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3D Modelling of Roller Assembly of Base Cutting Machine

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Abstract: ***3D modelling is an important technique for many studies and applications. Model data acquisition and modelling 3D modelling techniques have their own specialties in various research and application areas. This article systematically introduces the equipment of 3D modelling method. This document also introduces a 3D modelling application, including all model views created in Fusion 360.***
Fusion 360's direct modelling tools allow you to change modal geometry without having to edit the mid-levels of your model. You can seamlessly make design changes without causing modelling errors. The authors consider the construction of a roller assembly of Base cutting machine is demonstrated. The constructions are considered as applied to the Autodesk fusion 360 software.
The paper is aimed at improving the graphic methods of machine design and improving the educational process when training the Bachelor's degree students majoring in machine design. Finally, some major issues and some shortcomings are identified, and further challenges are predicted from various aspects such as modelling recovery, digitization methods, and dynamic modelling.
Keywords: Base Cutting Machine, Roller Assembly, 3D Modelling, Fusion 360, CAD.

I. INTRODUCTION

Building an accurate model for simulating and expressing the principles of behavior is a common and important technique for modern science. There is also growing interest and trend in the fields of applications and science to model the world in digital 3D. The process of digitizing object shapes, movements, textures, and other properties depending on focus in order to model and simulate the real world. Fusion 360 is the perfect design to solve the technical problems of cross-platform data exchange, provide effective control of cooperation between regions, provide an overview of cooperation, and break barriers between art and manufacturing, and blocks between design and processing.

Nowadays, engineering graphics is characterized by increase in development and introduction of 3D technology in computers. The primary process is to create a realistic 3D model of the object, and the drawing is a secondary, mostly automated process. 3D models can be transferred to production without creating drawings. [1,2]. All current CAD software has advanced tools for 3D modeling, design, and automatic drawing creation.

These trends are also reflected in architectural and structural design. Experience applying 3D design shows the high performance of this Direction [3-5]. Examples of successful applications of 3D methods in solving scientific problems in building construction are known. [6]. At the same time**,** architectural design practices still use traditional methods of 2D design based on the primary structure of the drawing**.**

This will reduce the efficiency of design work in the graphics department if the education of construction students also tends to move from traditional 2D methods to modern geometric simulation 3D methods [7-11]. There is a detailed debate among teachers about directions for improving the educational process [12-13]. The purpose of this work is to show some possibilities of 3D simulation in studying and solving scientific and application-oriented character tasks in the fields of architecture and construction, and the latest course of 3D training for construction students.

II. PROBLEM STATEMENT

V-Belt Base cutting machine is special purpose machine which is used in belt manufacturing industries. The task at hand was to create a 3D model of the roller assembly of base cutting machine using CAD Software for doing further analysis on CAE software. The dimensions of roller assembly were already provided by belt manufacturing industry.

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III.DIMENSIONS & MODELLING OF THE COMPONENTS

Dimensions are considered annotation objects. This means that when drawing from paper space, the dimensions are scale dependent. When plotting from the layout, plot the sheet 1: 1 but note that the viewport is set to one scale. Before the annotation scaling feature existed, it was necessary to calculate the height of a dimension multiplied by the viewport scale in order to display the dimension in the correct size. Also, if you have other viewports with different scales, you need to calculate those dimensions. Also, the size. However, you can use annotation scaling to set dimensions so that all dimensions are displayed in the same size, regardless of the viewport they are displayed, and are displayed at a specific scale in a particular viewport.

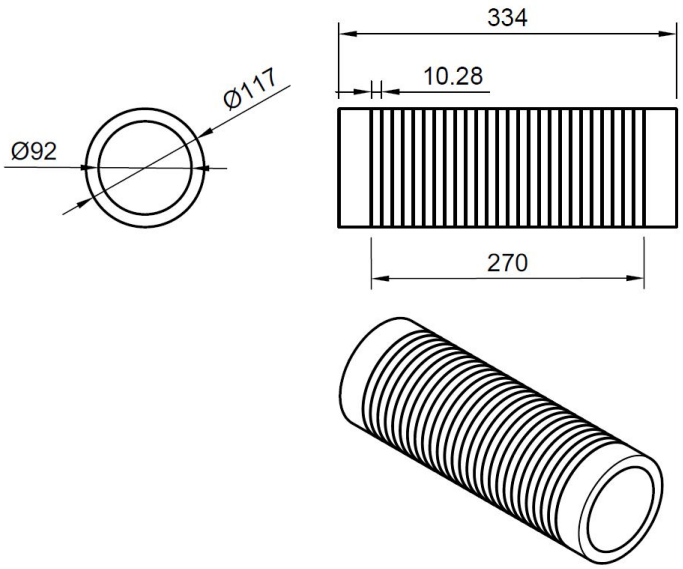

Fig. 1 Dimensions Of Teflon Roller

The roller is made up of Teflon. The dimensions of roller are given in the Fig 1. The Teflon roller act as a base for cutting of rubber sleeve. The HSS blade cutter penetrates the v-belt and create grooves on a Teflon roller, the grooves are also shown in the above fig.

