

The barriers to recycling plastic waste

BREAKING BARRIERS TO RECYCLING PLASTICS WASTE

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INTRODUCTION

Plastics, the modern materials that substitute metals, wood, natural fibers and paper products, providing economy and convenience to users-have come to stay in our lives.

Plastics in many forms live as long as buildings as pipes, conduits, wires, tanks, window/door profiles and last as long as automobiles and consumer durables, as parts replacing steel and other metals. But in many other uses they are short lived in primary form as packaging materials for FMCG, Agro & Industrial produce.

This gives rise to the opportunity to reprocess plastics for re-use. The factories that make plastics processed goods have their own waste in the process & this is the easiest to reprocess. Packaging materials for commodities like food grains, sugar, cement, fertilisers so on are either re-used for sometime & later recycled or available for reprocessing after first use.

We now come to the FMCG goods that we as consumers buy day in & day out. They are mostly in plastics packs as containers or flexible pouches or wraps. Some of them have lamination with paper & Aluminium foil (Lami tubes & tetra pack cartons) They are discarded from our homes or public places for food service. More & more multi layer films by co-extrusion or lamination are used to enhance shelf life & suit new merchandising techniques.

Herein lies the challenge of segregation and cleaning prior to reprocessing. Home discards having traces of content sticking to the film further makes matters more complicated.

While most urban citizen comply with wet & dry waste segregation with bins, many plastic items in the dry waste end up in landfills as the cost of separation, washing & cleaning does not meet commercial consideration for reprocessing.

We at Steer Engineering, have focussed on a process to make this stream of co-mingled plastics waste a viable value added product by recycling.



OMEGA 1.71 DO/DI

The Technology

The OMEGA SERIES sets a new standard in the compounding industry. The revolutionary 1.71 Do/Di allows manufacturers to increase their production capacity by up to 25%* with its increased volume and torque ability. The patented 'fraction-lobe' special elements enhance process efficiency and quality of output, while delivering far greater returns on investment.

STEER technology provides the ability to process different types of mixed plastics into advanced plastics with desirable properties for a variety of applications.



Co-mingled film waste collected from home discards



After shredding and agglomeration the feed is ready to reprocess

THE PROCESS

We have developed a process where co-mingled plastics film waste is shredded and agglomerated in a specially designed equipment. This is directly processed in our Co-rotating twin screw extruder and this melt stock is reinforced with continuous glass filament bundle known as rovings. The screw configuration ensures homogenous melt and the patented elements minimise attrition of glass fiber. The extrudate passes through a die to obtain circular or square rods or compact sheet strips.

Rods are stiff enough to serve as structured products for fencing, pot stands, furniture items and the like. Strips are compression pressed into sheets for claddings, floorings and partitions in buildings. Unlike other recycled plastics in the form of pellets for injection moulding or extrusion of monsoon films, this process opens up new avenues of use.

In a nutshell the process deals with the most difficult plastics waste which will otherwise end up as land fill & develops a stiff product which is an intermediate for structural uses- a new outlet for recycled plastics, widening the application base.



Pot stands & Trolley from rods reinforced with long glass and Re-Cycled GPVC Desks for schools

Recycling of plastics is considered the next viable and technically feasible option to tackle plastic waste. The approach utilizes several technologies to produce a second supply chain of raw materials. Recovery of secondary raw materials through recycling is given the highest priority after reuse, according to the waste hierarchy. Plastic waste is also integrated with bitumen for laying roads. The process of laying roads by utilizing this technique has been well established for the advantages it offers. The approach utilizes several technologies to produce a second supply chain of raw materials. Recovery of secondary raw materials through recycling is given the highest priority after reuse, according to the waste hierarchy. Recycling options are generally classified into primary and secondary recycling, while tertiary recycling is preferred for multilayered plastics (MLPs) where separating individual layers is difficult and expensive. Recycling requires participation from the public and, therefore, needs citizens to perform separation of waste materials at the source.

While India's average per capita consumption of plastic is about 11 kg, which is considerably low as compared to the global average of 28 kg. This is further brought into perspective with a special emphasis on the US where consumption is nearly ten times. An estimate by the Ministry of Petroleum and Natural Gas, Government of India suggests that the annual per capita consumption in India would be 20 kg by 2022. In the coming years, world plastic production and consumption would increase considerably. This will lead to large amounts of plastic waste generation and related GHG emissions by 2050 as per the World Economic Forum. WEF also stated that owing to the dependence on petroleum feedstocks, oil consumption will have increased threefold and the carbon budget would register an increase from 1% to 15%. As per the WEF report indicates that 60% of the total plastic waste is being recycled. The major challenge, however, is segregation and re-



Production of rods at Steer factory

aggregation of plastic waste streams such as packaging waste, including laminated plastic. Although recycling is one of the preferred ways to deal with plastic waste in the waste hierarchy, the concern is the heterogeneous properties of unsegregated and littered waste that remains scattered in the urban landscape. These result in an unpleasant landscape, choking of drains, and release of GHGs from landfills at times leading to a fire.

CONCLUSION

A combination of materials knowledge and processing capability of co-rotating twin screw extruder have resulted in a new range of stiff extrudates that are valuable intermediates for designers & entrepreneurs to develop useful applications. This process also prevents the waste stream from ending up as landfill and presents a better value proposition while addressing the environmental issue.