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Eco-Echoes

ICPE NEWSLETTER

Quarterly Publication of Indian Centre for Plastics in the Environment

DRINKING

WATER



BOTTLED



"Drinking Water through Eco-friendly Plastic pouches"

Marketing "Safe Drinking Water" through plastic pouches has become an accepted norm both among the urban and rural masses in Gujarat. Chilled Mineral Water available packed in plastic pouches has several advantages over traditional system of chilled water in open glasses particularly in public places. Priced economically at Re. 1 for 250 ml. pouch, it is easily available and handy. In Gujarat State itself, there are 150 units engaged in marketing and distributing drinking water in plastic



pouches under different brand names. The production capacity is estimated at 30 lakhs pouches per day.

The peak period for demand of drinking water through plastic pouches is during summer season i.e. April-July. The plastic pouches are seen used in cities like Ahmedabad, Mehsana, Rajkot and Surat, and also in Tamil Nadu.

Linear Low Density Polyethylene (LLDPE) Multiplayer Film is used in the manufacture of pouches for packaging of mineral water.

(Courtesy: RIL, Ahmedabad & Chennai)



Vol. 2, April/June 2001 No. 2

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Cover: Bottled/Pouched drinking water ensures purity and safety.

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Readers are invited to send their contributions in the form of short notes/news item, new products development, case studies relating to Plastics and the environment, recycling technology, waste management, etc. for Publication in the Newsletter.

All correspondence regarding ICPE Newsletter should be addressed to the Editor Eco-Echoes ICPE, Vajra Building, 10th Floor, 17, Barakhamba Road, New Delhi-110 001, INDIA. Material published in the Newsletter may be freely reproduced, but its due acknowledgement will be appreciated.

Indian Centre for Plastics in the Environment

1009, Vijaya Building, 10th Floor, 17 Barakhamba Road, New Delhi-110 001
New Delhi
Tel: 011-3326376 to 78 Fax: 91-011-3326379
Website: www.icperviro.org E-mail: icpedelhi@sify.com

Mumbai
203, 2nd Floor, Sagar Avenue (Opp. Shopper's Stop)
Andheri (W), Mumbai-40058

Founder Members

Chemicals and Petrochemicals Manufacturers' Association, New Delhi
PlastIndia Foundation, Mumbai

WATER BOTTLED



Pure and safe drinking water has always been on demand. Tradition has it, that piped water distributed by the municipalities has been the trusted water supply for drinking. Good old days, even water available from springs and wells used to be labelled as the purest form appropriately stored in earthen pitchers, brass containers and of late in plastics containers, and declared healthy for drinking. Serving drinking water to guests at home or a visitor in public places has been a social and charitable cause. All through, this style of serving drinking water, it has never been priced. However, in certain urban areas, refrigerated water is sold at 50 paise per glass, to cater to floating population. At railway stations and religious places, public hydrants/taps continue to serve traveling population. In very remote areas, drinking water could be seen as priced by the local population, as scarce commodity.

A foreign visitor to India always preferred to have soft drinks or demand a bottle of mineral water because he or she refused to trust the quality of the tap water supplied in India.

The tradition and style of serving drinking water in India has altogether changed during the past decade and a half. Whether at home or in public places there is constant demand for pure drinking water. Even water purification systems have been designed for home and institutions and the water thus purified is preferred to be served to the guests and visitors. Almost a decade ago, the introduction of bottled water or some may call it "packaged Mineral Water" has changed the tradition of serving and enjoying drinking water.

Today, Packaged Drinking Water is an industry in India. Estimated at Rs. 700 crores with over 200 brands, the bottled water has seen a significant development during the past five years. The material choice for the bottle originally that of PVC (plastic), has gradually shifted to PET (Polyethylene Terephthalate). Though the packaged drinking water industry has continued to grow with the entry of even multinationals like Coca

(contd. on page 3)



cola, Pepsi cola and Nestle, it was not without any teething troubles. "Bisleri" was the original brand name, which was introduced in the field of packaged drinking (Mineral) water. The growth of the industry was unexpected as the Indian consumer has been more traditional in serving drinking water.

The quality of water and the sealing of the bottles for any pilferage or adulteration were questionable. The standardization of the quality of water and of the bottles was not thought of. Consumers at times had been worried, whether mushrooming of the brand names in packaged drinking water will really assure purity and safety. The provisions of mandatory BIS certification and that of Prevention of Food Adulteration Act have brought in assurance to the consumers that packaged drinking water is trustworthy.

Every year an estimated 800 million liters of bottled water are marketed in India. The demand continues to grow. Besides bottled water, there is an assured market for plastic pouches (using LLDPE multilayer film) for drinking water, mostly in Gujarat and Tamilnadu. In Gujarat itself, the production capacity is estimated at 30 lakhs pouches of 250-ml. each per day. The packaged drinking water is marketed in different sizes of bottles ranging from 500 ml to 1, 1.2, 1.5, 2, 5, 18 and 20 litres, depending upon, for individual consumption or bulk supply. Priced reasonably from Rs. 5 for 500 ml to Rs. 40/- for 20 litres bottles, the plastic pouch of 250 ml. costs only Re. 1/-

The bulk supply during social and marriage functions is also through 20- litres bottles or small glasses of 200 ml. each. These disposable plastic glasses are made of Polystyrene.

Worldwide, the bottled drinking water is the fastest growing beverage industry worth \$ 22 billion a year, consuming 1.5 million tonnes of plastics (mostly PET) for the manufacture of different sizes of bottles. Whereas, in India, out

of 54,000 tonnes of PET, produced locally, only 12,500 tonnes go in for manufacture of bottles for the packaged water industry.

The PET bottle market is expected to grow to over 20,000 tonnes during the period 2001-2002. Ischmalbach-Lubeca PET Containers India has started production of preforms for Nestle India at its plant in Pune. The preforms are used for a new mineral water product under the brand "Pure Life" launched by Nestle in northern India, early this year.

The used PET bottles are disposable, their collection and recycling continue to worry the industry, consumers as well as the environment groups. There is a comfortable PET recycling industry in India with a capacity of 75,000 tonnes per annum. Worldwide recycling of PET has worried several countries and targets have been framed, even laws enacted, and a range of useful products designed using recycled PET. In India, the PET waste is recycled into fibres. Coca-cola India has initiated processes to recycle the reject PET scrap into yarn at its eight locations where it manufactures PET bottles. This is an effort to pre-empt a market situation of PET saturation that may arise about four years hence.

Packaged drinking water has now become a trend in satisfying one's thirst, whether in conferences and meetings, picnics, travelling by train or air, hotels and restaurants including offices and homes.

The style of serving drinking water packaged in PET bottles has its own charm. The bottles are handy, hygienic, convenient to carry and eco-friendly. Bottled drinking water is seen marketed in remote areas, urban as well as rural, even at city traffic junctions, up in the hills and far in the deserts, and promoted with confidence through print and electronic media. Above all, PET bottles are reusable for secondary applications and finally as part of waste stream, are collected for recycling.

