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05329



United Nations Industrial Development Organization

Distr.
LIMITED

ID/WG.153/5
7 May 1973

ORIGINAL: ENGLISH

Seminar on Plastics Application
in Developing Countries

London, England, 18 - 27 June 1973

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

by

Abdollah Khajenouri
National Petrochemical Company
Teheran, Iran

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"The present status and future plans for development of the plastic industry in Iran and technical assistance required."

Introduction

Iran with its vast resources of petrochemical feedstocks at very low prices offers one of the best areas of the world for the development of the plastics industry. The aim is to utilize this valuable national wealth in plants of optimum size to meet local demand and also to market surplus products abroad.

To achieve this, a policy of encouraging the formation of joint ventures with foreign partners, having the necessary technical and financial qualifications, has been adopted by the National Petrochemical Company (NPC).

NPC, so far, has successfully established four petrochemical plants within a span of half a decade and is in the process of establishing another five complexes to produce such products for the manufacture of polyethylene, polystyrene, polypropylene and other major plastics raw materials.

Amongst the existing plants, Abadan Petrochemical Company (APC), an affiliate of NPC is already producing polyvinyl chloride (suspension type) at the rate of about 20,000 tons per year, supplying part of the rapidly growing local market demand.

Past Situation

Fabrication of plastics in Iran began about 26 years ago when some small household articles were produced by very crude imported injection molding machines.

Raw materials, in the form of ready-made compounds, were also imported from Western European countries and the main plastic materials used were polyethylene and polystyrene.

Preliminary work on a large scale started in 1948 by a government-owned company (VANAK FACTORIES), where a limited variety of articles were produced and sold to the public.

Soon after, some other developments took place, and many individuals and companies came into the field of plastics fabrication, and by 1952 other plastics such as polyvinyl chloride (PVC), polypropylene (PP) and melamine formaldehyde (MF) were used.

Another government-owned plant which has been instrumental in the development of plastics industry in Iran, is Polika Plant. This plant began by fabricating, among other items, rigid PVC pipe and fitting for industrial, agricultural and home uses. Today Polika ranks as Iran's top PVC pipe producer of high quality, and has become a centre for research and new technology.

So it was during the fifties that the internally made plastics products began to move on markets long held by the traditional goods such as glass, wood, metal, paper and others. And despite all the competition by traditional materials, the Iranian plastics industry grew at a remarkable pace.

The extent of the development can be better realized by looking at some production figures of those early years of plastics fabrication in table I.

However, small plastic plants based on simple and economical processes and techniques of multipurpose units for varying market conditions were developed in those early years.

The consumption of various plastics during the years 1965 to 1972 is shown in table II. We notice that the industry has kept steady growth each year and by the end of 1972 the total consumption of plastics was recorded as high as 110,000 tons. The per capita consumption of plastics of Iran for 1965-1972 is shown in table III and it is noteworthy that consumption was increased from 1.4 kg. in 1965 to 3.6 kg. by 1972.

The annual average growth rate of plastics industry during these years was 19 per cent.

Current Situation

The following is some information on fabrication of certain plastic materials that are more commonly used than others by the Iranian manufacturers.

Polyvinyl Chloride

Among various plastics used in Iran, PVC enjoys a unique position, as far as, both the size of market and the annual rate of growth is concerned. This achievement could be attributed to an early use of PVC by the government plant (Polika) and an early acquaintance of both public and the manufacturers together with the diversity of applications to which PVC lends itself.

The current consumption of PVC resin in Iran is around 43,000 tons per year, as shown in table II, with a limited local production of about 20,000 tons per annum which is produced by Abadan Petrochemical Company (APC), an affiliate of the National Petrochemical Company (NPC). With the expansion program under consideration the local production of PVC resin by 1975 will be increased to 60,000 tons per year. Until such time, therefore, the discrepancy between the market demand and the local production needs to be imported from abroad.

