polyethylene is widely used, followed by polypropylene and PVC. Consumed during the year 1973, which is not included in the table, was estimated at 8 % more than the consumption during 1972.

Table II - CONSUMPTION OF PLASTIC MATERIALS FOR THE PAST FIVE YEARS

(QUANTITY: M.T. PER YEAR)

| RAW MATERIALS | 1968 | 1969 | 1970 | 1971 | 1972 | TOTALS |
|---|---|---|---|---|---|---|
| Polyethylene L.D. | 10,400 | 14,821 | 20,500 | 25,400 | 24,300 | 95,421 |
| Polypropylene | 11,960 | 13,800 | 16,710 | 25,000 | 22,000 | 89,470 |
| Polyvinyl Chloride* | 9,141 | 9,619 | 11,371 | 15,405 | 22,000 | 67,536 |
| Cellulosics | 7,100 | 7,000 | 7,505 | 6,815 | 8,600 | 37,020 |
| Polyethylene H.D. | 4,180 | 4,729 | 6,000 | 6,500 | 8,000 | 29,409 |
| Polystyrene | 3,850 | 2,890 | 3,400 | 4,880 | 5,045 | 20,065 |
| Other Thermoplastics | 300 | 910 | 1,100 | 1,800 | 2,300 | 6,410 |
| Phenolic, Urea, Melamine | 900 | 1,200 | 965 | 1,290 | 1,500 | 5,855 |
| Other Thermosets | 36 | 150 | 265 | 450 | 900 | 1,801 |
| Polyester | 4 | 30 | 30 | 40 | 50 | 144 |
| T O T A L S | 47,871 | 55,149 | 67,836 | 87,580 | 94,695 | 353,131 |
| FOB VALUE ($1,000) | $18,750 | $19,500 | $24,200 | $26,400 | $30,000 | $118,850 |
| Percent Usage | 13.6 | 15.6 | 19.4 | 24.8 | 26.6 | |

NOTE: This is based on imports and BOI study materials classified by Tariff commission not included.

(*) Local production included.

## PROBLEMS OF THE PLASTICS INDUSTRY

This developing industry is faced with some problems - technical and economic.

1. Most of the raw materials are imported. High prices paid for the materials are due to high taxes and high transportation and handling fees.
2. Importation of processing equipment and spare parts are costly.
3. Lack of plastic technicians - there are no schools, institutions or organization offering plastic technology in the field of research, testing, quality control and material processing.
4. Incomplete shop facilities for repairing and servicing equipment, and lack of competent service men.
5. Laboratory or testing center is not available for standardizing and testing materials and finished products.
6. Tendency of the industry in investing in an over crowded area is due to the lack of direction and control in the investment of new business.
7. Competition within the industry results in underpricing finished products on account of keen competition.
8. Rising cost of production and tightness of money, restraining the desire to plough in additional investment.
9. Lack of mould makers. Supply of locally fabricated moulds is not sufficient. Some moulds are to be imported at high

price and requires a big lead time.

10. Lack of technical know-how to manufacture other plastic products that can be produced locally.

## PLANS FOR FUTURE EXPANSION AND DIVERSIFICATION

Projected demand of plastic for the next 10 years is an average annual growth rate of 40%. This established the need and potentials for a large petrochemical complex in mid-seventies. Representatives of government agencies and private industries was organized to formulate plans regarding the complex. Significant effect will be lower cost of raw materials and a decrease of prices of end products which will be highly competitive with foreign goods.

The Board of Investment (BOI), aside from granting approval for the increase capacities of existing resins manufacturers, is now accepting application (Bulletin Today, June 27, 1974) for establishing a petrochemical complex to produce the following.

1. Low-density Polyethylene - 115,000 MT
2. High-density Polyethylene - 36,000 MT
3. Polypropylene - 40,000 MT

Other registered investment which will soon be in operation.