...O.P. RATRA

Effective 1st July 2001, ICPE Mumbai Office Moves to its New Premises.

New address:

Indian Centre for Plastics
in the Environment
(ICPE)
203, 2nd Floor,
"Sagar Avenue"
(Opp. Shopper's Stop)
Andheri (West)
Mumbai-400 058.

PLASTICS 1998 REPORT - WESTERN EUROPE

- total plastics consumption, including virgin polymers and recycled granulates, rose 4.8 per cent
- per capita consumption of virgin plastics rose 4.4 per cent to 75.8kg
- more than 30 per cent of plastics waste was recovered, up from 25 per cent in 1997
- landfilling decreased by 9 per cent in 1998
- mechanical recycling increased by 10.6 per cent from 1997 to 1998
- energy was recovered from 3.348 million tonnes of plastics waste in 1998, an increase of 30 per cent on 1997.

PLASTICS GARDEN

Delhi Public School, Mathura Road, New Delhi, celebrated "Earth Day" on April 20, 2001. On this occasion, the school had organized an exhibition displaying and demonstrating the importance of Earth Day. A number of Delhi Schools participated in the exhibition. Among those who addressed the students included Mr. V. Suresh, Chairman-cum Managing Director, HUDCO, Dr. (Mrs.) Kamala

Chaudhary, Chairperson, Environment Council, Delhi Public School. While addressing the students, Dr. Kamala Chaudhary had worried about the indiscriminate use and disposal of plastics. She was sore about the upkeep of Lodhi Garden, New Delhi which is seen littered with plastics disposable ware like bags, cups and bottles. She said there were litterbins seen around but they do not seem to be

used by the visitors. Going on a morning walk through the garden she said, "Lodhi garden appeared to be Plastic Garden". While talking informally she agreed that the litterbins placed in public places must be used by the visitors for disposing of plastics and paper wastes. She also agreed that we must create awareness among public to avoid littering in gardens and parks.

PUJA CEREMONY

To formalize moving into new premises, ICPE performed Puja Ceremony on April 25, 2001. Those who graced the occasion included Mr. Sujit Banerji, Secretary and Member, Executive Committee, Mr. Rajiv Tolat, Member Executive Committee, ICPE; Mr. Arvind M. Mehta, President, All India Plastics Manufacturers' Association and Mr. Harilal Boolani.

Special features of interior of ICPE Office at New Delhi, include extensive use of Plastics building products, like PVC window frames, PVC paneling and door shutters including collapsible door for the pantry, cabinets etc.



FELICITATION FUNCTION

At a glittering function held in Mumbai on April 7, 2001, members of the outgoing team responsible for organizing Fourth International Exhibition and conference PLASTINDIA 2000 were felicitated. Mr. Shyam Tibrewal, President of Plastindia Foundation expressed his appreciation and gratitude to the whole outgoing team for their selfless efforts.

Hon'ble Mr. Ram Naik, Minister for Petroleum and Natural Gas was the Chief Guest at the function. He handed over Mementoes to the members of the

outgoing team in appreciation of their work.

Others who spoke on the occasion included Mr. M.L. Lahoti outgoing President of the foundation, Mr. Mukesh Ambani, outgoing President of the National Advisory Board (NAB) and Mr. Sarup Chowdhary outgoing Chairman of the National Executive Council (NEC) of Plastindia 2000.

Plastindia Foundation is the apex body of plastics manufacturers and users. The main objective of the foundation is to promote the development of the plastics

industry in India and abroad, and to assist the growth of plastics, plastics related materials and their products.

The Plastindia Foundation organizes seminars, trade fairs and exhibitions related to plastics, conducts training courses and manpower development programmes, provides consultancy and advisory services and publishes technical journals, periodicals, surveys and reports.

Plastindia 2000 attracted 7,50,000 visitors and 1055 exhibitors from 25 countries around the world. The total business generated during the exhibition amounted to Rs. 450 crores.

Fifth International exhibition, **PLASTINDIA 2003** will be held in New Delhi during February 15-20, 2003 and is expected to be the largest trade fair of its kind in Asia. PLASTINDIA 2003 will also have an international conference where global experts on plastics will share their experience and expertise with the delegates.



NDMC TO SET UP GARBAGE RECYCLING STATIONS

The New Delhi Municipal Council is setting up 10 garbage stations at INA market, Dilli Haat, Tilak Marg, Bangla Sahib Gurudwara and Connaught Place. These stations will have recycling facilities.

According to NDMC Chairman B.P. Misra, the garbage stations will be

leased out to private contractors who will earn revenue through advertisements.

"Tenders will be floated and private operators will be given the contract to maintain them. Caretakers will be stationed at the stations for 8 to 10 hours" he said.

