

Plastic Extruder Machine

Lect. Bhavesh Variya¹, Mistry Bhavik², Panchal Harshil³, Patel Jenish⁴, Gajjar Hardik⁵

¹Lecturer, ^{2,3,4,5}Diploma Mechanical,

¹Mechanical Engineering,
^{1,2,3,4,5}Bhagwan Mahavir Polytechnic, Surat, Gujarat, India

Abstract: Plastic extrusion process is a well-known technique widely used in the polymerization industry. In order to produce a good quality of plastic product, the temperature in each zone must be appropriately set and precisely controlled. The temperature of the plastic extrusion system has a wide range of variation subject to various disturbances. The system is generally nonlinear and so, controlling the temperature is a tedious process, as it has multiple stages and the system is coupled with each other. Plastic extrusion barrel temperature has slow response. During the transition, from the ideal state of the machine to the operation state, the temperature variation exists significantly in the temperature zones, which in turn, lead to unstable melting temperatures and inconsistent product quality.

I. INTRODUCTION

Plastic extruder machine is machine used recycling plastic and reuse the plastic with the help of extruding process. Extruding process is the simplest process of recycling and reusing the plastic. It consists of lead screw (worm screw) which has threads of 5mm. The plastic is fed from the hopper, which helps it to fall on the thread. As the path suggested, the plastic moves in forward direction. It melts as it goes forward with the help of heater pad. Heater pad gets heated up to 350 °c. The melted plastic is moved in forward direction and it is gained from the nozzle.

It is used in industries for making moulded plastic materials and can be used in household use for recycling waste plastic. If buy from market, it can be very costly. Therefore, we made our project at the minimum cost so it has very low running cost, low setup cost.

II. WORKING OF PROJECT

Extrusion is a high volume manufacturing process in which raw material is melted and formed into a continuous profile. The plastic extrusion process is a well-known technique, widely used in the polymerization industry. In the plastic extrusion, raw thermoplastic material, in the form of small beads are feed from a top mounted hopper into the barrel of the extruder.

The melted plastic is moulded in the mould. Any shape can be obtained by the help of mould.

III. ASSEMBLY AND DISASSEMBLY OF PARTS



Figure No. 01 Plastic extruder



Figure No. 02 Barrel



Figure No. 03 Lead screw



Figure No. 04 Hopper



Figure No. 05 Table

IV. DETAILS OF INSPECTION CARRIED OUT

Bearing shaft misalignment:

When we started the machine, we found the problem of shaft misalignment.

To solve the problem we found the following

SOLUTION:

- Remove bearing from barrel.
- Remove the main shaft and took centre line on shaft.
- Match a Centre line of shaft with centre line of lead screw.
- Installed a shaft into bearing with push fitting method with rubber hammer.

Vibration of barrel fittings:

When we started the machine, another problem came in action that was vibration and rotation of shaft along with barrel.

To solve the problem we found the following

SOLUTION

- Remove the barrel fittings from the reducer shaft.
- Take measurement of barrel.
- According to the measurement taken from barrel, make clamp.

- Installed the clamp that holds the barrel and avoid it to rotate.
- After this, we did not find any problem.

V. ADVANTAGES

- Plastic can be used effectively.
- Awareness can be created in people about plastic.
- Waste can be reducing.
- Profits can be earned by selling plastic materials.
- Low skilled worker can operate.

VI. DISADVANTAGES

- All type of plastic cannot be used in this machine.
- Initial cost is high.
- It takes time to release melted plastic.
- Care has to take as heater pad is very hot.

VII. APPLICATION

- Can be used in domestic use.
- Can be used in any sectors whether industrial or household.
- Shredder may require if needed, or readymade plastic granules can be used.
- No problem of fluctuation of electricity.
- Helpful in innovating new mechanism.
- In reducing amount of waste in industry.
- In industry for saving money, this can be used.
- Can be used in unique design area.

REFERENCES

- [1]. Plastics Extrusion Technology Handbook by Sidney Levy, James F. Carley
- [2]. Workshop Technology I & II - J.A.Schey
- [3]. Workshop Technology I & II - Raghuvanshi
- [4]. https://en.wikipedia.org/wiki/Plastics_extrusion
- [5]. <https://m.youtube.com/watch?v=8J7JZcsoHyA>
- [6]. <https://m.youtube.com/watch?v=VFIPXgrk7u0>
- [7]. <https://preciousplastic.com>
- [8]. <https://davehakkens.nl>