The end uses of PVC in Iran is estimated to be about 35 per cent in the manufacture of shoes, 19 per cent is used by calendering sheet operators, 12 per cent by the wire and cable producers, 12 per cent is used for rigid sheet and profile, 10 per cent by rigid pipe and fitting producers, 6 per cent by tile and flooring operators and the remaining 6 per cent is used by other small manufacturers.

Polyethylene (PE)

An important plastic material which has found an excellent ground in the Iranian market is PE of Low Density and of High Density, used for the production of a variety of articles. As a result of its diversity of usage, PE is now used for the production of film of different gauges, hollow plastic containers, flexible pipe, wire and cable, toys and many other articles of every day use.

At present the consumption of LDPE is around 36,000 tons and HDPE is used at the rate of 5,500 tons per year, as shown in table IV. The use of PE in Iran came earlier than some other plastics and therefore its consumption increased faster during the years 1945-1955 as shown in table I, but it slowed down as of 1960 when PVC grew at a faster rate as shown in tables I and II. However, it is anticipated that by 1976 when the production of PE raw material will be fulfilled in Iran, the situation will change again and PE will enjoy a faster rate of growth for a number of years to come.

Polystyrene (PS)

This plastic was one of the first plastics which found its use in the Iranian market. The main consumption of PS in Iran is for the manufacture of refrigeration panels, television and radio cases. The consumption of this material in Iran has not grown as rapidly as PE or PVC and the present rate of use by the manufacturers is about 9,500 tons per annum. But as shown in table IV the consumption of this material will increase faster than before because of the rapid development of new refrigerator and radio/television industries and the fast expansion of present facilities.

Polypropylene (PP)

The development of the woven sacks industry in Iran during the past few years has been an important factor in the rapid growth of PP. Until 1968 the consumption of this plastic was only about 1,000 tons, but by 1973 the consumption is estimated to be around 6,400 tons as shown in tables II and IV.

Sacks made of PP are now replacing paper, jute, and even polyethylene bags at such a rate that the PP sack manufacturers cannot cope with the increasing market demand. Nearly 70 per cent of the total PP now consumed in Iran is for the production of woven sacks and the rest for the manufacture of industrial and household articles.

Melamine and Urea Formaldehyde

Melamine formaldehyde (MF) is mainly used in Iran for the manufacture of kitchen-ware and it dates back as far as 1955 when consumption was about 100 tons.

Consumption of MF and UF have increased rapidly too and in 1973 it is estimated that about 6,100 tons of both materials will be used by the local manufacturers, as shown in table IV. There is already a project for the establishment of plant in Iran to produce MF and it is hoped that by 1976 when the plant comes into production, the rate of consumption will grow faster than before, and the consumption of MF by 1980 will reach a figure of 8,500 as shown in table IV.

Acrylonitrile Butadiene Styrene (ABS)

This material has had a rather limited use in the past and as shown in table II in 1968 the consumption was only about 500 tons. The present consumption of ABS by the manufacturers is around 2,300 tons as shown in table IV and nearly 70 per cent of the material is used by refrigerator factories.

Presently ABS consumed by the automobile industry is very limited but by the development of this industry consumption of ABS will increase at a much greater rate and by 1980 it will reach a figure of 8,500 tons as shown in table IV.

Other Plastics

Other plastics such as polyurethane, phenol formaldehyde, polyvinyl acetate and so forth are currently in use by the manufacturers. Polyurethane is more widely used than other plastics mentioned and in 1973 the consumption is estimated to be around 2,400 tons, as indicated in table IV.

Summary of the current situation

To complete the description of the present plastics situation in Iran as shown in table IV, nearly 120,000 tons of different plastics will be used by the different manufacturers in 1973 . As we look at figures of present consumption and compare them with the figures of earlier years we notice how the pattern of the industry has been changing as the result of the shaping forces of market demand and the availability of different raw materials. Table VI shows the percentage share of the market held by some important plastics at different years.

Projection of Future Growth

The demand for plastics is rising sharply in Iran. It is estimated that by 1980, the demand for only the two basic plastics namely PVC and PE will be around 179,000 tons as indicated in table IV. These two plastics will probably enjoy the highest rate of growth. But the growth rate of other plastics will be somewhat variable because of limitation of imported raw materials as the supply and prices of these materials have been fluctuating a great deal in recent years.