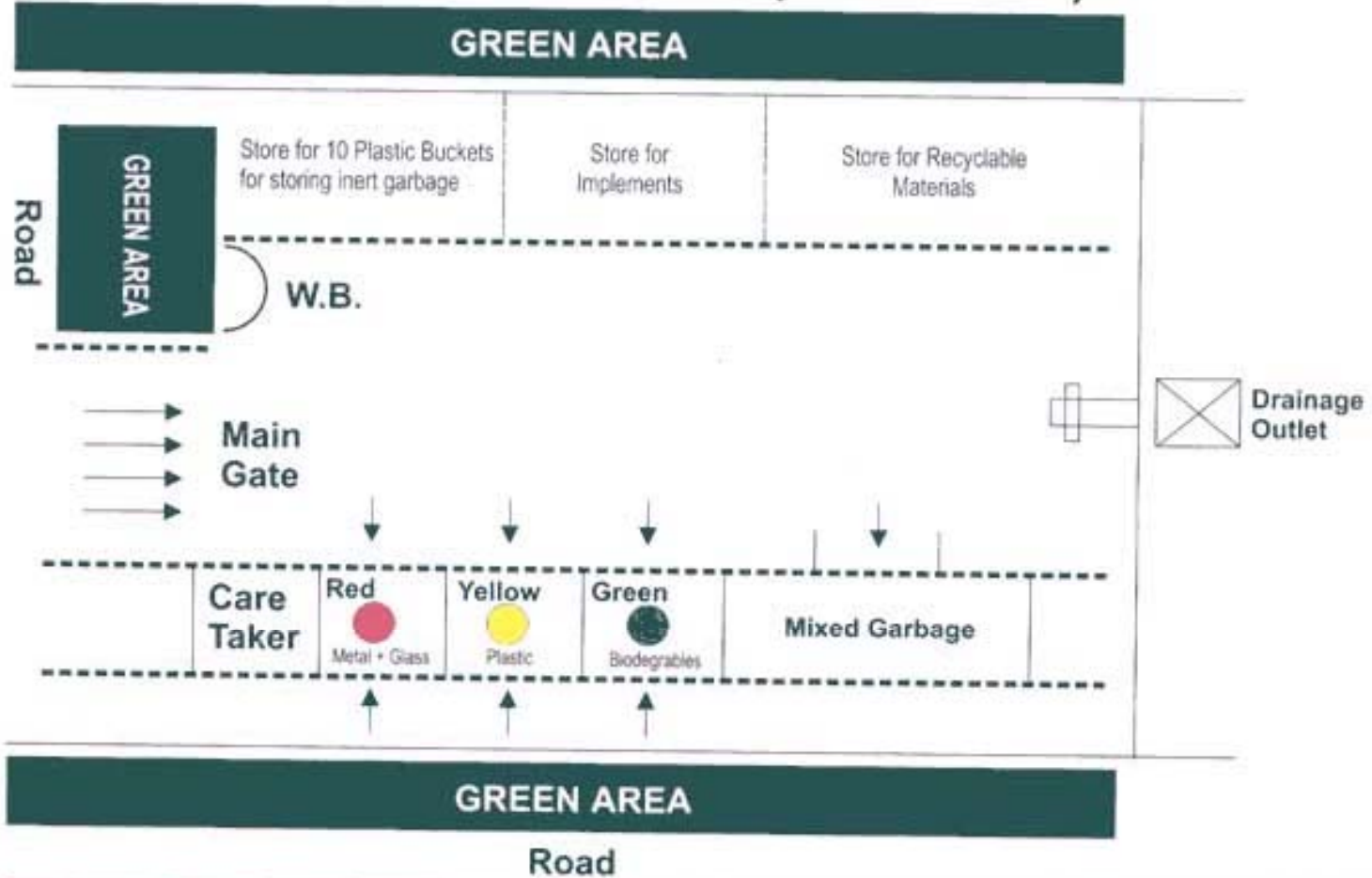
The caretaker will segregate the

garbage into four cans: "There will be separate cans for metal, glass, biodegradable waste and plastic and mixed garbage.

"While mixed garbage will sent to landfill sites, Plastic, metal and glass will be sold in the market," Misra said.

He claims this is the first step towards

NDMC GARBAGE STATION (1 OR 2 M.T.)



garbage segregation initiated by the Council. "Our net effort will be to educate people to segregate garbage at home", Misra added.

The NDMC has borrowed this concept from the West after realizing that Delhites will not stop throwing garbage on the roads "While hearing cases,

Judges ask us to start education drives for the people.

"But the people living in the NDMC area include politicians, bureaucrats and the upper middle class. They are all educated. So how does one aim to educate the already educated," questions an NDMC official.

"Our's is a servant-driven society. Unlike in the West, where garbage is stored in the house for a week before it is taken away by the collector, Delhites tend to throw garbage throughout the day. It is impossible to have safai karamcharis cleaning the colonies more than once a day, he adds.

GARBAGE COLLECTION IN CP PRIVATIZED, ROLE FOR RAGPICKERS

Express News Services, New Delhi, June 22, 2001.

The New Delhi Municipal Council (NDMC) in collaboration with New Delhi Traders' Association (NDTA), Chintan, an NGO and the ragpickers of Connaught Place, launched *Samagam*, an initiative to privatize waste collection. The scheme will also ensure the welfare of the rag pickers.

In its first effort to privatize waste collection, NDMC had decided to work in tandem with people who recycle solid waste and has allowed them to participate in privatisation efforts. Ragpickers handle about nine to 15 per cent of the waste generated, saving the municipality about Rs. 6 lakh daily.



Over 70 ragpickers gathered at E Block, Connaught Place to mark the inauguration of the scheme. The team working in CP has eight trained members.

Formed to promote social, mental, physical, psychological and economic well being of ragpickers, Chintan will supervise the working of the section. They also aim to provide ragpickers with banking and medical facilities and encourage private initiative in organizing the sector.

The scheme will initially start in three blocks D, L and M of Connaught Place. Chintan aims to create a module of financially viable and self-sustainable system on segregation and recycling of waste. It will also help waste pickers to organize themselves, which will include providing protective gear and other implements to facilitate door-to-door collection, segregation and recycling of garbage from all waste generators of the defined areas.



Chintan will also train the ragpickers, helping them in their skills, and collect garbage quickly. NDTA will collect Rs.



100 from all waste generators of the defined areas.

The amount generated will be spent on upgrading the living conditions of the ragpickers.

Speaking on the occasion, NDMC Chairman B.P. Mishra said, "Civic bodies alone cannot keep the city clean. We need the co-operation of citizens." He further added that the scheme would be implemented all over NDMC, if it is successful in Connaught Place. Special wheel barrows, which are easy to move around, were also unveiled on the occasion.



ICPE - NAGAR - BMC PROJECT "SEGREGATION OF WASTE COLLECTION"

ICPE has sponsored a project in association with NGOs Alliance for Governance and Renewal (NAGAR) and Mumbai Municipal Corporation to link citizens, government and the industry. With the co-operation of NAGAR through its project coordinator Ms. Priya Ubale and Mumbai Municipal Corporation through its Ward officer Mr. Achrekar responsible for Cuffe Parade area in Mumbai, ICPE has initiated the programme on segregation of dry and wet garbage. The programme was inaugurated by the Municipal Commissioner Mr. A. K. Srivastava on April 18, 2001. The area covered consists of 55 buildings in the Ward.

This waste management scheme is being operated in the following manner:

- The individual residents keep two separate bins to segregate dry and wet garbage.
- The dry and wet garbage bins are emptied into specially designated collection rooms on the ground floor of the building.
- Five rag pickers arranged by Ms. Jyoti Mhapsekar of Stri Mukti Sangatana are assigned the task of loading the BMC van from each of the building on a daily basis. They will be provided with safety wear such as Apron, Rainy shoes, Raincoat, cap bearing ICPE logo.
- After collection of dry garbage from the participating buildings the BMC van dumps the waste in a corner of "Suraksha garden" -designated by BMC.
- The rag pickers sort the waste material into plastic, paper, glass and keep for the Recyclers.
- The local Recyclers/dealers take stock of the sorted material and make payment to the rag pickers as per the prevailing market rates.
- The scheme is expected to be self-sustaining after an initial period of about three months of monitoring.

The system ensures that the rag pickers would go from one building to another and take all that is recyclable from the waste without scattering the garbage in the premises and footpaths.

The role of the Recyclers brought in the by ICPE would be to ensure effective and efficient management of the sorted dry waste on a day-to-day basis (eventually). It is expected that this



Recyclers meet addressed by Dr. A.N. Bhat on June 2, 2001 at Mumbai. Others seen in the picture include, Mr. Duggad, Mr PP Kharas, Mr Shyam Tibrewal, Mr Arvind Mehta and Mr Achrekar.

specific Solid Waste Management programme will cover more and more housing localities and in due course most parts of Mumbai. Correspondingly, the volume of dry waste is expected to rise substantially from 200 kgs/day at the present.

Meeting with Recyclers

To ensure operational success of the above project, ICPE has involved Recyclers of plastics waste. In this connection ICPE held a meeting with a select group of Recyclers in Mumbai on June 2, 2001.

Dr. A.N. Bhat, Director General, ICPE, gave a brief account of the objectives of the project. **Mr. Shyam Tibrewal**, President, Plastindia Foundation, outlined the broader picture on the utility of plastic products in the society and expressed happiness at the cooperation of the agencies such as Brihan Mumbai Municipal Corporation (BMC), NGOs Alliance for Governance and Renewal (NAGAR), ICPE, Stri Mukti Sanghatana (SMS) and the Recyclers.

