

PWMI Newsletter

Aug. 1991
No.4



**PLASPIA
in JAPAN**

PWMI Bolsters Its Functions and Activities

The PWMI held an extraordinary Board of Directors meeting on March and adopted a policy to bolster its functions and activities.

In Japan, as in the rest of the world, concerns over such issues as global environment, post-consumer plastics and municipal waste disposal have been rapidly growing among the public. To better cope with such a social trend, the 1991 March meeting agreed that the PWMI on its part had to make stepped-up efforts for adequate disposal of and resource recovery from waste plastics. The inauguration of the new PWMI Executive Director was also approved at the meeting.

Principal measures to bolster the PWMI are:

1. The steering committee: To encourage member companies to be further involved in the PWMI planning/decision-making processes, the steering committee members are to be filled with member companies' presidents or others in comparable positions, and its committee meetings are to be held more frequently.
2. Standing committees: Ranking the standing committee members higher; Requiring all the member companies to participate in the committees; Dividing the

Survey and Public Relations Committee into two committees; and, Forming subcommittees under individual standing committees.

3. Secretariat: The number of staff is to be increased.
4. Formation of new committees: It was decided to form new committees, including a committee to discuss the PWMI's future visions as well as ideal cooperation/coordination among related industries, and a committee to study and discuss how to promote plastics-containing waste incineration-based power generation/energy use. The newly formed committees are: (1) The Basic Issues Study Committee is expected to identify the PWMI's future visions, and discuss any issues crucial to the PWMI management; (2) The Advisory Committee consists of representatives of related industries, academic experts, and administrators, among others, and is expected to offer opinions and advices about the PWMI management; (3) The Organization-related Management Issues Study Committee is expected to review the PWMI's organization and management; and (4) The Plastic Waste Energy Recovery/Reuse Promotion Committee is expected to discuss how to promote energy recovery from plastics-containing waste incineration.

Profile of the PWMI New Executive Director

The Board of Directors at its extraordinary meeting last March approved inauguration of Mr. Tatsuji Warabioka as the successor to the PWMI outgoing Executive Director, Mr. Hiroshi Nasu. Mr. Warabioka is 56 years old now. Graduated from the Tokyo Metropolitan University in 1958, Mr. Warabioka joined the Ministry of International Trade and Industry. As a MITI official, he has filled various posts: head of the JETRO Buenos Aires office (inaugurated in 1971); manager of the Textile and Chemical Standards Division, the Standards Dept., the Agency of Industrial Science and Technology (1977); manager of the Chemical Products Division, the MITI's Basic Industries Bureau (1982); and senior councilor at the National Land Agency (1982). He left the MITI in 1985, then joined in 1986 the Japan High Pressure Gas Safety Association, serving as a member of its Board of Directors until his resignation from the post early this year.



An Estimated 580,000 Tons of Plastics Recycled in 1988 in Japan

In an effort to describe a whole image of Japan's plastics recycling business in 1988, the PWMI made a comprehensive study. The study is based on a questionnaire sent to 259 recyclers belonging to either of their two nationwide trade organizations. One is the Japan Synthetic Resin Feedstocks Recycling Industry Federation consisting of those specializing in the pellet production, and the other is Japan Association for Plastics Effective Use formed by manufacturers of recycled molded products. While referring to the questionnaire results (respondents 79%), the

PWMI estimated the state of an additional 400 recyclers who did not belong to the trade organizations.

Output of recycled plastics

Based on the questionnaire results, the PWMI calculated output of recycled plastics by non-trade-organization-member recyclers and put total output of recycled plastics at an estimated 550,000 tons for 1988. The estimated output is broken down by source (Table 1), by resin (Table

A PWMI New Video Film Completed **"Burning to Live: Using Plastics Waste Energy"**

The PWMI recently completed the production of its latest PR video film. It is a 24-minute film and titled "Burning to Live: Using Plastics Waste Energy". While introducing various forms of plastics recycling, the film focuses on energy use of waste plastics and describes how a plastics-derived energy source is becoming popular in our society and contributing to our daily life, by picking up actual projects, together with interviews to those responsible for the projects in the distribution and waste disposal industries, etc.

