

HOT WIRE FOAM CUTTING MACHINE

Sumit Kasana¹, Aakash Dahiya²

Mechanical Department, Mahavir Swami Institute of Technology, Sonapat, India

Abstract: Direct cutting of foam has the advantage of greater flexibility and reduced lead time over moulding. This paper discusses the design and development of a flexible automated system for foam cutting that utilizes hot-wire cutters. A method for modeling the cut geometry, based on representing the three-dimensional cut shape as a combination of basic geometrical block shapes, is presented. This method gives the system flexibility to handle different workpiece geometries. A technique for generating the required cutting paths from the modeled geometry is also shown. The developed methodology was applied for the cutting of automotive seat cushions. The results show that the automated system significantly reduces the cutting time and produces cuts of improved quality.

I. INTRODUCTION

Manufacturing industries are basically meant for production of useful goods and services at low cost. All the tasks in everyday lives have been made quicker due to technological advancements. However, this advancement also demands huge investments and expenditure. In view of this, every industry desires to achieve a high productivity rate while maintaining the quality and standard of the product at a low cost.

The idea behind this project is to develop a conceptual machine tool which would be capable of performing the foam cutting operation economically and efficiently. Cutting is one of the processes of manufacturing in which the specified shape to any work piece is imparted by removing the surplus material. In this machine the foam material is separated by using the wire in which the current is supplied and the hotness of that wire cut the foam smoothly with a proper finishing.

This machine work on the principle of the heating effect of current which was studied experimentally by Joule in 1941. After doing his experiments Joule came to the conclusion that the heat produced in a conductor is directly proportional to the product of square of current (I^2), resistance of the conductor (R) and the time (t) for which current is passed. Thus,

$$H = I^2 Rt$$



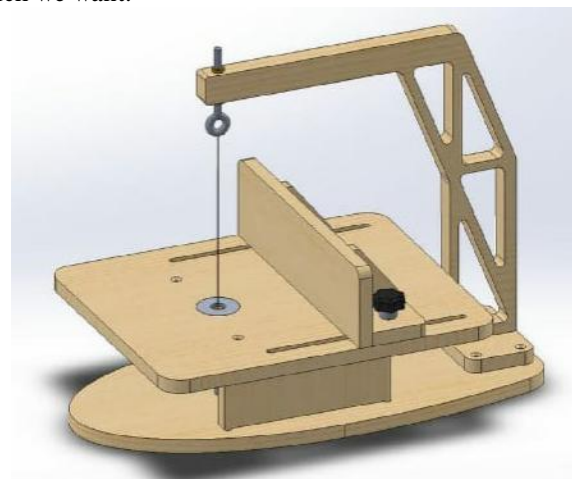
AS PER ACTUAL MODEL

NEED OF DEVELOPMENT OF MACHINE

In the present scenario, Various cutting operations perform on various industries. Because of that production cost and time required to perform these operation is increases. Also we required more electric energy to run all these machines to complete the operation. Cutting operation on the different materials can be done by changing the wire and the electric supply through it.

WORKING PRINCIPLE

There is the only heat generation method through which this machine works. In this machine tool the heating effect of the nicrome wire results the cutting of the foam in to the design which we want.



PRODUCT DESIGN

II. CONCLUSIONS

The presented system is designed and configured for practical use. The system is able to cut a maximum height of 200mm and 200mm wide. This machine can be used to design various 3D foam models of project design to visualize the shape and size in industries, also the packing for various material can manufactured with the help of this machine . As well as the decoration industries can adept this machine for ease in decoration designing and production

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