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# Ad Blue (Def) Plastic Pipe Cutting Machine

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**ABSTRACT:** In Extrusion blow molding machine products being manufactured through blowing air. Into the hot plastic material tube, and the air pressure expands this tube into die size. But the drawback of this process that the tube being hold by the die in the upper and Lower portion. This unfinished part needs manual cutting operations before getting the final Product. Manual cutting operations involves labour, dependency on labours, Additional operation since additional space required and delay in operation. For the subject product (DEF Hose Pipe), the machine used is double head, double Station. Heavy cost being paid for labor every day for finishing operation of the pinch off From top and bottom of the pipe. There for to Reduction in Man power cost, improvement in quality and eliminate Dependency on the man power this advanced DEF Hose pipe cutting machine is Introduced.

**KEYWORDS:** Electric Motor, Cutting Blades, Linear Bush Bearings, EN 24 Chrome Shaft.

## I.INTRODUCTION

Extrusion Blow Molding is a process that makes small and large hollow parts Quickly. There are two different industry segments that use Extrusion Blow Molding, Packaging (bottles) and industrial hollow parts. The products range from less than 1 Oz up to 1000 gal.

### Process:

- The process starts with the formation of a hollow tube of plastic, called a Parison. The tube is extruded downward until it extends past the bottom of The mold. The mold then closes on the parison.
- Air is introduced into the parison via a blow pin at the top of the part or a Needle in the middle of the part, inflating the plastic and pushing it against The mold sides.
- Then part cools in the mold.
- Then part is ejected from mold. Extrusion blow moulding is generally two type's i.e 1) Continuous extrusion blow Moulding & 2) Intermittent extrusion blow moulding.

### Continuous Extrusion Blow Molding

- The parison is continuously extruded throughout the cycle.
- It can only be used with materials that have good melt strength.
- It also can only be used for short cycle times.

### Intermittent Extrusion Blow Molding

- The plastic material that is extruded is stored in an accumulator.
- When the mold opens, the accumulator pushes the material out of the die to Form a parison.
- It is used for parts with long cycles and materials with low melt strength. There are two ways to get air into the parison.
- Blow pins are used to bring the air in on the parting line of the mold. In Bottles, it is inserted through the neck.
- Blowing needles are used to create very small holes in a part. Such pins can Be located anywhere in a mold The plastic material expands through its thickness as it exits the die. This is called die Swell. It expands because of plastic memory. The plastic material is squeezed as it Goes though the land in a blow molding die. As it exists, it wants to go back to the Shape it had before it went through the land. During the formation of the Parison, it gets longer and

heavier. As it gets heavier, Gravity starts to extend the Parison. This is called parison sag. This creates an uneven Wall thickness in the Parison.

### Key Processing Parameters

- Melt Temperature – Changes the viscosity of the material.
- Extruder Speed – Determines the speed that the parison is made.
- Blow Time – Although blowing forms the product, holding the pressure on The product keeps it in contact with the mold and increases the cooling.
- Blow Pressure – Helps to pick up surface detail in the mold.
- Parison Drop Time – How long the parison hangs and stretches before the Mold closes
- Parison Programming – Creates local thickness changes in the parison.
- If the parison is off-center, it will cause thickness variation around the Circumference of the part.

### Process Advantages

- Molds are inexpensive vs. injection molding. Since molding pressures are Much lower, tooling can be produced in aluminum.
- Irregular geometry can be easily molded if the mold can open without Destroying the part.
- There is the ability to combine several components into one part.
- The inside volume of the part can be filled with foam while the mold is still Closed.
- By using specialized polymers, better barrier properties can be had.
- Recycled materials can be layered in the middle.
- Less costly materials can be used in a layer to reduce the part's cost

## II.PROBLEM STATEMENT

In Extrusion blow molding machine products being manufactured trough blowing air Into the hot plastic material tube, and the air pressure expands this tube into die size. But the drawback of this process that the tube being hold by the die in the upper and Lower portion. And this unfinished parts needs manual cutting operations. Manual cutting operations involves labor, dependency on labors, and additional Operation since additional space and delay in operation.