The film refers to increasing concerns over global environmental problems worldwide, above all global warming largely caused by fossil fuel burning, which is arousing keen attention to untapped urban energy sources. Then, the film introduces the project under way in the Atsubetsu district, Sapporo city, as a good example of electricity generation and district heat supply based on exhaust heat of a waste incineration plant, which is now popularly in practice in Japan nationwide.

Indeed, with plastics accounting for 7~8%, municipal wastes are now serving as a viable domestic energy source in Japan. As plastics have played increasingly crucial roles to our daily life these years, their production has been on the sharp increase. Particularly, trays, wraps and the like are familiar in the distribution sector, making great contribution

to our "life style." But, not a few consumers are demanding collection of the trays. Among them is a staff of COOP Kobe, who appears in the film and comments on the matter while interviewed. Also, the film interviews a staff at the Imaizumi incineration plant, Sendai city, and Prof. Naomichi Hirayama of Chiba Institute of Technology, who also chairs the Japan Waste Academy, on incineration of waste plastics. According to them, incineration of waste plastics, if coupled with energy recovery, is a better approach among currently available options.

The film also highlights a district heat supply system based on recycled solid fuels from waste plastics as a new viable approach of plastics recycling. The processes to manufacture solid fuels are described by introducing a resource recovery plant in Sapporo city as well as a solid fuel plant run by Hokkaido Heat Supply Corp. The district heat supply system, using solid fuels from wood chips, waste paper and waste plastics, not merely proves effective in waste reduction and resource recovery but also contributes much to alleviating environmental problems.

Thus, the latest video film produced by the PWMI shows that energy recovery from waste plastics can help reduce fossil fuel use and that waste plastics are likely to provide a new energy source benign to the earth.

2), and by shape (Table 3).

Besides, PET resin is also recycled. PET processing remnants, primarily generated from film manufacturing/processing plant, are largely recycled into the products like cotton. Recycled output is estimated to be some 80,000 tons annually.

totalled less than ¥300 million each accounted for 57.6% of the whole. Of the recyclers, those specializing in the manufacture of recycled molded products appear smaller than the average in business scale terms. Also, many of the recyclers not belonging to the trade organizations are found to be marginal business operators.

Business scale

The questionnaire results revealed that 38.7% of the respondents are the recyclers specialized in plastics recycling business, 42.7% are those with a side job, 15.7% specializing in marketing, and 2.9% others. As for business scale, recyclers having less than five employees each held 34.4% of the whole. Annual output per recycler averaged 1,881 tons, and recyclers whose annual turnover

Recycling rates

Table 4 shows the recycling rates which are calculated from the estimated recycled output by the PWMI.

Plastics in municipal waste streams are recycled little, while the recycling rate of industrial waste plastics reached 28%. When municipal and industrial waste plastics combined, the recycling rate turned to be 12% in 1988.

Table 1 Estimated Recycled Output by Source (1988)

Source	Share (%)	Recycled output (tons)
Resin plants	13.8	76,000
Molding/processing plants	71.1	391,000
Post-consumer products	13.5	74,000
Others	1.6	9,000
Total	100.0	550,000

Table 3 Estimated Recycled Output by Shape (1988)

Shape	Share (%)	Recycled output (tons)
Pellets	68.9	379,000
Crushed/powdered	17.1	94,000
Films	3.9	21,000
Sheets/mats	2.5	14,000
Bars/stakes/plates	3.2	18,000
Pipes	0.1	≈ 0
Other molded products	4.3	24,000
Total	100.0	550,000

Table 2 Estimated Recycled Output by Resin (1988)

