

# Design & Development of Plastic Recycling Machine

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## ABSTRACT

Plastic causes serious environmental problems. Although they are not intrinsically dangerous, they take up a huge amount of space in landfills and they are made from a non-renewable resources, namely fossil fuels. For these reasons it is important that, where possible plastics are recycled. The use of plastic is increased now days in many industries like automobile, packaging, medical, etc. The reason behind this is that the plastic made things are quiet easier to manufacture, handle and reliable to use. So the plastic goods manufacturing industries are striving hard to produce good quality products at large scale and cheaper cost. The hydraulically operated machines solve the problem, but they are too costlier for small scale and medium scale industries. This paper deals with design and fabrication of Shredder machine injection and plastic moulding machine

**Keywords:-** Plastic Recycle

## I. INTRODUCTION

Recycling has been debated endlessly for many years now. There are two points of view regarding this issue. The argument in support of recycling concerns the negative impact of waste and emissions on our planet. The counter case is that costs undertaken to recycle are larger than the revenue returns. Only recycles 5% of its plastic waste even though it is one of the largest industrial cities in the country and there is growing concern about its part in the release of greenhouse gases from industry and the waste system.

Decreasing greenhouse gas emissions is also favorable to all for environmental reasons. The trend between the

emissions and the cost can be deduced. It will be a strong, positive, linear correlation. The cost and the emissions can be kept low simultaneously using an increased recycle rate. It is important to note that several assumptions were made in the calculations. One assumption made is that only the production Energy contributes emissions; incineration has not been taken into account. Actually, incineration contributes largely to the outcome as 30% of waste in Houston is incinerated, emitting large volumes of gases. The cost of raw material is assumed as the price of crude oil. Methane, an emission from landfill plastic waste, has been omitted. Together with other such assumptions, results can alter greatly. One should realize that Tierney has also made assumptions in his work. He may have chosen specific assumptions to induce his data to imitate his viewpoint. We states that a loss will

always be incurred by the faction attempting to recycle because the cost of plastic production is already at its cheapest. We believe that the current 5% recycle rate is too low a recycle rate as the money saved is not enough incentive for large-scale process. 4% is saved economically and emissions are reduced by 2.4%. These numbers are much too small to have a substantial current effect.

## II. PROBLEM IDENTIFICATION AND PROBLEM DEFINITION

**Problem Identification :** ( Recycling waste plastic)  
Now a days the plastic bottles, supporting frames etc. are normally used after use these plastics are disposed of they take lot of space and as it is this increases pollution. Hence this can have to be recycled taking in consideration and environmental concerns. Plastics crushed can be melted and can be used to produce different kind of product but it is an extremely laborious work. Hence we need a simple machine which will reduce the human efforts.

**Problem Definition :** ( Plastic Recycling Machine)  
Plastic recycling machine is a simple machine, compact, light-weight. A plunger inside cylinder is used to compress the molten plastic heated by coil heater of capacity 100W. Liquid plastic is then delivered under high pressure (10 bar) to the die to produce a required product.

### III. LITERATURE SURVEY

[1] Alireza Akbarzadeh and Mohammad Sadeghi "Parameter Study in Plastic Injection Molding Process using Statistical Methods and IWO Algorithm" *International Journal of Modeling and Optimization*, Vol. 1, No. 2, June 2011 pp-141 Dimensional changes because of shrinkage is one of the most important problems in production of plastic parts using injection molding. In this study, effect of injection molding parameters on the shrinkage in polypropylene (PP) and polystyrene (PS) is investigated. The relationship between input and output of the process is studied using regression method and Analysis of Variance (ANOVA) technique. To do this, existing data is used. The selected input parameters are melting temperature, injection pressure, packing pressure and packing time. Effect of these parameters on the shrinkage of above mentioned materials is studied using mathematical modelling. For modelling the process, different types of regression equations including linear polynomial, Quadratic polynomial and logarithmic function, are used to interpolate experiment data

[2] Prof. S. B. Khedkar<sup>1</sup>, Prof. R. D. Thakre<sup>2</sup>, Prof. Y. V. Mahantare<sup>3</sup>, Mr. Ravi Gondne<sup>4</sup> "Study of Implementing 5S Techniques in Plastic Moulding" *International Journal of Modern Engineering Research (IJMER)* Vol.2, Issue.5, Sep.-Oct. 2012 pp-3653-3656. It will impact the instructors and workman of Industry that work within the selected place. By following the 5S methodology, this research effort may show significant improvements to safety, productivity, efficiency, and housekeeping. The research documents improvements by using before and after pictures. It also intends to build a stronger work ethic within the workman and engineer who would be expected to continue the good practices.

