PWMI Newsletter

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PLASPIA in JAPAN

President Takebayashi of Mitsui Petrochemical Industries, Ltd. elected as PWMI Chairman

The PWMI's Board of Directors elected Mr. Shogo Takebayashi, President of Mitsui Petrochemical Industries, Ltd., as the new PWMI chairman at its regular meeting held concurrently with the 1990 ordinary general conference last May. Mr. Takebayashi so far has acted as the API (Association of Petrochemical Industry) chairman. The PWMI chairman holds office for two years.

After his election, Chairman Takebayashi attended a press conference and stated; "Lately, global environmental problems have been highlighted worldwide and, amid such trends, wastes have been provoking an additional social problem at home and abroad. In its effort to deal with this new situation as properly as possible, the PWMI intends to organize necessary projects based on full consultations with concerned industries and others."

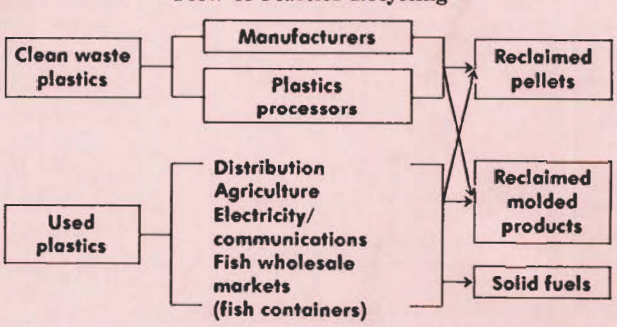
A Total of 580,000 t/y Recycled in Japan

Table 1 (show the next page) contains the estimates for the 1989 plastics output and the 1988 waste plastics generation. Though slower than before, plastics output in 1989 grew a high 8.5% over the previous year and totalled nearly 12 million tons.

As for recent waste plastics recycling, pellets reclaimed from contamination-free industrial waste plastics amount to an estimated some 470,000 tons/year. From waste plastics collected from those used in distribution, etc., are produced an estimated about 80,000 tons/year of bars, stakes and other molded products. Fluffs manufactured from defective PET films and other out-of-standard products total some 30,000 tons/year. When combined, recycled waste plastics total about 580,000 tons a year. Besides, progress is being made in commercialization of waste plastics-derived solid fuels. Flow of these recycling efforts is charted below.

Recycling of household waste plastics, called for by some groups, has difficulties in application and economics but is now under consideration by the plastics industry.

Flow of Plastics Recycling



Japan's Municipal Waste Disposal: 72.8% Incinerated in 1988

General descriptions of Japan's municipal waste disposal are given in Table 2. During the high growth period of 1960-70, due to a massive inflow of population from the rural to urban areas, many cities faced surges in not merely population but municipal wastes that they had to collect and manage. At the time, their incineration capacity was insufficient in both physical and technological (unable to deal with high-calorie wastes) terms, and many claimed that growing waste plastics made waste incineration harder.

Half of some 3,200 municipalities in Japan practise waste separation at source as a measure to cover insufficient incineration capacity and reduce acid gas emissions. Many of such municipalities designated plastics as one of hard-to-be-incinerated items, and plastics are landfilled together with the incombustible wastes. However, citizens' waste separation efforts are not necessarily sufficient. Taking Tokyo Metropolis as an example, some 60% of waste plastics is found in the waste stream to be incinerated, and only the remaining 40% is separated as instructed.

Of the densely-populated 11 special cities approved by the central government order, Tokyo, Nagoya and Hiroshima collect plastics as part of the wastes to be separated at source, while the remaining eight special cities collect plastics together with the wastes to be incinerated.