## III.CONSTRUCTION

### COMPONENTES

M.S SQUARE TUBES  
ELECTRIC MOTOR 0.37 KW  
CUTTING WHEELS  
ALUMINUM JIG  
SLIDING BLOCK  
M.S FLAT PLATE

### COMPONENT DETAILS

#### M.S SQUARE TUBES

We used M.S Square tube to fabricate the machine structure frame, with the Size of M.S square tube is 50 MM x 50 MM x 1.5 MM Thickness. It provides good Stability to the machine during operation of cutting. And it prevents machine against All the loads acting on the machine whether it is linear loads or circular loads. Size of the structure is kept appropriate as the comfortable working height for Human beings is between 600 to 800 MM and we kept it 800 MM. Here machine Operator can work on the machine in standing position as well as with the help of the Stool for seating. Width of the machine is such that the machine will have suitable Distance as per the product length and by fixing electric motors on both ends the Hose Pipe can be cut easily within this width of 300 MM. Hose pipe length is

258 MM and 40 MM is allowed for distance setting. Also motor mounting brackets will be placed Outskirt of the machine frame.

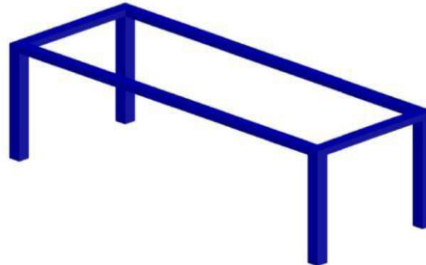


Figure 1: M.S Square Tubes

### ELECTRIC MOTOR 0.37 KW

Electric motors produce linear or rotary force (torque) intended to propel some External mechanism, such as a fan or an elevator. An electric motor is generally Designed for continuous rotation or for linear movement over a significant distance. Compared to its size. Magnetic solenoids are also transducers that convert electrical Power to mechanical motion, but can produce motion over only a limited distance. This electric motors are the taken from the scrap and it is actually a cost Saving as this motors are taken from un used spares. Converted its shaft as per the Required of the cutting machine. Where required mounting of cutting wheels Appropriately on to the motor shafts. And it must provide proper balancing and less Initial starting torque. So the motor will not get over load while starting the machine. Motors are selected with 0.37 KW ( or 0.5 HP ) when the pipes will come into contact. With rotating wheels then it will resist the rotation of the motor and that should not Stop the motor from rotating. It is tested for this operation and the motors are working Fine with 8 nos of pipes during cutting.



Figure 2 : Electric Motor

### CUTTING WHEELS

In metal fabrication and manufacturing operations, various tools use cutting wheels to Cut material from a work piece. What is a cutting wheel? Cutting wheels, or cut-off Wheels, differ from grinding wheels in their function and structure. Where grinding Wheels use an abrasive to grind large pieces of material off a work piece from a Shallow angle, cutting wheels typically make narrow, precise cuts at 90-degree angles. Consequently, cutting wheels are often thinner than grinding wheels — though they Do not have the lateral strength required for side grinding, their minimal thickness makes them better for clean, accurate cuts. Weller Abrasives offers several cutting Wheels for different applications. We provide everything from 1-millimeter cutting Wheels to extended-diameter wheels for larger cuts. This guide to cutting wheels Covers the differences between various types of cutting wheels and explains how to Choose the right wheel for a given application. We need to both the motors in reverse direction by changing its connections Because both cutters should have same direction impact on the plastic hose pipe Otherwise the pipe will tends to rotate.





Figure 3: Cutting wheels

### ALUMINUM JIG

Aluminum is easily machined and can be relatively easily textured with grit blasting and chemical etching. Computer numerically controlled (CNC) lathes are cost-effective ways of machining aluminum when many small molds are required. By far the most common way of producing aluminum molds is by casting. There are Three general casting approaches. Atmospheric casting relies on open ladling or Pouring of molten aluminum into a foundry casting. Pressure casting places the Foundry casting in a sturdy support frame, and the ladled molten aluminium is forced Into the casting under pressure of 350 kN/m<sup>2</sup>. The Aluminium jig is designed for the holding the house pipes form the both sides and the cutting operation will be occurred smoothly and accurately. The Material of aluminium of jig is selected because the aluminium is property of highly corrosion resistance and it's light in weight. The sizes of the blocks are 455 mm in the length and 40 mm width and 40 mm height of it.