However the total consumption of various plastics is estimated to be about 255,000 tons by 1980 and the likely pattern of plastics is shown in table IV.

The per capita consumption of plastics that at present is about 3.8 kg. is expected to reach a figure of 6.5 kg. by 1980 as indicated in table V.

The foregoing of the past and current situation of the development of the plastic industry has proved that the market for plastic every 5 years since 1950 has had a different rate of growth.

Between 1950 to 1955 the rate of growth was about 90 per cent, between 1955 to 1960 was 100 per cent, between 1960 to 1965 was about 80 per cent and between 1965 to 1970 has been about 170 per cent. This would mean that from 1965 to 1970 there has been a tremendous development in the plastic industry of Iran and it is extremely difficult to estimate the hidden demand for plastics that may exist during the next five years. Therefore it is felt that our projection on table IV for the future consumption of plastic is rather conservative and by 1980 the consumption of various plastic in Iran will be higher than anticipated.

The grounds for estimating a higher rate of growth for the plastics industry in Iran may be summarized and pointed out as follows:-

- 1) The production capacities of the present plastic fabricators have already been increased.
- 2) The market demand is rising very rapidly owing to the general economic growth of the country.
- 3) Raw materials for major plastics will be produced in Iran in near future.
- 4) As yet there is no waste or pollution problem in the country.
- 5) Iranian plastic products are finding markets abroad and the government of Iran has a special promotional program in this respect.

Major Problems

Although at present the plastic fabricators, in Iran, have established many factories with large capacities, their production is handicapped by the deficiency of raw materials which, excepting in the case of PVC, all other plastics are to be imported from abroad until 1966-1967 when the products of the new petrochemical plants will flow into the market.

Absence of research for adopting new techniques or developing new products adapted to local demand and conditions makes it difficult for the plastics industry to move ahead as fast as expansion of plant facilities and the establishments of new factories. Assistance to Iran could be given in this respect to overcome this handicap by creating a much needed centre for research in plastics.

Standardisation of quality of fabricated plastic goods is lacking badly in Iran. Despite the great effort exerted by the government Bureau of Standards for the standardisation of industrial products, no or very little efforts have been made for the standardisation of plastic goods. Assistance to Iran could be given in supplying experts to the Bureau of Standards for the achievement of this purpose.

Problems solved

As far as the shortage of raw material for plastics is concerned, the government of Iran through the formation of joint ventures has plans for the production of such raw materials as ethylene, chlorine, propylene, styrene, benzene and other petrochemicals.

The plant capacities for these products are taken much higher than indigenous demand, and for a few years substantial export is envisaged to utilize excess capacities. Therefore the production of olefin and aromatic hydrocarbons is ranked first in response to the rapidly growing demand for plastics raw materials in Iran.

Assistance Expected

Since nearly, with exception of one plant, all fabrication of plastics in Iran is undertaken by private sector, therefore ways in which any assistance could help the plastics fabricators may be summarized as follows:-

- 1) Assistance in solving problems connected with the operation of fabrication plants.
- 2) Assistance towards the establishment and installation of modern plastic plants.
- 3) To train technicians and skilled workers abroad.
- 4) To supply expert on the fabrication of new products.
- 5) To develop newer techniques for higher standards of plastic goods.
- 6) To cooperate and assist the Iranian Standardization Bureau to establish standards for plastics products.

