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THE PRESENT STATUS AND FUTURE PLANS
FOR DEVELOPMENT OF THE PLASTICS INDUSTRY IN THE PHILIPPINES
AND TECHNICAL ASSISTANCE REQUIRED^{1/}

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1. INTRODUCTION

1. Plastics are man-made products, chemically synthesized from coal, crude oil, natural gas, salt, air, water and certain agricultural products such as cotton and soybeans.

2. Plastics, being a creation of the chemical industry, employs many terms that are common to that science. Those that the industry encounters frequently are monomer, polymer and copolymer.

3. The basic unit in chemistry, of course, is the molecule and when thousands of molecules of a gaseous or liquid substance, say ethylene, are chemically and physically modified - by heat, pressure and catalysts - they can be joined end to end to produce a solid in the form of a long-chain (giant) molecule or polymer. The smallest repeating structural unit of this giant molecule is called a "mer", thus one mer is a monomer. In the case of the polymerized ethylene molecules, the monomer in long-chain form is called polyethylene.

4. When monomers of different molecules, say ethylene and propylene, are chemically joined - polymerized - the resulting compound is a copolymer. If they are simply mixed in polymer form, the result is called a blend.

5. Plastics are divided into two divisions. The class employed for most applications is thermoplastic - polyethylene, polystyrene, vinyl. These can be softened again and again by heat. The thermosets - phenolic, urea and melamine - once molded into a cap, lid or package cannot be heat softened for further processing or for scrap recovery. ✓

HISTORICAL BACKGROUND OF THE PHILIPPINE PLASTIC INDUSTRY

6. The plastic industry in the Philippines began after the Second World War with the establishment of a small firm for the production of plastic tiles in 1947.

I
II
7. During the 1950's it did not flourish although about 25 other companies were formed when some improved processing techniques were used in commercial production. Injection and compression moulded housewares were introduced in the market such as toys, tumblers, plates, cup and saucers, bottle caps, likewise, insulation items, pipe and fittings, sheets and other moulded products were also produced.

8. The following decade (60's) the plastics in the Philippines achieved full stature and maturity as an industry with the availability of better injection, extrusion and blow moulding equipment. The industry went into the packaging market so that bottles, jars, bags, wrappers and box containers were made from plastic resins. Then the polypropylene bags penetrated the jute bag market and slashed it by 90%. During this period, the Mabuhay Vinyl Corporation established the country's first synthetic resin plant with its manufacture of polyvinyl chloride (PVC).

9. This period (60's), saw the mushrooming of plastic companies with the establishment of eighty one (81) firms with known registration date. Product lines of these companies vary like the housewares, containers, tubes and pipes, bottles, plastic caps, toothbrushes, combs, hairbrushes, school bags, plastic screens, ropes and optical products.

10. Other developments that contributed to the progress of the plastic industry was the availability of cheaper source of raw materials coming from Japan, which before was dependent upon America and Europe. The family of plastics then available to processors continued to grow each year. Increasingly, the plas-

tic industry had a wider choice of plastic materials which suited the production requirement of the new market.

11. Another favorable development was the incentive given by the Board of Investment (BOI) to encourage the establishment of a petrochemical complex, which will favorably affect our country's economy with respect to the following:

1. Generation of foreign exchange savings and earnings;
2. Reduction of the cost of raw materials; and
3. Creation of employment for hundreds of Filipinos.

12. The production in the plastic industry at present consist of three major categories as follows:

1. The plastic materials manufacturer who produces the basic plastic resin or compound from chemicals;
2. The processor who changes the plastic resin or compound into solid shapes; and
3. The fabricator and finisher who further fashions and decorates the solid plastics.

13. Today, plastics in the Philippines is a \$ 44 million investment. In the field of processing alone, it is estimated that more than two hundred and fifty (250) firms are in operation, with an estimated manpower of about 10,000. This manpower is composed of semi-skilled and skilled workers accounting for 45% and 25% respectively of the total personnel.

