Desktop Type 3D filament Making Machine

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Abstract **- Plastic filament extruder produces plastic filaments of specified diameter by using corresponding dies. Input materials (thermoplastics) used is in the form of granules and pellets and it can be of waste plastic materials. Ceramic band heater is used to melt the input material. In this process we treat the waste filament particles and making it as reusable.**

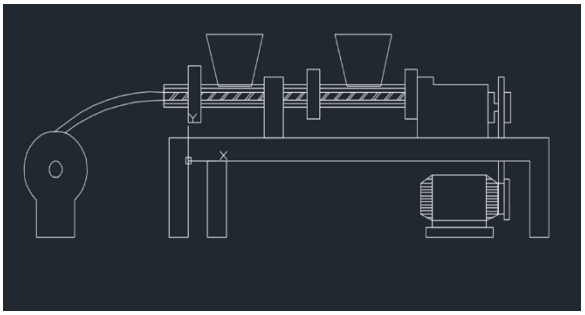
INTRODUCTION

A 3d printer is an additive manufacturing technique where 3D objects and parts are made by the addition of multiple layers of material. It can also be called as rapid prototyping. It is a mechanized method where 3D objects are quickly made as per the required size machine connected to a computer containing blueprints of any object. The additive method may differ with the subtractive process, where the material is removed from a block by sculpting or drilling. The main reason to use 3d printer is for 90% of material utilization, increase product life, lighter and stronger. 3D printing is efficiently utilized in various fields such as aerospace, automobile, medical, construction and in manufacturing of many household products.3D printing or is the construction of a three-dimensional object from a cad model or a digital 3D model. The term "3D printing" can refer to a variety of processes in which material is deposited, joined, or solidified under computer control to create a three-dimensional object, with material being added together such as liquid molecules or powder grains being fused together, typically layer by layer.

WORKING PRINCIPLE

3D printable models may be created with a computer-aided design (CAD) package, via a 3D scanner, or by a plain digital camera and photogrammetry software. 3D printed models created with CAD result in relatively fewer errors than other methods. Errors in 3D printable models can be identified and corrected before printing. The manual modeling process of preparing geometric data for 3D computer graphics is similar to plastic arts such as sculpting. 3D scanning is a process of collecting digital data on the shape and appearance of a real object, creating a digital model based on it. CAD models can be saved in the stereolithography file format (STL), a de facto CAD file format for additive manufacturing that stores data based on triangulations of the surface of CAD models. STL is not tailored for additive manufacturing because it generates large file sizes of topology optimized parts and lattice structures due to the large number of surfaces involved. A newer CAD file format, the Additive Manufacturing File format (AMF) was introduced in 2011 to solve this problem. It stores information using curved triangulations. The whole setup consists of two sections, mechanical and electrical. The mechanical setup consists of a hopper which is fitted on the cylindrical pipe is used to load the ABS granules. A wooden drill bit which is used to drive the pellets is placed inside the cylindrical pipe. A DC motor or actuator is used to rotate the drill bit inside the pipe and the speed of the motor is controlled with the help of a 12V DC motor controller. Two heating cartridges of 12V DC is clamped on the pipe to heat and melt the filament and a temperature sensor (Thermistor) is also clamped on it to measure the temperature and it is controlled within a specified range with the help of the microcontroller and also the temperature values can be viewed on LCD display. Once the granules are loaded and the motor is turned on the drill bit starts to rotate, and this bit carries the granules from the hopper to the die through the cylindrical pipe. During this time, the material is heated and melted inside the pipe with the help of heating cartridge which is clamped on the pipe and the sensor senses the temperature and sends feedback to the controller which keeps the temperature within the specified range. Then this melted material comes through the die as a filament and gets solidified on

room temperature. In order to increase the solidification, process a 12V DC electrical fan is placed on both the sides of the die to cool it and the filament is fed to the roller to roll it.



FABRICATION METHOD

- Parameters used
- Example winding speed
- Heater Screw for continuous flow of material
- Chain drive
- Filament material
- Both the motor and the chain drives are connected, and the screw shaft rotates with the help of chain
- drive which gives the continuous flow for the material

ADVANTAGES

- Speed
- Cost
- Flexibility
- Competitive Advantage
- Tangible Design & Product Testing
- Quality
- Consistency
- Risk Reduction
- Access Ability
- Sustainability

APPLICATION

- Addictive manufacturing
- Medical
- Industrial
- Social cultural
- Architecture

CONCLUSION

Thus, the plastic filament extruder is manufactured as per the design and within the estimated cost as mentioned in the Plastic filament extruder manufactured, can be used to make filament from all type of thermoplastic materials except PVC. This machine will be used in small scale production. Produced filament can be used in the Rapid prototyping (FDM) and 3D-printing machine can be further digitalized by using digital temperature indicator and controller. Winding of filament may be done by using the DC motor setup.