BMC/NAGAR/ICPE Project

- Segregating dry and wet garbage from the household.
- Collecting the same in the respective buildings.



- Loading of the dry waste onto an exclusive van of the BMC by the rag pickers from SMS.
- Transporting the dry waste to a common dumping ground (A corner of Suraksha Garden) in an exclusive Van from the BMC.
- Sorting of the dry waste at the dumping ground by the rag pickers and kept ready for recyclers to pick it up.
- Recyclers buying the sorted waste from the rag pickers and transporting it to their recycling facilities.

ICPE Delegation Visit to Goa

A delegation from ICPE comprising Dr. A.N. Bhat, Mr. Rajiv Tolat and Mr. Rajendra Naik visited Goa for discussions with the Government officials regarding the notification prescribing minimum thickness of carry bags. The ICPE delegation had meeting with the Chief minister of Goa. Hon'ble Chief Minister Mr. Manohar Parrikar had

be too high to be viable for the recyclers.

- The Goa Administration is prepared to give the garbage absolutely free.
- The NGOs are now getting dispirited since the good work they undertook has not been carried to its logical conclusion.
- Mr. Rajiv Tolat offered to get some recyclers at the dump site for



invited officials representing Environment and Municipal Bodies in Goa.

The following conclusions were arrived at during discussions:

- A group of NGOs in Panaji had organized a collection drive for dry garbage through various agencies and schools from October to December 2000. A huge pile of dry garbage was collected and dumped at a site in Panaji.
- The administration now has a Herculean task of disposing off this dry garbage in an appropriate safe manner.
- A number of Recyclers were approached but none of them was interested in transporting this dry garbage to their own recycling facilities (possibly outside the state). There are no recyclers operating in the State of Goa. The cost of transporting the dry garbage would

inspection. The nearest known recycler is in a town called Chiplun in South Coastal Maharashtra.

- The Administration is also keen to talk to big companies like Coca Cola and Bisleri if they could offer some incentives to customers for returning the empty PET bottles.
- Dr. Varde, Director & Joint Secretary, Department of Science, Technology & Environment, estimates the share



Dr. AN Bhat seen addressing the Press conference

of plastics to be about 5-6% in the total garbage collected.

Press Conference

While in Goa, the ICPE Delegation in collaboration with Goa Small Industries Association (GSIA) had addressed a Press Conference. Dr. A.N. Bhat gave detailed presentation, on the role of ICPE and virtues of plastics as an environment friendly product. He dwelt on the wide spread myths regarding plastics. Dr. Bhat also had a meeting with Mr. K.N.S. Nair, Director, Municipal Administration, Goa.

The following recommendations were arrived at during discussions:

- Local plastics association has been advised to organize Awareness Programmes and establish rapport with local civic authorities,

Government of Goa and the local NGOs.

- GSIA must spread the positive environmental attributes about plastics through press, seminars and conferences.
- Intense efforts are also required to start the Awareness Programmes in the local communities, schools and at local Club levels such as Rotary, Lions club etc.
- The Chief Minister has given assurances about giving heavy subsidies in Goa to put up recycling facilities. As a first step, they should take immediate measures in removing the huge dry garbage lying unattended.
- GSIA must also come up with some concrete action plans to be

presented to the Chief Minister well before the deadline of the new notification being drafted.

- ICPE will give support to GSIA for their exhibition expected to take place this year with promotional material.
- Negative publicity by a few NGOs must be countered with positive campaign and educating the masses about the utility aspect of plastics. The false propaganda about toxicity of plastic must be countered with correct data. ICPE will assist them in this exercise.
- ICPE to be in regular touch with important Government officers such as Dr. Varde and Mr. Nair to keep them updated with progress.

MEETING THE CHALLENGES OF PLASTICS AND THE ENVIRONMENT—A WESTERN EUROPEAN PERSPECTIVE

By Dr. Neil Mayne, Head, Technical & Environmental Centre, Association of Plastics Manufacturers in Europe

As a representative of the European plastics manufacturers association, I welcome this opportunity to address the Indian plastics industry on the subject of plastics recycling and recovery. The intention is to give you an overview of developments in Western Europe in terms of progress being made against the background of ever increasing legislation in the environmental area. It is not the intention to propose how India should develop its approach to recycling -as in terms of waste management, the importance of local and regional circumstances is clearly recognised -but rather an opportunity to share our experiences and perhaps help avoid some of the mistakes made in Europe. I will also explain what the overall strategic direction is of our industry to ensure our industry has a healthy and sustainable future.

Let me first explain the role of our association. APME (Association of Plastics Manufacturers in Europe) recently celebrated its 25 years anniversary and therefore has a long

history in promoting the industry in general.

1. Association of Plastics Manufacturers in Europe

About 10 years ago the APME member companies founded a separate organization (PWMI) to focus on waste issues in responses to all the evolving legislation in Europe related to packaging and packaging waste. This was later integrated into APME where the activities continue as the Technical and Environmental Centre.

2. APME Technical and Environmental Centre

Since the early 1990's there has been a continuing focus on the reduction and management of waste within the European Union. A number of priority waste streams were identified and legislation is progressively being introduced both at national and at community level. Because of their versatility and widespread application, plastics are involved in these end-of-life product streams to a greater or lesser extent.

The first, and most important area for plastics is that of packaging. European Packaging and Packaging Waste Directives were introduced in 1994, and this is due to be revised with higher recycling targets for post-user waste during 2001. A similar Directive for end of life vehicles (ELV) was adopted at the end of 2000, while a proposal for Directive for waste electrical and electronic equipment (WEEE) is about to be considered by the European Parliament and Council. While it appears unlikely there will be a Directive at European level for building and construction waste, a formal recommendation for action at Member State level is expected.

What should be the reaction of industry to such proposals? The days of industry making products without regards for the consequences of when they become waste are long gone. Industry accepts a role of shared responsibility and the debate on Integrated Product Policy are just beginning at the European level. To appreciate the scale, of the challenge we only need to look at estimates made

12. EU Recycling schemes studied

Results showed that there is a general hierarchy of selective recycling schemes, which should be pursued.

13. General hierarchy of recycling schemes in Europe

In fact economic viability is, I believe, often a reasonable indicator of relative environmental benefit when assessing plastics recycling schemes, as the economics often reflects the overall use of energy. The overall mix of plastics actually recycled in Europe compared to the composition of the waste produced would indicate that when there is the flexibility, then the focus is on the most economic and environmentally beneficial schemes.

14. Plastics waste vs. plastics recycled

The key to improving these figures will be to focus on the success factors for eco-efficient recovery. Here the matching of supply of waste and demand for the resultant recycle is important. Because of their greater diversity compared to say glass, the recycling of plastics presents a number of specific challenges.

