IJRAR.ORG E-ISSN: 2348-1269, P-ISSN: 2349-5138

INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG

An International Open Access, Peer-reviewed, Refereed Journal

IMPORTANCE OF RECYCLING OF PLASTIC FOR THE PROTECTION OF ENVIRONMENT

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ABSTRACT

In our country much importance is not given to the plastic recycling industry. There are no large scale industries of plastic recycling. The paper made on attempt in emphasising the economic development of any country does not mean that we should just increase GDP, attaining full employment, eradicating poverty, increasing literacy rate or any other socio-economic phenomena. In the process of economic development, it is important for countries to look after the environmental costs. The paper is about the importance of recycling in protecting the environment. Though recycling may be a simple task, it has its own importance. Recycling of plastic is the best way of reducing the production of plastic. It is reducing the usage of plastic we can protect our environment.

Keywords: Plastic Recycling, Socio- Economic, Environmental costs

INTRODUCTION

Waste is generated during the process of production and using the materials and products. All the products that have put forth in the market will become waste on day or the other. Considering the above situation, recycling and recovering of waste solving the away from land fill plays a significant role in solving the problems that has negative impact on environment through increasing in the volume of waste.

Recycling is a process in which it deals with the conversion of trash into valuable items. The process of recycling has been use to manage waste segregation for many years that involves gathering materials which can be recycled like paper plus plastics and beneficial raw materials are extracted from them.

The paper made an attempted to provide information about plastic-its composition, types and uses. Plastic has revolutionized the way we think and live. We have reached a stage where we cannot think of life without plastic. Plastic is used in the environment finds its cause in the irrational use of plastic.

Origin and development of Plastic

Plastic has become one of the most used materials in the world. Some of the special properties of plastic like low density, low electric conductivity, transparency and toughness has revolutionised our life and out-dated the traditional uses of wood, stone, horn and bone, leather, paper, metal, glass and ceramic. The word plastic is derived from the Greek term 'plastikos' and plastos. Plastikos means fit for moulding and plastikos means moulded. The first man made plastic dates back to 1855 in Birmingham, UK. This first attempt was made by 'Alexander Parkes'. However, this was not the synthetically prepare plastic. It was made from cellulose treated with nitric acid and a solvent, which gave out cellulose nitrate or pyroxilin. The first plastic based on a synthetic polymer was made from phenol and formaldehyde by Belgain-born American scientist 'Leo Hedrick Baekeland in 1909. This grabbed the attention of producers to produce a new synthetic replacer to the traditional materials.

Meaning of Plastic

Plastic is a chemical compound that can be moulded by pressure or other mechanical means at a suitable temperature into a required form, which is then retained in that particular form up to its durable form.

Types of plastic which has recently developed

- Polystyrene and PVC: Polystyrene is a rigid, brittle, inexpensive plastic that has been used to make plastic model kits. PVC has side chains incorporating chlorine atoms, which form strong bonds. PVC in its normal form is stiff, strong, neat and weather resistant and is now used for making plumbing; gutters, house siding, enclosures for computers and other electronics gear.
- Nylon: The real star of the plastics industry in the 1930's was Polyamide far better known by its trade name Nylon. Nylon was the first purely synthetic fibre, introduced by DuPont Corporation in the 1939 world fair in New York City. The first application was for bristles for toothbrushes. However, DuPont real target was silk, particularly silk stockings.
- Rubber: Natural rubber is an elastomer that was originally derived from latex a milky colloidal suspension found in the sap of some plants.
- Bio degradable plastics: Research has been done for biodegradable plastics that break down with exposure to sunlight, water or dampness, bacteria, enzymes, wind abrasion and some instances rodent pest or insect attack are also included as forms of biodegradation or environmental degradation. Starch powder has been mixed with plastic, as a filler to allow it to degrade more easily, but it still does not lead to complete breakdown of the plastic. Some researchers have actually created genetically engineered bacterial that synthesized a completely bio degradable plastic but this material such as Biopol is expensive at present.
- Bio plastics: a number of manufacturers have been exploring alternatives to plastic made from non-renewable fossil fuels. Such alternative bio plastics include polymers made from plants, sugars and plastics grown inside genetically modified plants or micro organisms. Health and safety concerns have

arisen over potentially hazardous chemical additives to plastics and consumer pressure has contributed to manufactures switching to plant based in such cases.