The Ministry of Health and Welfare (MHW) has been providing more than ¥50 billion a year to help promote installation of incineration plants and facilities for waste managment. Combined

Table 1 Generation of Plastic Wastes (Estimated by PWMI)

(Unit : 1,000 t/year)

Year	Production amount	Plastic waste subject amount	Disposal amount total	Municipal plastic wastes (%)	Industrial plastic wastes (%)
1972	5,675	3,337	1,906	1,137 (60)	769 (40)
1975	5,167	3,146	2,613	1,471 (56)	1,142 (44)
1980	7,518	5,523	3,258	1,784 (55)	1,474 (45)
1985	9,232	6,994	4,188	2,317 (55)	1,871 (45)
1986	9,374	7,296	4,528	2,502 (55)	2,026 (45)
1987	10,032	7,916	4,656	2,604 (56)	2,052 (44)
1988	11,016	8,613	4,878	2,761 (57)	2,117 (43)
1989	11,955				

Table 2 Trends of Waste Disposal in Japan (Nationwide)

FY	Population with the areas covered by planned disposal services (1,000 pns)	Ratio to total population (%)	Total amount of wastes generated (ton/day) Basis: ~ 1976 Daily living 1980 ~ Planned disposal	Incineration ratio (%)	Lower heat value for incinerator in Osaka (kcal/kg)	Plastic contents in Municipal wastes (Osaka) (%) dry basis
1960	47,440	49.8	24,399	31.1	1,095	1.0
1965	64,231	65.4	44,522	37.9	1,163	1.6
1970	84,694	81.6	76,998	55.3	1,138	6.0
1975	111,554	99.3	104,312	57.8	1,404	5.3
1980	116,678	99.4	113,728	60.4	1,608	7.6
1985	120,774	99.6	113,782	70.6	1,847	8.5
1986	121,801	99.8	117,693	71.9	2,020	9.5
1987	122,025	99.9	122,762	72.6	2,073	9.8
1988	122,648	99.9	128,615	72.8	2,211	13.2

Note: Increase of plastic contents in 1988 resulted from the change of measuring method.

with efforts made by municipal sanitation officials, municipal incineration capacity newly installed or remodeled has amounted to 5,000 – 7,000 tons/day annually in recent years. Also, in technological terms, it has become possible to incinerate the wastes with as high heat value as 3,000 kcal/kg. In 1988, the share of incineration in municipal waste disposal reached 72.8%, and flue gas treatment was satisfactorily conducted. In comparison, the incineration share stands at 14% in the United States, and averages 33% in Europe.

Partly due to disappearing landfill sites available in major urban areas, like Tokyo Metropolis, the MHW suggests that waste plastics would be used in helping promote the use of incineration heat in power generation and others, and plans to make stepped-up efforts to install necessary incineration plants, while endeavoring to reduce wastes by curbing the growth of waste generation and facilitating resource recovery from wastes.

The MITI (Ministry of International Trade and Industry), on its part, organized in December 1990 waste disposal and resource recovery measures to be taken, through its Industrial Structure Council meetings, and currently considers necessary enactment. In regard to waste plastics, the MITI intends to promote resource recovery, energy recovery and waste plastics reductions, the last one through thinner/more durable products.

PWMI Activities for Fiscal 1990: To Better Cope with Severer Situations for Plastics

Plastics output in Japan, having nearly reached an estimated 12 million tons in 1989, has been on the increase year by year. As a result, waste plastics generated each year has kept growing and adequate plastic waste disposal is now called for.

In addition, as the global environmental issue now poses one of top priorities for various countries, plastic waste disposal/resource recovery particularly attracts keen concerns throughout the world. With these situations as background, the MHW initiated drastic reviews on its waste disposal policy, including a possible amendment of the Waste Disposal and Public Cleansing Law. The MITI also started full-scale policy reviews to prepare guidelines designed to encourage resource recovery from waste plastics.

With these situations kept in mind, the PWMI has carried out following activities in fiscal 1990.

Technological development

(1) Development of a plastic waste incinerator: A pilot incinerator specifically designed for waste plastics was remodelled and moved to Ishikawa Prefecture, and incineration tests are now conducted on the five major general-purpose resins, with resultant data organized by the year-end.

(2) A basic survey on waste plastics resource recovery systems: This survey is conducted to publish a handbook to resource recovery technologies.

Other technological development efforts include a preliminary survey on pyrolysis and various activities to improve the level among recycling business operators.

Surveys/public relations

(1) English-language publications: This includes undating of "PLASTIC WASTE: Resource Recovery and Recycling in Japan" prepared in 1985, semiannual publications of the PWMI News.