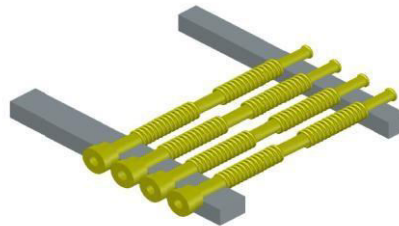


Figure 4: Aluminium Jig

### SLIDING BLOCK

Sliding block fabricated with the help of linear sliding bush bearing with aluminium Block and the hard chrome shaft. This hard chrome shafts are mounted parallel to each Other with having two number of bearing fitted in each shaft. Chrome shafts provides Glossy finish surface, which is helpful to slide the bearing in linear direction with Negligible amount of lubrication. Linear sliding bush bearing having aluminium blocks Also provide mounting of the top plates with the help of Allen key bolts. Outer Diameter of the hard chrome shaft is 25 MM and the bore diameter of the bearing is also kept 25 MM (05 micron tolerance). Allen key bolts used is size of M6 x 15 MM Long.

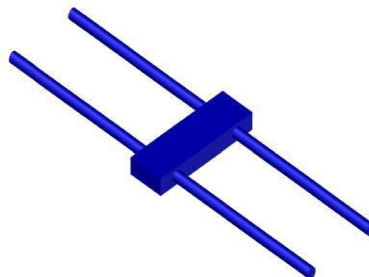


Figure 5: Sliding Block

### M.S FLAT PLATE

Main purpose of this plate is the mounting medium between the linear sliding bush Bearing from down side and the aluminum jigs are mounted on the top of this table. This plate simply holds both together and provides smooth linear motion of the Sliding block perpendicular to the motor shaft axis. Where the cutting operation will Take place with help of carbide cutter.



Figure 6: M.S Flat Plate

### IV. WORKING AND PRINCIPLE

Our project —Ad Blue (DEF) Plastic Pipe Cutting Machine| Cutting Machine used for the Plastic Pipe Cutting. it consist of two 0.37 KW Motors. Provided with blades and the sliding block placing on frame and it's slight's when normal pressure apply on the holding handle on upper side of the aluminium Jig. Pipes are placing on the aluminium Jig and stars motor and towards rotation of cutting Wheel.

### V.MERITS AND DEMERITS

#### MERITS

- Mass production is possible
- Easy setup.
- Can be operated with unskilled worker.
- It is portable.
- Less maintenance
- Environmental friendly

**DEMERITS** Pinch And Cut Hazard When Replacing The Blade

#### APPLICATION

Def pipes cut more Accurate and Faster

### VI.METHODOLOGY

Our project —Ad Blue (DEF) Plastic Pipe Cutting Machine| Cutting Machine used for the Plastic Pipe Cutting. It consist of two 0.37 KW Motors. Provided with blades and the sliding block placing on frame and it's slight's when normal pressure apply on the holding handle on upper side of the aluminium Jig. Pipes are placing on the aluminium Jig and stars motor and towards rotation of cutting Wheel.

## VII. LITURATURE REVIEW

The vast review of literature will help to understand the Concepts of Machine and the concepts of the components will be selected in the model. Help Md. Jalalluddin, Machine Design. R.S.Khurmi, Strength of materials R.K. Bansal, Kinematics of Machinery R.K. Bansal, Strength of materials

## VIII.DESIGNANDFABRICATIONOFADBLUE(DEF)PLASTICPIPECUTTINGMACHINE



Figure 7: Ad Blue (DEF) Plastic Pipe Cutting Machine

## IX.CONCLUSION

Thus, this machine provides the mass production against the 1116kilfu operation and it more accurate than the 1116kilfu cutting operation. The Operator has no need to 1116kilful for that machine This simple in design and easy to handle less maintaince is required for this machine.

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