14. The following are the names of the manufacturers of plastic
Vinyl Chloride, and the amount of production of PVC that have been
announced, namely:

1. Acacia, Inc. - manufacturer of plastic
fibres;
2. Philippine Vinyl Consortium, Inc. - will
produce PVC end-year at a capacity of
20,000 MT per year;
3. Philippine Petrochemical Products, Inc. -
by mid-year will be producing Polystyrene
of general purpose, high impact and expan-
sible grades. Rated capacity - 7,700 per
year;
4. Filipinas Synthetic Fiber Corporation -
with existing capacity of 4,700 MT per
year. The expansion of 4,500 MT per year
is expected to start next year.

15. The aggregate capacity of Mabuhay Vinyl Corporation and
Philippine Vinyl Consortium, Inc, will be 46,000 MT of PVC
plus 1,800 MT of the copolymer.

PROBLEMS OF THE PLASTICS INDUSTRY

16. Like any growing industry, the plastics industry has her share of problems - technical and economic.

1. Lack of technical education - there are no schools, institutes or organizations offering plastic technology covering technical assistance, testing, research and training;
2. No local manufacturer of plant equipment - all the machineries and spare parts are imported;
3. Incomplete shop facilities - unavailable competent services and repair shops for the expensive processing equipment;
4. Necessity of a testing center - for standardization and control of plastic materials and products;
5. Lack of direction of investment - the tendency of the industry is investing in areas that are over-crowded, apparently due to lack of proper direction and control in the investment of new areas;
6. Competition within the industry - the underpricing of their finished products on account of keen competition;
7. Raw materials imported - almost all essential raw materials are obtained at higher prices since they are imported;

8. Untapped export market - lack of developing the wide export market, as evidenced by our successful export of toothbrushes;
9. Credit facilities - the industry is not yet among those with highest priority ratings;
10. Lack of mould makers - the supply of locally made moulds are nil, therefore the moulds are imported at premium cost and requiring big lead time.

REPORT OF THE COMMISSIONER

17. The actual importation of raw materials consisting of the major synthetic resins during the five (5) year period 1968 to 1972 are shown in Table I.

TABLE I

TOTAL IMPORTS OF PLASTIC MATERIALS FOR THE
PAST FIVE YEARS - QUANTITY & VALUE

<u>Y E A R</u>	<u>QUANTITY (M.T.)</u>	<u>VALUE (US\$ FOB)</u>
1 9 6 8	40,906	\$ 16,067,785.00
1 9 6 9	54,143	\$ 19,179,512.00
1 9 7 0	62,942	\$ 23,333,590.00
1 9 7 1	81,372	\$ 25,800,000.00
1 9 7 2	90,210	\$ 28,792,402.00
T O T A L	<u>329,573</u>	<u>\$113,173,289.00</u>

14. Manufacture of Polyvinyl Chloride Material -

The plant has been operating since the establishment has been successfully manufacturing the basic plastic material Polyvinyl Chloride (PVC) as shown in Table II indicating the annual volume and value of production for the last five years:

VOLUME AND VALUE OF PRODUCTION OF PVC
FOR LOCAL CONSUMPTION

TABLE II

<u>Y E A R</u>	<u>VOLUME (M.T.)</u>	<u>VALUE (US\$ FOB)</u>
1 9 6 8	6,648	\$ 2,192.00
1 9 6 9	7,772	\$ 2,783.00
1 9 7 0	7,119	\$ 2,150.00
1 9 7 1	9,036	\$ 2,612.00
1 9 7 2	9,849	\$ 2,876.00
T O T A L	<u>38,324</u>	<u>\$12,613.00</u>

19. It should be noted that the volume of local production of PVC has steadily grown from 6,648 MT in 1968 to 9,849 MT in 1972. In August, 1972, the plant increased its capacity to 26,000 MT per year for PVC plus 1,800 MT per year for copolymer.