3] Poonam G. Shukla, Gaurav P. Shukla "Design & Fabrication of Pneumatically Operated Plastic Injection Molding Machine" *International Journal of Engineering and Innovative Technology (IJEIT)* Volume 2, Issue 7, January 2013 pp-98. The use of plastic is increased now days in many industries like automobile, packaging, medical, etc. The reason behind this is that the plastic made things are quiet easier to manufacture, handle and reliable to use. So the plastic goods manufacturing industries are

striving hard to produce good quality products at large scale and cheaper cost. The hydraulically operated machines solve the problem, but they are too costlier for small scale and medium scale industries. This paper deals with design and fabrication of pneumatically operated injection plastic molding machine. The manually operated machine is converted into pneumatically operated machine by applying proper design procedure.

### IV. SCOPE OF WORK

We can produce different types of domestic and industry all products by recycling the waste plastic. Using compound dies we can produce components on scale and avoid the time consumption. By using automation and multi stage heating coils we can increase the production rate. The results above counter exactly that showing that by recycling, companies can further reduce these cheap production costs. The main point of difference between the two articles is that he does not deal with the full life cycle of the materials directly. He mainly looks at the recycling section and makes his deductions from there. He also talks generally about waste instead of specifically plastic. The trivial life cycle is the cheapest method but it does not show us data that can be compared with the type of data that was collected for this report such as environmental (less emission) benefits. Whether the city is cleaner to reduce emissions or keener to reduce the costs of the plastic life cycle, the solution is to recycle at a higher rate as both will be affected by this.

### V. OBJECTIVES OF PROJECT

- 1) Optimization of Plastic Recycling Machine by using F.E.A.
- 2) To utilize the plastic from domestic and industrial waste to reproduce useful components like washers and bushes.
- 3) To reduce the solid plastic waste.
- 4) Innovative use of scrap machinery.

### VI. METHODOLOGY

#### 6.1 Basic parts of shredder machine

- 1) Shredder blades
- 2) Casing
- 3) Industrial motor with gear (100RPM)
- 4) Gear setup

#### 6.2 Operation of Shredder Machine

- 1) Gather the sorted plastic you want to shred.
- 2) Separate in colours.

- 3) Turn on the machine.
- 4) Put in the plastic and wait.
- 5) Store the shredded plastic.
- 6) Clean the machine.

### **6.3 Basic parts of injection machine**

- 1) Hopper
- 2) Barrel
- 3) Heat source
- 4) Plunger
- 5) Handle
- 6) Supporting stand

## **VII. CONCLUSION**

There is so much information about recycling. But high quality education is a must if the amount of recycling is to be increased. We must communicate one message if people are to understand the seriousness of the problem. Everyone should understand the subject thoroughly so that the only excuse can be a lack of interest. The problem of contamination of recycling bins must be overcome.

Research is of vital importance and must continue. For example, the recycling of films which are laminates of different plastics must continue to be investigated.

Together we must reduce, reuse and recycle. We can reduce by purchasing items with the least amount of packaging and buying in bulk when appropriate. We can reuse by avoiding disposable items. Finally we can recycle by using community recycling programs and purchasing products made from recycled materials.

Never before has there been a time when environmental issues such as recycling have been more relevant. We must stop refusing to look past today.

## **REFERENCES**

- [1] Alireza Akbarzadeh and Mohammad Sadeghi "Parameter Study in Plastic Injection Molding Process using Statistical Methods and IWO Algorithm" *International Journal of Modeling and Optimization*, Vol. 1, No. 2, June 2011 pp-141
- [2] Prof. S. B. Khedkar<sup>1</sup>, Prof. R. D. Thakre<sup>2</sup>, Prof. Y. V. Mahantare<sup>3</sup>, Mr. Ravi Gondne<sup>4</sup> "Study of Implementing 5S Techniques in Plastic Moulding" *International Journal of Modern Engineering Research (IJMER)* Vol.2, Issue.5, Sep.-Oct. 2012 pp-3653-3656
- [3] Poonam G. Shukla, Gaurav P. Shukla "Design & Fabrication of Pneumatically Operated Plastic Injection Molding Machine" *International Journal of Engineering and Innovative Technology (IJEIT)* Volume 2, Issue 7, January 2013 pp-98
- [4] Madan Mohan Reddy .K\*, Ajitha .B\*\* and Bhavani .R "Melt-Densified Post Consumer Recycled Plastic Bags Used As Light Weight Aggregate In Concrete" Madan Mohan Reddy .K, Ajitha .B, Bhavani .R / *International Journal of Engineering Research and Applications (IJERA)* ISSN: 2248-9622 www.ijera.com Vol. 2, Issue4, July-August 2012, pp.1097-1101