- Oxo- Biodegradable: Oxo biodegradable plastic is polyolefin plastic to which has been added very small amounts of metal salts. as long as the plastic has access to oxygen, these additives catalyse the natural degradation process to speed it up so that the OBD plastic will degrade when subject to environmental conditions once degraded to a small enough particle they can interact with biological process to produce a water carbon dioxide and biomass.

Use of Plastic according to its quality

PET (Polyethylene Terephthalate): commonly found on 2 litre soft drink bottles, cooking oil bottles, peanut butter jars.

HDPE: High density polyethylene commonly found on detergent bottles and milk jugs.

PVC: Polyvinyl chloride commonly found on plastic pipes, outdoor furniture, siding and floor tiles.

LDPE: Low density polyethylene commonly found on dry cleaning bags, produce bags, transhcan liners and food storage container.

PP: Polystyrene commonly found on bottle caps, drinking straws, yogurt containers, used to make chairs, food containers, appliances, car fenders etc

PS: Polystyrene commonly found on packing peanuts, cups plastic table wire, meat trays, take away food clamshell container, plate's cutlery and cassette boxes.

High impact polystyrene is used to make fridge liners, food packaging and vending ups Acrylonitrile butadiene styrene is used for electronic equipment cases, drainage pipe Polyramides are used to make fibres, toothbrush bristles, fishing lines under the hood car engine and moulding

Polyurethanes is used to make cushioning foams, thermal insulation foams, surface coatings, printing rollers.

Polycarbonate is used to make compact discs: eye glasses, riot shields, security windows, traffic lights, lenses.

Polyvinylidene chloride is used for food packaging.

Alternatives to Recycling

1. By developing and using products requiring less material per unit of the products e.g. the nano cars use of small car

2. substituting re-usable product for single use of disposable products e.g., try to make lifetime products, which can be reused

3. Increasing the number of times the products is reused

4. Reducing the number of units of the products consumed by household e.g. each person in the family using the car

The conservation of natural resources should be made mandatory for all governments. This needs a holistic approach.

Introduction to Recycling

The establishment selected for our project analysis is located in the industrial area in Nayandalli near Mysore road in Bangalore. This industrial area consists of various types of industries like packing industry, food processing industry, plastic sheet making industry etc.

Background

In the beginning of the 21st century, there was no plastic recycling industry in the south zone of Bangalore. There were millions of tons of recyclable plastic dumped into the outskirts of Bangalore. By seeing the extent of solid waste, an idea of starting a new plastic recycling industry flashed to the mind of ex-army personnel Sri Umapathy. Then he started a firm under sole proprietorship in 2003, as a small unit, which began with basic recycling technique. This firm has developed from that basic stage to the advanced stages like manufacturing plastic sheets, fibre articles etc. In our project analysis, we have taken this basic plant that could be considered as the mother of all other plants.

Process of Recycling

The raw materials of this industry are the waste plastic covers like milk covers, curd covers, carry bags and other low density polythene materials. These are purchased from different dealers who run the old scrap shops. Apart from this, the dealers get waste plastic materials from rag pickets. These dealers become major source of raw materials to this industry. This industry purchases about 4 to 5 quintals of low density of plastic every day, which are available at 10am in the morning at its premises.

The process of recycling takes place in 6 stages, namely

Stage 1: Sorting: in this stage, workers sort the waste plastic materials, which are supplied, this lot is a mixture of sand, small metal pieces, some high density plastics. These are not necessary for the industry. This would form wastage of about 20% of raw materials. Then these sorted raw materials are moved to the next stage.

Stage 2: Decolourising: In this stage, the sorted materials are dumped into a container in which, caustic soda solution (NaOH) is used as decolourising agent. The chemical property of NaOH decolourises the waste plastic into white covers. In this stage of process 10% wastage is produced in the form of effluent of decolourising agent that contains colouring agents, fat and oil content of milk and curds as remains in the plastic covers. The output of this stage is the thin, pure white covers. This output is moved into the next room.