20. Processors of Plastic

The estimated 250 plastic processors produced a total of 353,131 MT of plastic products worth \$118,350,000 F.O.B. for the five-year period (1968 - 1972). During the period, there is a continuous increasing trend in the yearly production, as could be seen in the following table:

TABLE III

CONSUMPTION OF PLASTIC MATERIAL FOR THE PAST FIVE YEARS

<u>Y E A R</u>	<u>VOLUME (M.T.)</u>	<u>%</u>	<u>VALUE F.O.B. US\$ 1,000</u>	<u>%</u>
1 9 6 8	47,871	13.6	\$ 18,750	15.8
1 9 6 9	55,149	15.6	19,500	16.4
1 9 7 0	67,836	19.4	24,200	20.4
1 9 7 1	87,580	24.8	26,400	22.2
1 9 7 2	<u>94,695</u>	<u>26.6</u>	<u>30,000</u>	<u>25.2</u>
T O T A L	<u>352,131</u>	<u>100.0</u>	<u>\$ 118,850</u>	<u>100.0</u>

21. The last two (2) years, 1971 and 1972, accounted for 52% of the production volume (more than one-half) for the five-year period which is equivalent to 47.5% of the total value for the same period.

22. During the period, there is a geometric growth rate of 14.6% quantity of raw material and 9.8% in value.

23. According to the types of major synthetic resins used, polystyrene (low density), polypropylene, polyvinyl chloride, celluloses, high density polyethylene and polystyrene occupied first, second, third, fourth and fifth positions respectively during the period as shown on Table IV.

TABLE IV

CONSUMPTION OF PLASTIC MATERIALS FOR THE PAST FIVE YEARS
(QUANTITY: M.T. PER YEAR)

	1968	1969	1970	1971	1972
TOTALS	95,421	104,000	148,210	25,400	24,300
Polyethylene L.D.	89,470	11,960	16,710	25,000	22,000
Polypropylene	67,536	9,121	11,371	15,405	22,000
Polyvinyl Chloride P. V. C.	37,020	7,100	7,505	6,815	8,600
Cellulosics	29,409	4,180	6,000	6,500	8,000
Polyethylene H. D.	20,065	3,850	3,400	4,830	5,045
Other Thermo- Plastics	6,410	300	1,100	1,800	2,300
Phenolic, Urea, Melamine	5,855	900	965	1,290	1,500
Other Thermosets	1,801	36	265	450	900
Polyester	144	4	20	40	50
	353,131	47,871	67,836	87,580	94,695

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

(*) Local production included.

ESTIMATED CONSUMPTION OF RAW MATERIALS FOR 1973

24. It is estimated that the consumption of the major synthetic resins in 1973 will continue the trend as the previous five years.

25. As expected, the combined volume of low density polyethylene, polypropylene and polyvinyl chloride will amount to 72.7% of the volume and 64.9% of the value of raw materials to be used in 1973.

TABLE V

ESTIMATED CONSUMPTION FOR 1973

<u>Raw Material</u>	<u>Quantity (M.T.)</u>	<u>Value, FOB (\$1,000)</u>
Polyethylene L. D.	26,600	\$ 6,543
Polypropylene	24,400	\$ 10,126
Polyvinyl Chloride P.V.C.	24,200	\$ 6,890
Cellulosics	9,500	\$ 7,410
Polyethylene H. D.	8,800	\$ 2,130
Polystyrene	5,000	\$ 1,250
Other Thermoplastic	2,000	\$ 800
Phenolic, Urea & Melamine	1,650	\$ 598
Other Thermosets	950	\$ 400
Acrylics	150	\$ 106
Polyesters	70	\$ 38
	<u>203,520</u>	<u>\$ 56,291</u>

26. As shown in Table V, both volume-wise and value wise, low density polyethylene again tops the other raw materials, followed by polypropylene, polyvinyl chloride, celluloses and high density polyethylene in second, third, fourth and fifth positions respectively.