Resin	Share (%)	Recycled output (tons)
Polyethylene	34.1	187,000
Polypropylene	24.3	134,000
Polyvinyl chloride	10.6	58,000
Polystyrene	14.4	79,000
ABS	10.1	56,000
AS	1.0	6,000
Others	5.5	30,000
Total	100.0	550,000

Table 4 Generated Waste Plastics and Recycled Output (1988)

Source	Generated amount (1,000 tons)	Recycled amount (1,000 tons)	Recycling rate (%)
Municipal wastes	2,800	0	0
Industrial wastes	2,100	580	28
Total	4,900	580	12

Plastics Recycling Technologies (2)

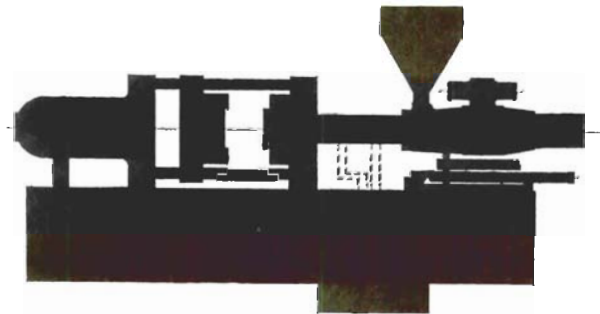
Among others, roll and extrusion molding technologies are popularly employed in waste plastics recycling:

Roll molding

This technology is employed primarily in recycling flexible PVC wastes, such as agricultural PVC films, electric-wire PVC coatings, and PVC leather remnants. These PVC wastes are first given prior treatment of crushing, washing and foreign-matter removal. Then, the feedstocks are well kneaded with rolls, and plasticizers and additives are added, if necessary. Well kneaded feedstocks are recycled into sheet-type continuous products, typically around 1 meter wide. Such sheet-type recycled products are often employed as part of flooring materials. The roll employed in kneading is the kneading roll generally in use in compounding PVC. Because the roll is heated by a thermal agent, it can provide kneading under a constant temperature, which eventually results in the production of recycled products showing uniform physical properties comparable to their virgin-resin counterparts. Also, by pouring a prescribed amount of kneaded molten resins into molds, mats of various shapes are press-molded. Some of them are as thick as 5~20mm, and as large as 1~2m. These large sheet products are put to practical use in various sectors.

Injection molding

This molding technology is in use when a single type of waste plastics, containing no foreign matters or demonstrating constant physical properties, is to be recycled. The injection molding machine popularly in use is the same machine as used in usual molding of virgin resins. A representative recycled product with this technology is seedling bed used in the agricultural sector. This molding technology is advantageous when required is inexpensive mass-production of a product which is complicatedly shaped but little needs accurate dimensions.



Extrusion molding

This molding technology is often adopted in manufacturing continuous recycled products, like plates and pipes. At present, waste plastics recyclable with this process include PE, PP and their blends, which ensure obvious physical properties in relative terms. With this molding technology too, waste plastics are given prior treatment, where they are crushed and foreign matters are eliminated, among others. Then, after blending different types of waste plastics and adding additives, when necessary, the feedstocks are given molten kneading in an extruder specifically designed for recycling. The extruder is equipped with molds at its outlet, in which the molten feedstocks are discharged to be recycled into long product of prescribed shapes. The extruder in use features a large L/D (larger than 30) and is of vent type, which never fails to provide satisfactory kneading. Thanks to complete kneading and sufficient degassing, the latter offered by the vent, recycled products made with this extrusion molding have well-finished surface featuring excellent accuracy of dimensions. Good examples are drain pipes, continuous plates, and vehicles' spacers. This recycling-purpose extruder is also put to a combined use with press or in die cast molding lines, whereby the extruder is expected to give molten kneading treatment to waste plastics.

Plastic Waste Management Institute

Fukide Bldg., 4-13 Toranomon, Minato-ku, Tokyo 105, Japan
Tel: 033437-2251 Cable: PLASPEM/JAPAN Fax: 033437-5270