1. Filipinas Plastic Corporation - to manufacture PVC plastic sheets and films for table cloth, rain coat and other household items. Capacity will be 36,000 yards of sheets and films per day of 8-hour shift.
2. Sec-Ce Plastic Coating Co. - to be in the business of plastic coating and rubber lining steel tanks and pipe line.
3. Project to start on 1977 for processing phtalic anhydride

and vinyl chloride monomer. Phatalic Anhydride are needed by manufacturers of plastics and alkyd resins, and by polyester dye, agricultural, chemical and pharmaceutical industry, while PVC monomer is the principal raw material for PVC resins. Caustic soda is one of the by products.

4. Goodrich Company, the world's largest producer of PVC, will tie up with Philippine Vinyl Consortium Inc. to produce more PVC resins.

AREAS IN WHICH THE ASSISTANCE OF THE UNITED NATIONS INDUSTRIAL ORGANIZATION ARE NEEDED BY THE PHILIPPINE PLASTIC INDUSTRY.

1. Award individual fellowships to qualified personnel to enable them to undergo a course of practical training at a factory in an industrialized country.
2. Sponsor a Plastic Exhibition in the country to show developments in plastics and processing equipment, conduct lectures and demonstrations, and promote inter-change of views and experiences between specialists and local industrialists.
3. Provide assistance in making a market and feasibility studies for projects on new application of plastics, studies on the improvement of technical service, testing and standardisation of plastics.
4. Send experts in specialized field to conduct seminars for the development of the small scale industry, such as
   a). Production and process improvement and instrumentation techniques.
   b). Fibre-glass reinforced plastics and other reinforcing fibres for plastics composites.
   c). Mould Design and mould making.
   d). Development of Plastics and Testing Services.
5. Provide financial and technological assistance to establish the much needed "Plastic Technology Institute". The establishment can be done fast if sponsored by the government and the United Nations. The institute should consist of the following:

a. School for training plastics engineers and technicians

b. Night classes for refresher courses

c. Laboratory and workshop equiped with contemporary processing equipment for training manpower

d. Facilities for testing raw materials and finished products for their chemical and physical properties; and for research work

e. Spare parts pool

f. Information center to advise the manufacturers of new applications of plastics, new materials, latest techniques in process, new equipment, improvements and new designs of moulds and other developments.

6. Assist the industry to obtain technical informations, and licenses for new processes and products to be made locally.

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## PROJECT PROPOSALS

The following are projects which requires technical know-how, technology and financing.

1. Establishment of an Integrated Pectrochemical Complex, naphtha feed, to manufacture the following:
   a) Low density polyethelene - 115,000 MT
   b) High density polyethylene - 36,000 MT
   c) Polyprepylene - 40,000 MT
   d) Vinyl Chloride Monomer - 76,000 MT
   e) Ethylene (Naphtha cracker) - 200,000 MT
2. Production of a plastic tubing welded to a plastic dispensing cap for the Dextrose glass bottles. This set is termed as disposable Venoclysis Set by Abott Laboratories, U.S.A.. It is sterile and pyrogen-free. Sterilisation of the set.
3. Production of a disposable plastic clinical syringes and sterilisation of the set.
4. Manufacture of synthetic tubing for forming sausage in the food industry. Equipment and raw material used in the extrusion of the tubing.
5. Production of aerosols plastic containers. This is a development of the Mimisol Division of Polorex Corporation, Buffalo N.Y. using an integrated process of moulding and ultrasonic welding and decorating.
6. Production of a plastic corrugated board, similar to the