Table I

Consumption of Various Plastics in Iran

1945 - 1960

<u>Material</u>	<u>1945</u>	<u>1950</u>	<u>1955</u>	<u>M/Ton</u> <u>1960</u>
P.V.C.	-	-	100	1,000
Polyethylene	-	200	500	2,500
Polystyrene	100	200	600	2,500
Other Plastics	250	400	800	2,000
TOTAL	350	800	2,000	8,000

Table II

Consumption of Various Plastic in Iran

1965 - 1972

Material	1965	1966	1967	1968	1969	1970	1971	1972
PVC (Suspension)	12,000	17,000	23,000	27,000	33,000	36,000	38,000	40,000
PVC (Emulsion)	1,000	1,500	2,000	3,000	4,000	4,500	5,000	6,000
Low Density PE	13,000	16,000	21,000	25,500	27,500	29,000	31,000	33,000
High Density PE	1,000	1,500	2,000	3,000	3,500	4,000	4,500	5,000
Polystyrene	4,500	5,000	5,500	7,000	7,500	8,000	8,500	9,000
Poly- propylene	200	300	500	1,000	1,800	2,500	3,800	5,000
Polyurethane	600	700	800	1,200	1,300	1,500	1,800	2,200
Melamine F.	800	900	1,500	1,800	2,200	2,500	2,800	3,200
Urea F.	500	600	800	1,000	1,400	1,700	1,900	2,500
Phenolics	300	400	500	600	700	900	1,100	1,400
A.B.S.	-	-	200	500	700	900	1,100	2,000
Other- Plastics	100	100	200	400	400	500	500	700
TOTAL	34,000	44,000	58,000	72,000	84,000	92,000	100,000	110,000

Table III

Per Capita Plastics Consumption in Iran

1965 - 1972

<u>Year</u>	<u>Consumption/Ton</u>	<u>Population/1000</u>	<u>Per Capita/Kg</u>
1965	34,000	25,000	1.4
1966	44,000	25,700	1.7
1967	58,000	26,500	2.2
1968	72,000	27,400	2.6
1969	84,000	28,300	3.0
1970	92,000	29,000	3.2
1971	100,000	30,000	3.3
1972	110,000	30,000	3.6

Projection of Consumption of Plastics in Iran

1973-1980

Material	1973	1974	1975	1976	1977	1978	1979	1980
P.V.C. (Suspension)	43,000	47,000	52,000	56,000	60,000	64,000	70,000	76,500
P.V.C. (Emulsion)	6,500	7,000	8,000	8,500	9,000	9,500	10,500	12,000
Low Density PE	36,000	39,000	43,000	48,000	50,000	63,000	70,000	77,500
High Density PE	5,500	6,500	7,000	7,500	9,000	10,000	11,500	13,000
Polystyrene	9,500	10,500	11,500	13,000	14,500	15,500	17,500	19,000
Poly- propylene	6,400	7,600	8,500	10,000	11,000	12,500	14,000	16,000
Polyurethane	2,400	2,800	3,500	5,000	5,500	6,700	8,000	9,000
Melamine F.	3,400	4,000	4,500	5,000	6,000	7,000	8,000	8,500
Urea F.	2,700	3,000	3,500	4,000	4,000	5,000	6,000	7,000
Phenolics	1,600	1,800	2,000	2,700	3,000	3,500	4,500	5,000
A.D.S.	2,300	3,000	3,500	4,000	5,500	6,500	7,500	8,500
Other- plastics	700	800	1,000	1,300	1,500	1,800	2,500	3,000
TOTAL	120,000	133,000	148,000	165,000	185,000	205,000	230,000	255,000

Table V

Per Capita Plastic Consumption in Iran

Projection

1973 - 1980

<u>Year</u>	<u>Consumption/Ton</u>	<u>Population/1000 person</u>	<u>Per Capita Kg.</u>
1973	120,000	31,700	3.8
1974	133,000	32,600	4.1
1975	148,000	33,500	4.4
1976	165,000	34,500	4.8
1977	185,000	36,000	5.1
1978	205,000	37,000	5.5
1979	230,000	38,100	6.0
1980	255,000	39,200	6.5