15. Features of plastics recycling

The reluctance to use mechanically recycled plastics for food contact is a major factor, as is the fact that many waste streams consist of mixed plastics with inferior properties. For instance the German DSD scheme collects packaging plastics comprehensively but around 2/3 of the total consists of mixed plastics. Such mixtures can be used for thick sectioned articles to replace wood or concrete, but here a careful consideration of the environmental impact needs to be made against other recovery options (such as feedstock recycling or energy recovery).

Feedstock recycling is another potential recovery technique available to plastics.

Whether recycling back to the monomer (for condensation polymers such as

PET) or cracking to a hydrocarbon feedstock (e.g. polyolefins) a number of technologies have been demonstrated on a large scale.

16. Feedstock recycling

However, to date only one plant, based on an existing investment, is operational in Europe (in Germany). As well as economic considerations a key feature is to ensure a committed supply of a constant waste quality to feed a large scale plant and thereby justify new investment. A form of feedstock recycling, which may well be exploited in other countries is the use of plastics waste as a reductant in blast furnaces to manufacture steel. Here the challenge is to develop a treatment process for the waste, which will meet the input specifications of individual steel plants.

In general we feel that energy recovery options offer a greater scope than feedstock recycling for recovery of significant volumes of plastics not suitable for mechanical recycling.

With their high calorific value, plastics can be a valuable fuel either in their own right or in combination with other combustible waste resources. Such fuels can substitute traditional fossil fuels and therefore help extend natural resources.

17. Energy recovery options

In addition, environmentalists of all shades of green are now accepting that there is no rigid hierarchy of waste recovery options, and there exists a large degree of overlap in the environmental attractiveness of recycling versus energy recovery.

Based on our knowledge to date we can therefore identify a number of success factors for the eco-efficient recovery of plastics waste:

18. Success factors for eco-efficient recovery

But in addition to fulfilling these for plastics it is important that waste

management is approached in a comprehensive way, involving all materials. Especially with durable goods, the end of life product is a complex mixture of materials. There is often an economic driver for the recycling, often the value of the metal, while the plastic is a low value mixture. So it is important to realise that complete dismantling may not always be the best route. Using a thermal treatment whereby the combustible components act as an additional source of fuel may make much more sense.

Equally with household packaging waste, the separate sorting and collection at source may not be as eco-efficient as new automated technologies for the treatment of the whole waste stream resulting in recovered fuels as well as fractions for recycling.

The key word here is flexibility in adapting to local circumstances and allowing the introduction of new technologies. The position of the plastics industry towards the European Waste policy reflects this.

19. Plastics and EU waste policy

There are encouraging signs that the EU Commission is now recognising much more the importance of considering the whole life-cycle of products, including end-of-life recovery, in judging environmental impact rather than undue emphasis on mechanical recycling.

In India the detailed solutions will probably be different to those in Europe, but one common principle will always remain; that of promoting the resource efficiency of plastic products, their positive contribution to the goals of sustainable development, and the use of end-of-life products as an additional material or energy resource.

20. The way forward

I am sure that with good co-operation, the plastics industries across the world can achieve recognition of the benefits of plastics in social, economic and environmental terms, thereby ensuring a sustainable future for us all.

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13. General hierarchy of recycling schemes in Europe

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PET) or cracking to a hydrocarbon feedstock (e.g. polyolefins) a number of technologies have been demonstrated on a large scale.

16. Feedstock recycling

However, to date only one plant, based on an existing investment, is operational in Europe (in Germany). As well as economic considerations a key feature is to ensure a committed supply of a constant waste quality to feed a large scale plant and thereby justify new investment. A form of feedstock recycling, which may well be exploited in other countries is the use of plastics waste as a reductant in blast furnaces to manufacture steel. Here the challenge is to develop a treatment process for the waste, which will meet the input specifications of individual steel plants.

In general we feel that energy recovery options offer a greater scope than feedstock recycling for recovery of significant volumes of plastics not suitable for mechanical recycling.

With their high calorific value, plastics can be a valuable fuel either in their own right or in combination with other combustible waste resources. Such fuels can substitute traditional fossil fuels and therefore help extend natural resources.

17. Energy recovery options

In addition, environmentalists of all shades of green are now accepting that there is no rigid hierarchy of waste recovery options, and there exists a large degree of overlap in the environmental attractiveness of recycling versus energy recovery.

Based on our knowledge to date we can therefore identify a number of success factors for the eco-efficient recovery of plastics waste:

18. Success factors for eco-efficient recovery

But in addition to fulfilling these for plastics it is important that waste

management is approached in a comprehensive way, involving all materials. Especially with durable goods, the end of life product is a complex mixture of materials. There is often an economic driver for the recycling, often the value of the metal, while the plastic is a low value mixture. So it is important to realise that complete dismantling may not always be the best route. Using a thermal treatment whereby the combustible components act as an additional source of fuel may make much more sense.

Equally with household packaging waste, the separate sorting and collection at source may not be as eco-efficient as new automated technologies for the treatment of the whole waste stream resulting in recovered fuels as well as fractions for recycling.

The key word here is flexibility in adapting to local circumstances and allowing the introduction of new technologies. The position of the plastics industry towards the European Waste policy reflects this.

19. Plastics and EU waste policy

There are encouraging signs that the EU Commission is now recognising much more the importance of considering the whole life-cycle of products, including end-of-life recovery, in judging environmental impact rather than undue emphasis on mechanical recycling.

In India the detailed solutions will probably be different to those in Europe, but one common principle will always remain; that of promoting the resource efficiency of plastic products, their positive contribution to the goals of sustainable development, and the use of end-of-life products as an additional material or energy resource.

20. The way forward

I am sure that with good co-operation, the plastics industries across the world can achieve recognition of the benefits of plastics in social, economic and environmental terms, thereby ensuring a sustainable future for us all.

MANUFACTURE AND USES OF PLASTIC WOVEN SACKS

Plastic Woven Sacks are manufactured by extrusion of Polypropylene (PP) granules under heat and pressure into flat tapes, which in turn are woven on flat or Circular Looms to produce sacks for desired end use. The normal tape denier ranges from 800 to 1000 with average Tenacity of 5.6 gpd, which results in the tensile strength of the bags to 90-100 kgf. This is enough to bear the load of the 50 kg of the content and sustains the accidental drops etc. The functional advantages of PWS as packaging material are given in Table 1.



Table 1: Advantages of Plastic Woven Sacks

Base Property	Functional Advantages
Excellent Chemical Resistance	Suitable For Packing Food Products
Inert	No Organoleptic Deterioration
Non Toxic	Useful For Food Packaging
Non Biodegradable	Can Find Other Uses
Non Hygroscopic	Ideal For Fertilizer, Chemical & Sugar Packing
Varied Colours	Aesthetic Appeal
Breathing possible	Preservation Efficient
Higher Tenacity Of Tapes	Better End Use Performance.