Stage 3: Chopping: In this stage, the white plastic covers are dumped into the chopping machine. This chopping machine is run by a 10 HP motor, and it consists of 6 blades. This finely chops white plastic cover into tiny pieces that is almost like powder. This finely chopped plastic is moved to the next stage.

Stage 4: Melting: In this stage, those finely chopped plastic is dumped into a large machine, which uses 60 percent of the power consumption of the industry. This equipment heats up the chopped plastic into the molten form. In the liquid form, it is easy for plastic to change its shape. In that form, it is squeezed from the equipment in the form of wire. This wire like structures is then moved to the next stage, which is attached to the equipment itself.

Stage 5: Condensing: In this stage, the heated liquid form of plastic is pulled down into the tank of water. This tank has the constant supply of water through a tap. This process is used to cool down the molten plastic. After cooling down these plastic wires becomes harder, then it moves to the final stage

Stage 6: Granulating: In this final stage, the hardened wire is attached to the granulating machine. This machine cuts the plastic wire into 0.3 granules. These granules are collected in a container and then it is moved to the packing space of the plant. Granules are packed into a bag of 25 kg of each. These bags are moved to the next plant where these plastic granules are re melted and dyed into long plastic sheets, these sheets are used to wrap goods in the ships and it is used in construction works.

Advantages of Plastic Recycling industry

This plastic recycling industry has many advantages. The major advantages of this industry are • Income generation: From the macro point of view recycling industries is a new area, which is adding up to the fast growing industrial sector of our country. Due to this reason, we can say these industries boost the national income. If we see from the micro view, we can say that, the per capita income of that locality increases. When the per capita income increases the standard of living of the residents in that locality increases.

• Employment generation: According to the 2004-05, 61st round survey of National sample survey organisation the unemployment rate is 8.36%. This new type of industry generates new employment opportunities in the country. Now, we can see that a small recycling plant is employing about 10 workers. Then, if the recycling process were done in large scale, then employment generation would be massive. This might at least bring down unemployment level by 1 or less that 1 percent

• Reducing Environmental damages: This industry plays a very important role in reducing environmental damages. Since plastic is non-degradable material, if it is not recycled then the accumulation of plastic would increase in such a way that, one day there would be no place to dump the waste plastic. Therefore, the process of recycling reduces the damage on soil.

The plastic manufacturing is a huge power munching process. Therefore to feed this process, many of the precious natural resources like fossil fuels, mineral resources etc., are damaged. In simple words, when a single unit of natural resources in delayed from consumption, then we can call it as saving for our future.

When a single man dares to enter this new field to plastic recycling industry, by starting a small scale industry, why not the entrepreneurs of large scale industries? The capitalists and industrialists should step forward to invest in this industry. By this income increases, employment is generated; productivity increases and keeps our cities and environment clean.

Recycled Plastic v/s Original Plastic

Original plastic manufacturing is huge power consuming process. It is manufactured in four stages, where enormous energy source is required. The basic raw materials like phenol and formaldehyde are very costly and it is available in limited quantity. Recycled plastic is the output of old first used original plastic. The cost incurred in recycling plastic is almost same as that of producing original plastic. The recycled plastics don’t have the efficient quality of original plastic. The recycled plastic can only be used for the production of

the lower grade plastic materials only. For example, the plastic waste materials of mobile phones and its accessories cannot be used again for the manufacturing mobile phones, but it can be used to produce other low grade plastic goods. However, if metal rods or sheets are recycled, then it can again be moulded in to metallic rods or sheets at the same quality. But, plastic don't have this capability. So, under recycling category plastic is considered to have "Downcycle" characteristics.

CONCLUSION

In general history, we had many watch words like, freedom, liberty, fraternity, equality, globalise etc., which ruled the word. Now, new watch words like, Reduce- Reuse-Recycle had gained the attentions of most of the countries in the world. Recycling is the only means through which we can reduce the production of plastic. By this we can save many precious resources. This doesn't mean that plastic recycling has no disadvantages. This process too has many flaws. In spite of disadvantages, it is important to use recycled plastic, because the damage done to the environment is reduced. Though the cost of production is high, it pushes down the environmental cost.

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