(2) PR film production featuring adequate disposal of and resource recovery from waste plastics.

These publication and film production activities are designed to collect and organize a wide variety of examples of technologies and systems which permit waste plastics adeqauate disposal/resource recovery, in order to help the public and the concerned at home and abroad increase their knowledge about waste plastics. Other surveys/PR activities include a survey on the latest moves among municipalities, a survey on recent trends of resource recovery businesses, and publication of regular PR publications.

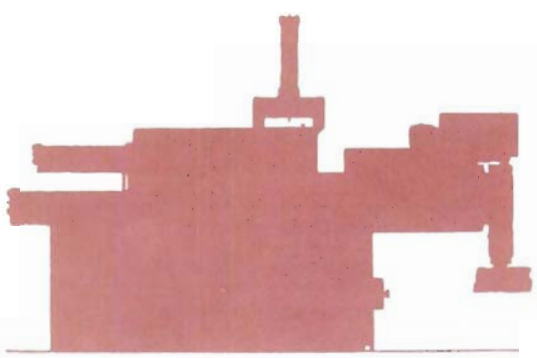
Overseas surveys/ International cooperation

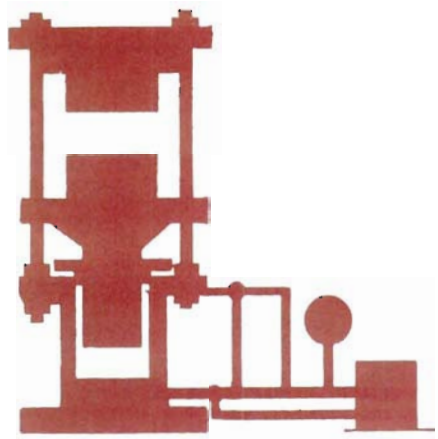
Study mission to Europe and the United States: A mission was sent in September 1990 to Europe and the United States to get the first-hand information about plastic regulations and recycling, other environmental issues, etc. The mission also visited various offices, both public and private, for information exchanges. A delegation was also sent to the "International Meeting on Plastic Waste Problems" held September 1990 in Monaco, where the PWMI representatives had informative discussions with their counterparts from various countries.

Plastics Recycling Technologies (1)

High-pressure die cast molding

This is one of the oldest among plastics recycling technologies in use. It was developed originally for waste plastics (post-consumer films, out-of-standard molded products, and others in various shapes), and is given special features absent to the virgin-pellets processing technologies. This technology consists of crushing, melting and molding processes, with the melter capable of providing efficient kneading, deaeration, and bubble elimination. With this technology, molten feedstocks are poured directly into molds by utilizing discharge pressure of the melter. The discharge pressure is high, and it is designed that the feedstocks can be injected directly into the molds, even in the presence of foreign matter to some extent. Its molding process is provided with large numbers of molds (ex. 50-60 molds) same in size. Once molten resins are injected, the molds are moved forward and replaced with empty ones, thus permitting continuous molding. The mold injected with molten resins are forwarded a cooling zone immediately below the molding line. When cooled down, products are taken out from the molds, which then are returned to the molding line. To sum up, the most outstanding feature of this technology is continuous molding with large numbers of uniform molds in use. Thickness characterizes the products molded with this technology.





Press molding

This is one of the most popularly in use among plastics recycling technologies. It is generally employed in manufacturing complicated-shaped thin products, or products requiring accurate dimensions. Pre-molding melting of waste plastics is provided by a plunger-type melter or a recycling-purpose extruder. Molten feedstocks are weighed in accordance with weight of a planned molded product. Then, hot molten feedstocks are poured into a press-molding mold in specified quantity. When cooled down, product is taken out from the mold. After having flash cut off and given inspections, the product is completed. Because this molding technology employs the expensive mold designed for pressing, and because the only one mold put to repeated use, it is hard to be automated. But, it is used in manufacturing secondary products of high added value. Given that development of secondary products is now directed toward higher added values, and that product diversification is increasingly called for, this technology is highly promising in plastics recycling.

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