Table 2: Comparative Properties of PWS and Jute Bags

Properties	PWS Bags	Jute Bags
Seam Strength	Strong	Strong
Surface Texture	Smooth	Rough
Operational Convenience	Good	Good But Abrasive
Capacity Utilization	Excellent	Excellent
Stack Stability	Good	Good
Resistance to Hooking	Poor	Fair
Drop Test Performance	Very Good	Fair
End-Use Performance (W.R.T. Bursting, Damage, Spillage, Replacement)	Excellent	Good
Grain Preservation Efficiency. (Breathing)	Very Good	Excellent
Resistance To Moisture Dampening	Excellent	Poor
Organoleptic Deterioration	Nil	Very High
Chemical Resistance	Excellent	Poor
Aesthetic Appearance	Excellent	Poor
Air Borne Pollution	None	Very High
Seepage	Very Low	Low

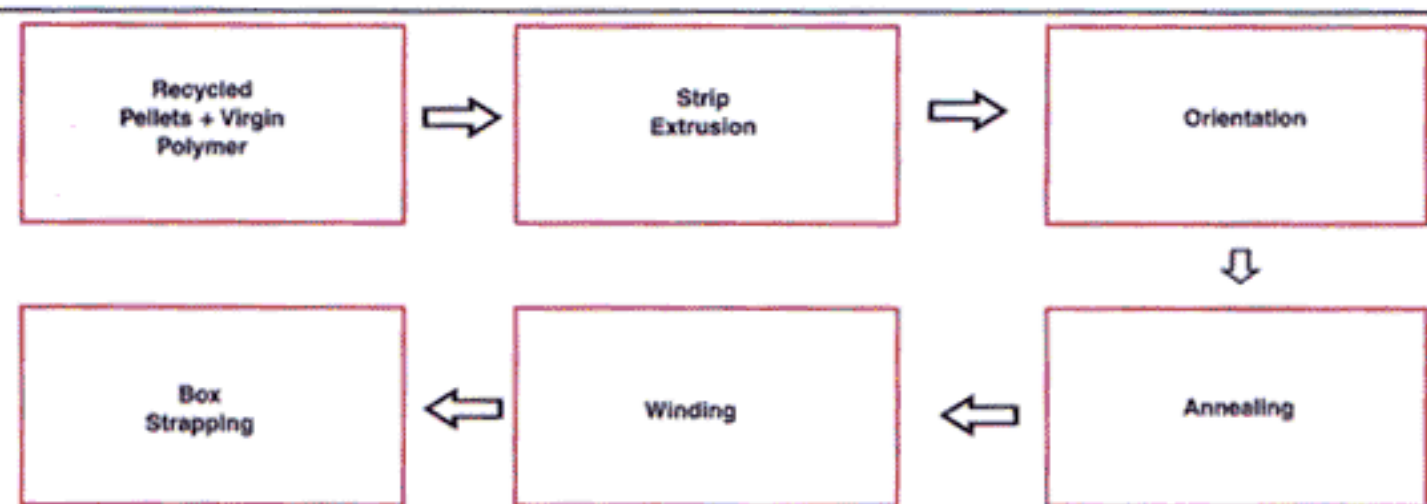
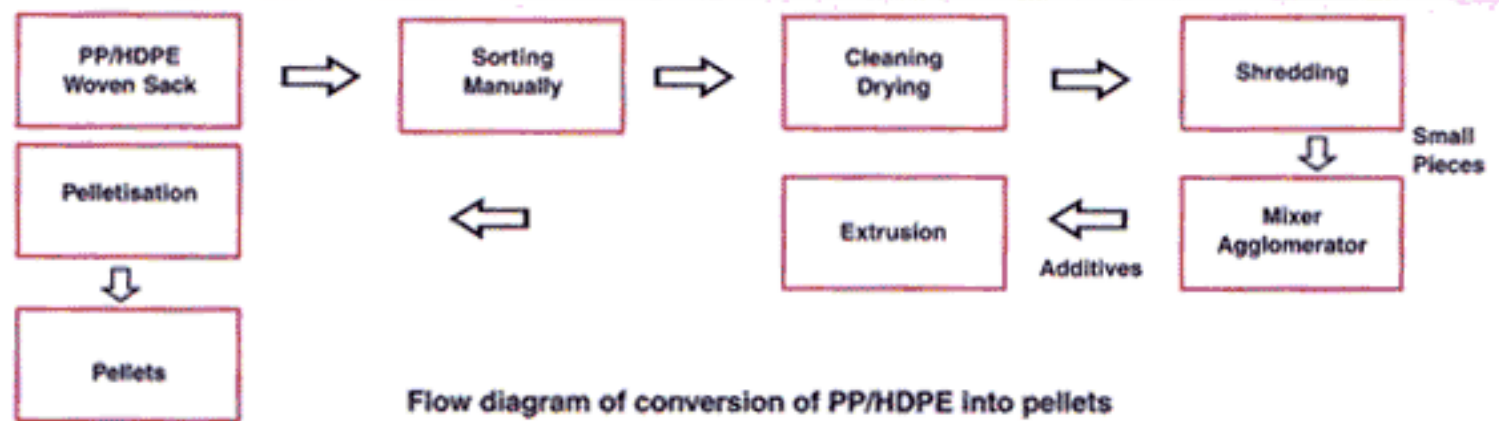
Unlike natural material like jute and paper, plastic woven sacks are eco-friendly because PWS manufacturing involve low energy input, no air polluting, generation of dust, effluent free, (since no chemical treatment like softening/bleaching is needed, no use of hydrocarbon oils), instant colouring, no emission of gases, safe & healthy manufacturing processes.

Above properties are combined with inherent advantages of Plastics Woven Sacks. A comparative advantage of Plastic Woven Sacks vis-a-vis jute bags is given in Table 2.

Types of Waste

Since Plastics Woven Sacks are used in packing of bulk commodities, large quantities of used Woven Sacks are rejected as waste. The source of Plastic Woven Sacks Waste can be categorized into Manufacturing Waste and Consumer Waste.

Manufacturing Waste includes ruptured tapes, inferior quality tapes, cut and torn of unspecified Woven Sacks, which are generated at manufacturing stage. These go at 1st grade waste and are routed through retailers to the recyclers for processing.



Flow diagram of conversion of Recycled Pellets into Box Strapping

Consumer waste is the major source of Plastic Woven Sacks Waste and is generated at consumer end. Packed product reached the consumers is being emptied and the bags rejected as waste. These bags are available for either reuse or recycling into useful products.

In India, there are more than 1000 units manufacturing plastic woven sacks, with annual consumption of more than 5,00,000 MT polymeric raw material and their reuse and recycle data is provided in Table 3.

Table 3 : Plastic Woven Sacks

(Annual Consumption : Reuse/Recycle)

Annual Consumption	500,000 MT
Recycled	350,000 MT
Reused	140,000 MT
Discarded	10,000 MT

Reuse and Recycle of Plastic Woven Sacks

Production of 500,000 MT per annum of plastics woven sacks is definitely going to generate some waste. 4R strategies are being employed for their eco-friendly disposal.

- Reduction at source -Minimize the Account of Waste
- Reuse--Extend life
- Repair -Extend life
- Recycle--Recover raw material

(All strategies are environment friendly)

Credit: U.K. Saroop, R.K. Jha, S.R. Debnath



Dr. AN Bhat seen addressing the Seminar 'Plastics-A Friend of Environment' at Ahmedabad on 8th January 2001.