Table VI

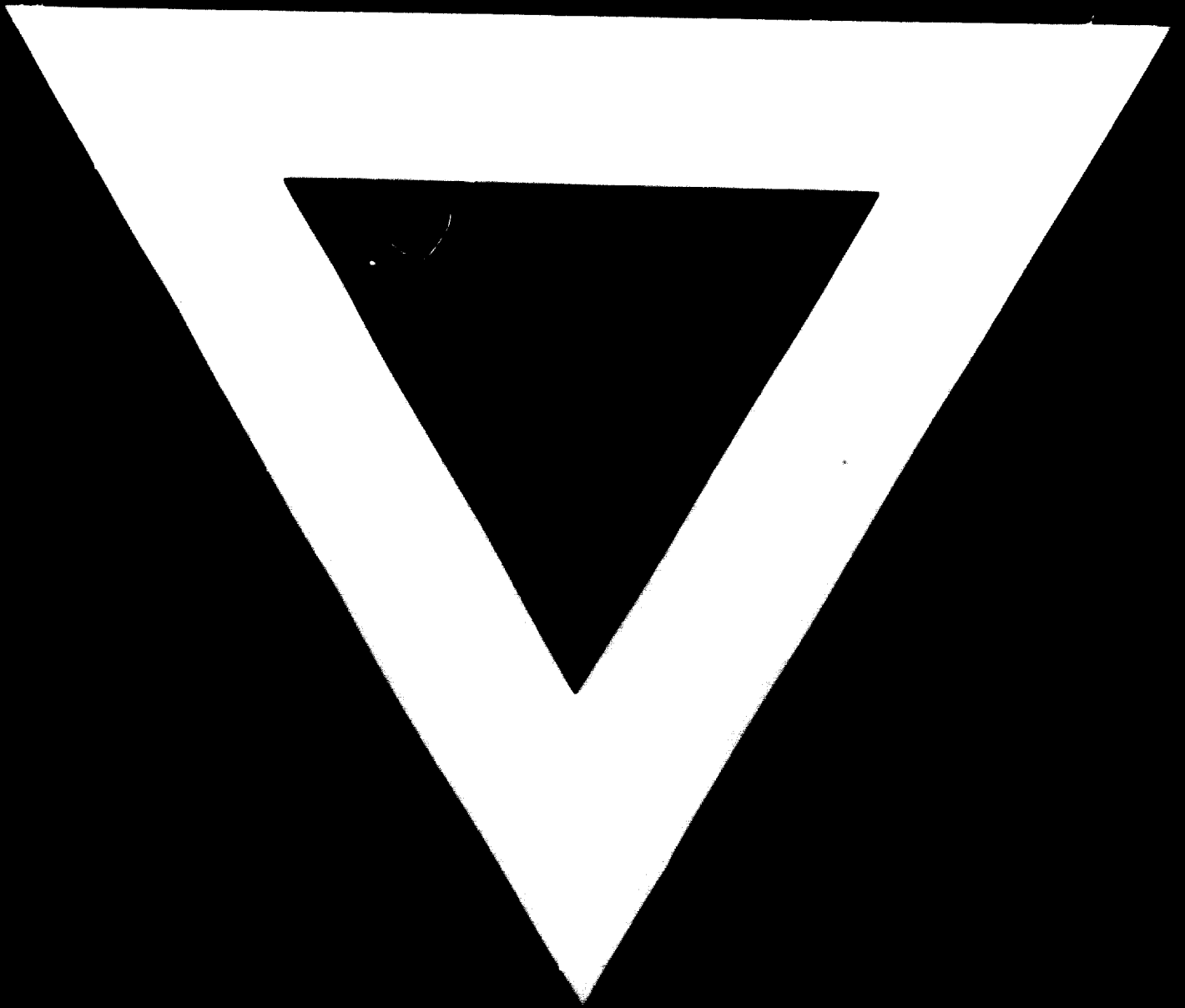
Market Share of Plastics in Iran (Percentage)

1965 - 1980

<u>Material</u>	<u>1965</u>	<u>1970</u>	<u>1975</u>	<u>1980</u>
P.V.C.	38	44	40	35
Polyethylene	41	37	34	36
Polystyrene	12	8.7	9	7.5
Polypropylene	0.6	2.8	8.6	6.3
Other Plastics	8.4	7.5	8.4	15.2

1975 } Projection
1980 }





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