PROJECTIONS OF FUTURE GROWTH - 1975 and 1980

27. Polypropylene, polyethylene, PVC and polystyrene are some of the major synthetic resins showing appreciable demand in the past and are expected to have similar demand in the immediate future. The polypropylene demand was estimated from the foreseen demand of the rope and bag industries and extrusion and moulding processes. The polyethylene demand was calculated to increase geometrically by 20% a year until 1975 and follow a linear growth trend from 1976. This is also assumed to be applicable for PVC. The projected demand in volume is shown in the Table below:

TABLE VI
DEMAND PROJECTION OF PLASTIC MATERIALS
1975 - 1980

	<u>PROJECTED DEMAND</u>	
	<u>(M. T.)</u> <u>1975</u>	<u>(M. T.)</u> <u>1980</u>
Polyethylene L. D.	42,000	84,000
Polypropylene	32,040	50,670
Polyvinyl Chloride P.V.C.	45,560	100,000
Cellulosics	11,000	15,000
Polyethylene H. D.	15,850	27,700
Polystyrene	16,900	32,000
Other Thermoplastic	3,500	4,500
Phenolic, Urea & Melamine	1,800	2,500
Other Thermosets	1,500	3,000
Acrylics	200	300
Polyesters	100	200
T O T A L	164,964	300,470

PLANS FOR FUTURE EXPANSION AND DIVERSIFICATION

26. As mentioned earlier in the "Historical Background of the Philippine Plastic Industry" aside from the Mabunay Vinyl Corporation that was granted last year by the Board of Investment (BOI) approval to increase its capacity to 26,000 MT per year for PVC and 1,800 MT per year for copolymer the following firms have the benefits of BOI registration:

1. Philippine Petrochemical Products - will be in operation by mid-year producing polystyrene of general purpose, high impact and expandable grades. Rated capacity is 10,000 MT per year;
2. Philippine Vinyl Consortium, Inc. - will produce PVC end of the year. Rated capacity is 10,000 MT per year;
3. Polyester Philippines, Inc. - with a capacity of 6,000 MT per year of polystyrene various grades. Will be in operation end 1974;
4. The Petrochemical Complex - to start in the very near future for the production of polyethylene (high and low density), polypropylene and vinyl chloride monomer (for PVC).

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UNITED NATIONS ASSISTANCE TO THE PLASTIC INDUSTRY

29. One of the major problems existing in the plastic industry of the Philippines is the lack of plastic technology.

30. As previously mentioned in the Historical Background of the Philippine Plastic Industry, most of the major problems existing in the industry could possibly be improved by the assistance of the United Nations as follows:

1. Lack of technical education - there are no schools, institutions or organizations offering plastic technology;

The United Nations could assist the industry by sending experts in the field of plastic technology and conduct teach-ins or seminars. The dire need of know-how in testing materials, research, education and training is a capital requirement for the success of the industry.

2. Incomplete shop facilities - unavailable competent services and repair shops.

The improvement in these areas could be attained if the assistance of the United Nations is made available thru proper training either by sending experts to the Philippines or awarding fellowships to local qualified men.