KEEPING TRAIL OF A RAGPICKER

April 21, 2001, 1630 to 1700 hrs.

Location: New Delhi Railway Station, Platform No. 1.

Visiting Railway Station to see off your friends and relatives is an experience in itself - pleasant or otherwise. While you watch passengers anxiously awaiting to board their desired train for the journey, there are vendors who are busy and watchful for their customers to buy a bottle of soft drinks, mineral water or a copy of the magazine



or a newspaper. The platform from which you wish to board the desired train is obviously crowded. In this crowd, not many would care to keep trail of at least one person who is seen clearing the litterbins and collecting waste paper and plastics. The person no other than a "rag picker" for whom clearing of litterbins for the value added waste is a daily ritual because it provides him for his livelihood.

Trains arrive and depart from the platform but this ragpicker perhaps has no wish to travel and be satisfied with his daily collections of value added waste both plastics and paper, which get accumulated everyday at the platform.

Following the trail of one ragpicker at the platform was a very interesting experience when he was seen pacing up and down the platform and railway track in search of plastics waste. While the collection of plastics waste was clean environmentally, the littering near the railway track was environmentally hazardous looking at the sewage disposal on railway track.

For the passengers and visitors in waiting at the platform, the obnoxious

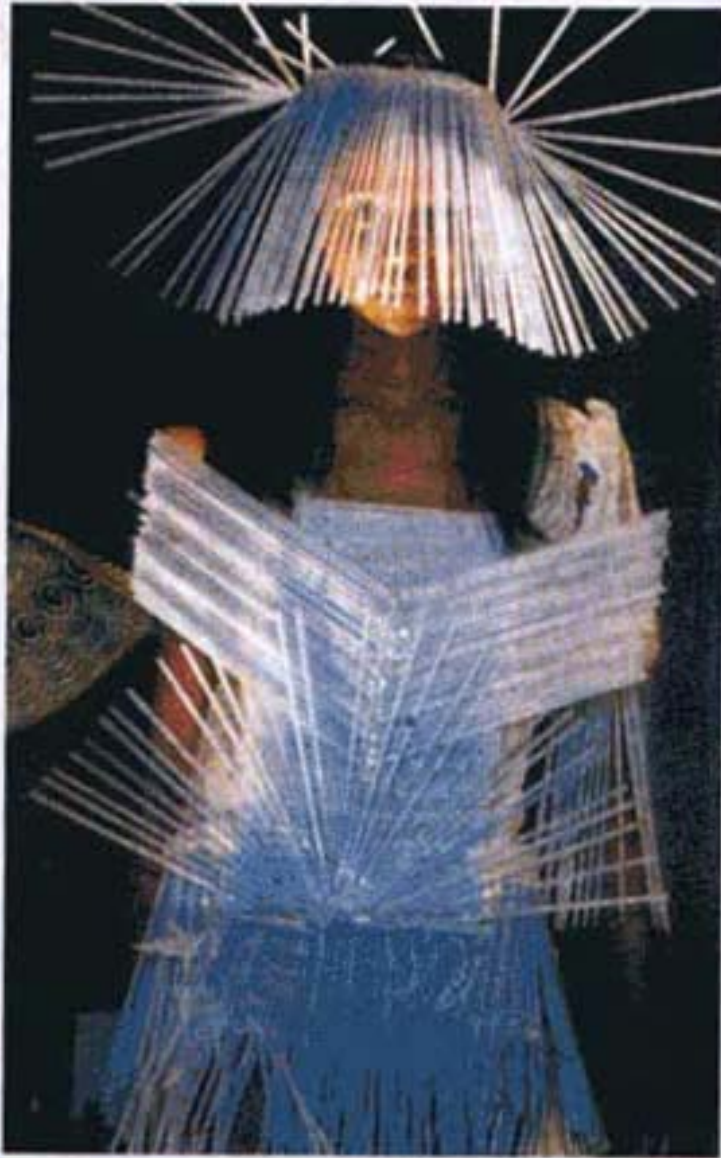
sight of open disposal of sewage on railway track was certainly not environmentally friendly. Not to speak of the car parking at New Delhi Railway station where one has to park one's car almost on the garbage dump.

The Railway Stations must be environmentally clean or appear so. While the rag picker is seen doing his duty to clear the recyclable waste, the



visitors and passengers alike have a responsibility to avoid littering, whereas the Railways have an obligation to keep the platform and railway track clean atleast at the stations.





Garb of Garbage

A model presenting a dress made of plastic straw, and plastic bags recycled from the garbage dump, in Nairobi on Tuesday the 5th June 2001. The Fashion show coincided with World Environment Day.



जैव डिजाइनर कार्ल जेफरसेन्ब की स्ट्रॉ/सबूर कॉलेजान में से एक ड्रेस का शोघाई ने प्रदर्शन करती एक चीनी मॉडल। भूरे रंग की स्लीवलेस जिएर जेकेट और स्कर्ट की हरी भारीदार प्लास्टिक स्ट्रॉ के साथ छटा देखते ही बनती ही थी।

जब भी खरीदारी करने के लिए जाएं
अपने साथ कपड़े या कैनवस का थोला जकर ले जाएं

और अगर कोई आपको पालिसिन में सामान दे
तो उसे लेने से इन्कार कर पीजिए

जनजागरण के लिए
दैनिक जागरण
की पहल



These are typical hoardings / ads put up in different cities all over India, as an effort of the Environment Groups to launch negative campaigns against plastic bags. Such negative campaigns have, however, not affected the use of plastic bags because of their convenience and ease of handling. For the consumers at large **plastic bags are here to stay.**

Please do not litter public places and parks.



DO YOU KNOW . . .

Wood-fiber composites yield cost-effective products to replace wood

Wood-plastic materials are hybrids with their own special envelope of properties. Wood-fiber reduces weight, imparts a wood-like look, and enhance physicals (stiffness) in end products. It is more moisture-resistant and dimensionally stable. Wood-fibers are selected by type, colour, and particle size to optimize composite performance. The use of agro-fibers, for example sugar cane, peanut, and coconut is being explored in Europe. On the polymer side, new resins and formulations are being tapped, broadening wood-plastic composites' capability. The long-preferred (and low-cost) material of choice, reclaimed PE, is now being supplemented by virgin PE, PVC, and PP.

These composites are a marriage of materials that expand cost-performance and raise potential for exterior profile extruders. The wood-fiber composite processing, screw and die design and other know-how is offered by a number of US firms. Wood-fiber composites are diversified in a number of novel construction profiles, which include decking, fencing, railing, window, corner post, framing products. Emerging markets include furniture, doorframes, and siding. In Japan, promising end-uses include walls, flooring, louvers, and indoor furniture.

Advanced processing approaches are playing a role in wood-plastic composites. Some depend heavily on conical, twin-screw counter-rotating extrusion equipment, and require pre-heating to thermally remove typical 5 to 8% by weight moisture levels from the wood fiber prior to extrusion.