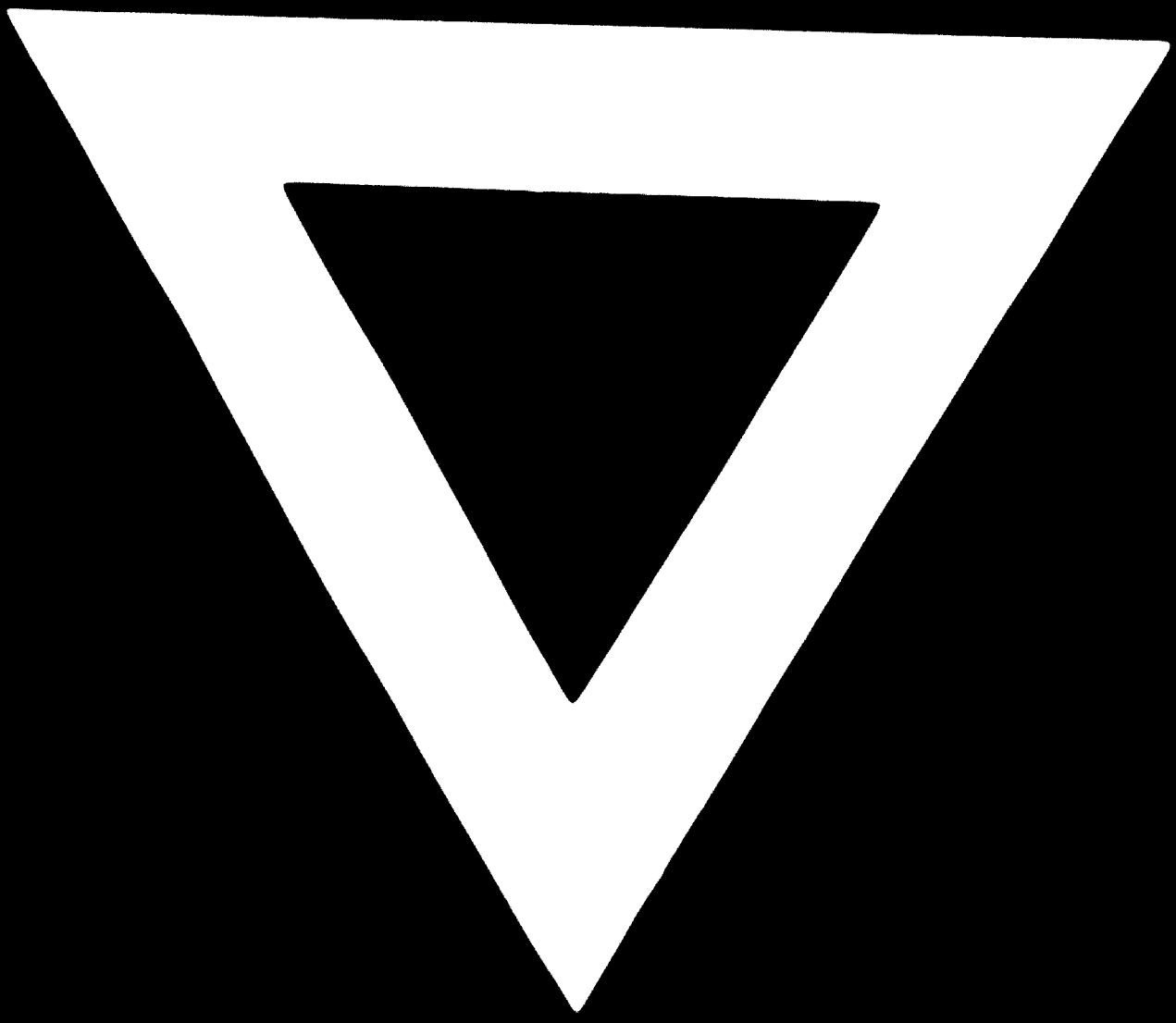
corrugated fiberboard which consist of a fluted or a wavy sheet sandwiched between 2 sheets of facing or liner. This plastic corrugated board shall be used for packaging and shipping containers.

7. Manufacture of hardened plastic spectacles lenses for eye glasses. The popular material used is the Allyl Diglycol carbonates. This has a code name of CR-39, a material made and patented by Pittsburgh Plate Glass Company. The basic material is a liquid monomer added with a catalyst for polymerization.

8. Design and fabrication of multi-cavity molds for injection and compression moulding of screw caps and complex shaped articles. The design of the mold for screw caps in injected moulding shall have an efficient cooling and an automatic ejection.

9. Making multi cavities in moulds by hobbing.

10. Guide for selection of processing equipment to produce the required products, and acquisition of each.



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