3. Necessity of a testing center - for standardization and control of plastic materials and products

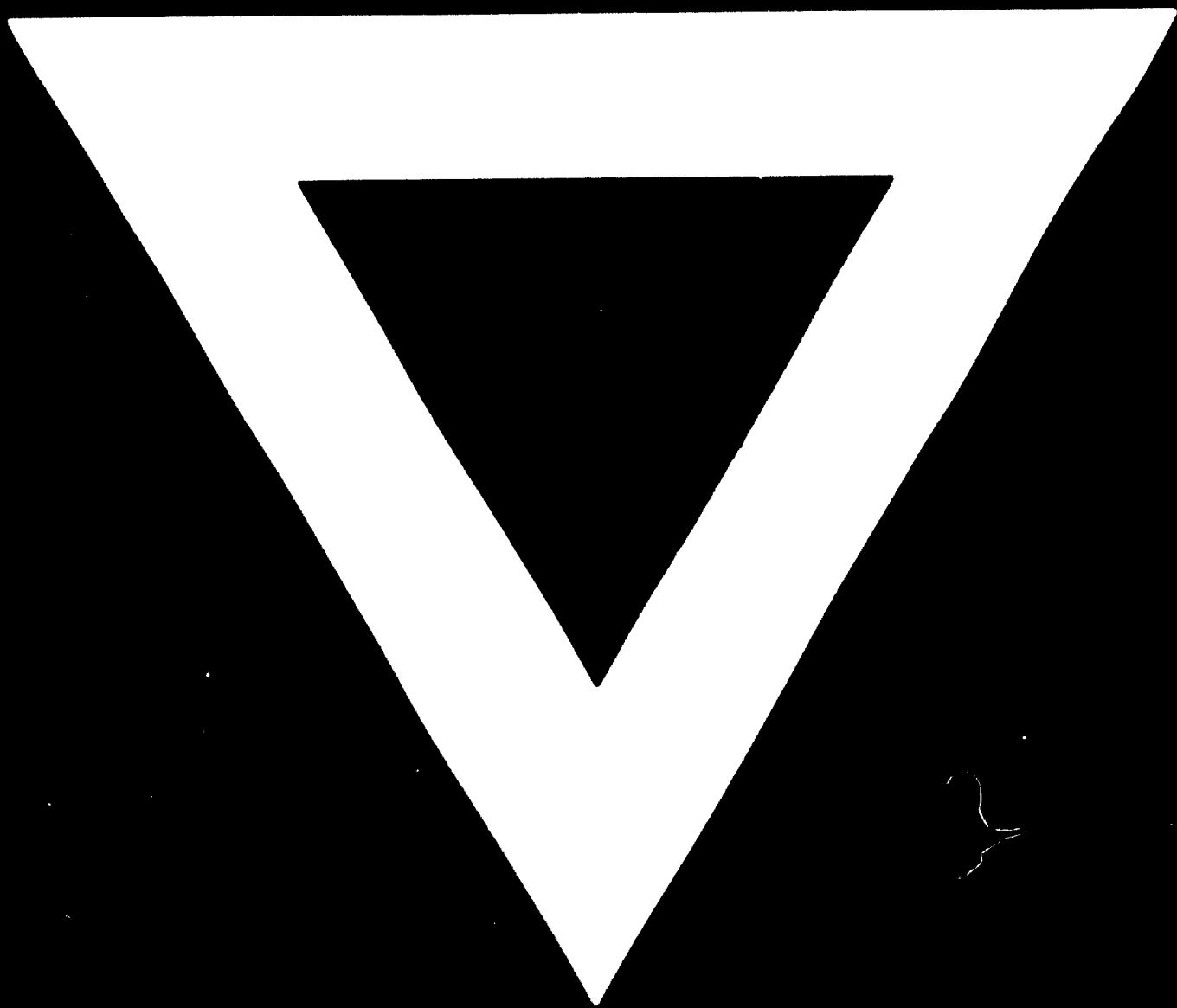
The United Nations' financial and technological assistance will definitely establish the long needed "Plastic Institute" consisting of the following services - testing, research, techni-

cal assistance, training and education.

This institute could be organized if sponsored by the government and the United Nations as in the case of other developing countries. This institute will advise the plastic industry the latest techniques in the processes involving injection, extrusion, blow moulding, blister forming, rotational casting in order to improve efficiency. It will test materials, determine the physical, electrical, chemical, thermal and weathering properties.

The institute will include training and educating men for mould and die design and making who in turn will help organize mould makers who are most needed in the plastic industry.





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