PVC gives better physical properties, superior and more consistent colour fade,



In Japan, Wood Fiber and PP are used in furniture, fencing, railing and decking. [Photo, EIN Engineering]

and good results in flame spread tests, as claimed by CertainTeed. The Company has introduced its Boardwalk line of vinyl-wood decking.

Virgin PE and PP grades, selected and tailored specifically to optimize performance in given end-uses are the new material candidates. What end-users in decking want is a true alternative to wood. That means not just decorative equivalence, but also load-bearing capability comparable to wood. Bill Crostic of BP Amoco predicts that PP will heavily replace existing materials. PP's value-added performance is key, those PP wood composites have superior stiffness-toughness, and better creep resistance. Extensive testing of various polyolefins by BP Amoco shows high crystallinity PP homopolymer as a prime candidate.

An initiative by Solvay is PP and PE powders with mesh size intentionally made to match those of wood flour.

Wood-plastic composite extrusion is a delicate matter since wood degrades easily, wood ratios are high (50 to 60%).

(Source: Modern Plastics International, December 2000, pp. 62-66)



Boardwalk, a solid-profile vinyl/wood decking product, has been introduced in the US [Photo, Certain Teed]

Govt thinks conditions laid by LG are delaying the Bill

EXPRESS NEWS SERVICE
NEW DELHI, JUNE 9

THE Delhi government is treating for a stand off with Lieutenant Governor Vijai Kapoor following his conditional approval to the Bill banning use of recycled plastic bags to carry food items.

After much controversy and reference to a select committee, the Delhi Plastic Bags (Manufacture, Sale and Usage) and Non-biodegradable Garbage (Control) Bill 2000 had been passed by the Delhi Assembly during its winter session in January and had been sent to the LG for approval.

While notifying the Bill about three weeks back, the L-G placed two conditions. He has stated that the definition of food in the Bill passed by the Assembly should conform to the Central government notification which refers only to "ready to eat items" and not "all consumable items" which the Delhi government had wanted.

Secondly, the enforcement of the ban should be coordinated with



all the civic agencies and a time-bound plan be given. With the L-G laying down these conditions for bringing the ban into effect, the Delhi government is now in a dilemma over its much-touted Bill. According to the Delhi government, the Bill in its toned-down version will not be successful in banning use of plastic bags entirely.

Also, for the Delhi government, accepting the L-G's conditions and

bringing the Bill back into the Vidhan Sabha for an amendment would mean a loss of face. Earlier, because of the controversy over the definition of 'food', the Bill had been referred to a select committee of the Delhi Vidhan Sabha. The committee, however, was divided over which definition of food should be adopted and both the BJP members in the committee had voted for the "ready to eat" definition. Sources in the government feel that accepting the L-G's conditions would mean that the minority BJP had prevailed.

On the other hand if the Delhi government ignores the conditions, the ban on plastics cannot be enforced, nullifying its approval by the Vidhan Sabha.

When asked if the Delhi government was planning to bring the Bill back into the Vidhan Sabha during the next session for an amendment, Delhi Environment Minister A.K. Walia said, "We want total discouragement of the use of plastic. When it gets into

PALLETS FROM RECYCLED PLASTICS

COST-EFFECTIVE SOLUTION FOR DISTRIBUTION

Pallets are a fundamental and established tool of the distribution business and are used for transporting everything from cereal cartons to polymer pellets. Recent design and technological innovations mean that there is now a longer-life alternative to the traditional wooden pallet—which offers a combination of cost-effectiveness and convenience.

Benefits of recycled-plastics pallets

Durability: plastics pallets typically last for 20 trips—far more than traditional formats.

Cost savings: over their lifetime, companies using recycled-plastics pallets have seen substantial cost savings

Recyclability: damaged pallets are easily recycled, extending resources, reducing landfill and providing a valuable contribution towards the achievement of recycling targets

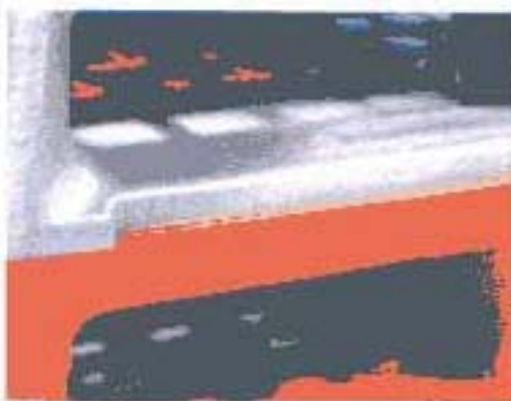
Lightweight: plastics pallets are lighter, and of a more constant weight as they do not become waterlogged, reducing the fuel needed to transport them

Return rates: because recycled-plastics pallets can be uniquely colour-coded or branded, and have a dedicated function high return rates may be attained

Customisation: recycled-plastics pallets can be specifically designed to handle irregularly-shaped loads.

Health and Safety: because recycled-plastics pallets do not splinter and are easily cleaned, they remain safe and hygienic.

(Source: APME)



FROM USED BOTTLES TO COLLECTION BOXES

Japan has stepped up its efforts in recycling used plastics containers due to the implementation of the Container and Packaging Recycling Law. The Law, which came into full force in April 2000, aims at tackling the serious problems concerning post-consumer recycling. One such problem is the recycling of used PET bottles.

Plastics product manufacturer Hisashi has come up with an innovative way to recycle used bottles to make boxes for the collection of used bottles. Known as PET Trash on the market, each bottle collection box measures 390 x 440 x 800 mm and is made from 100 500 ml PET bottles. The box has the capacity to hold

up to 60 500 ml PET bottles or 90 350 ml canned drinks.

Hisashi produces the boxes using a specialised PET bottle recycling machine, AOKI-3000H-60. This injection stretch blow moulding machine developed by Aoki is claimed to be the first of its kind that allows the manufacture of recycled products directly from the flakes of used PET bottles. Unlike typical recycled products which are made using recycled pellets, the recycled products made by this machine have a cost advantage as the machine eliminates the need for first pelletising the flakes, thus minimising the cost of processing the raw materials. The machine

can process up to 25 million 100 ml bottles/year.

Manufacturing of the collection boxes takes place in Hisashi's new factory located in Higashi, Osaka City. Production started in June last year with an output of 500 units/month. Yoshio Imai, executive director of Hisashi, expects that the output will gradually increase up to 5,000 units/month and revenue will reach ¥120million (US \$ 970,000) by the end of this fiscal year ending April 2002.

(Courtesy: Asian Plastic News, June 2001, Page 29)





Carrying foodstuff in recycled plastic bags is harmful and against the law. Plastic bags should be marked as made of "recycled material" or of "virgin plastic".

These are part of The Recycled Plastics Manufacture and Usage Rules, 1999. You have to follow them as an important step in keeping Delhi clean and green.

Should be corrected as "Ready-to-eat-food items"

Department of Environment
Govt. of N.C.T of Delhi

DPE/1945/2001

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Materials of Choice



PLASTICS ARE ENVIRONMENT FRIENDLY AND RECYCLABLE