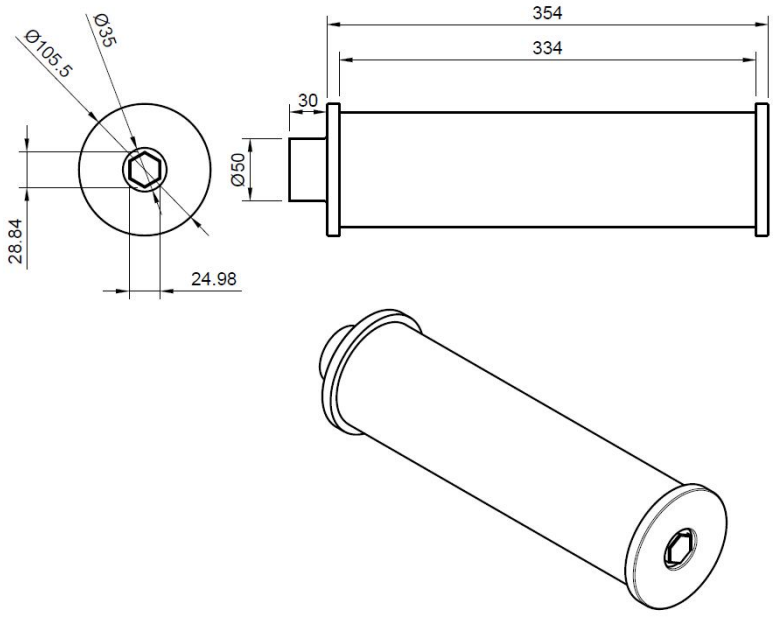

Fig. 2 Dimensions Of Roller Shaft

Teflon Roller mounts on the roller shaft which helps to rotate the Teflon roller smoothly on base cutting machine. it has a removable cover which helps to insert and remove roller easily. The cover is made up of structural steel and it helps the Teflon roller to hold in its place.

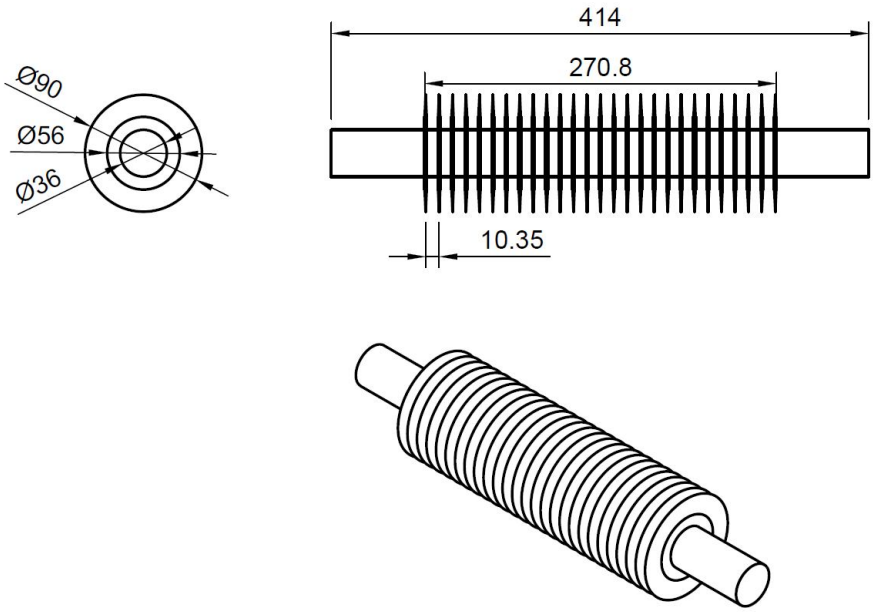

Fig. 3 Dimensions Of Cutter And Cutter Shaft

Figure shown above is of cutter which is situated below the Teflon roller. The cutter is made up of high-speed steel (HSS).it displace by means of pneumatic plunger having reciprocating motion on V belt base cutting machine. Which penetrate on belt result in cut of belt into section. This cutter is adjustable.

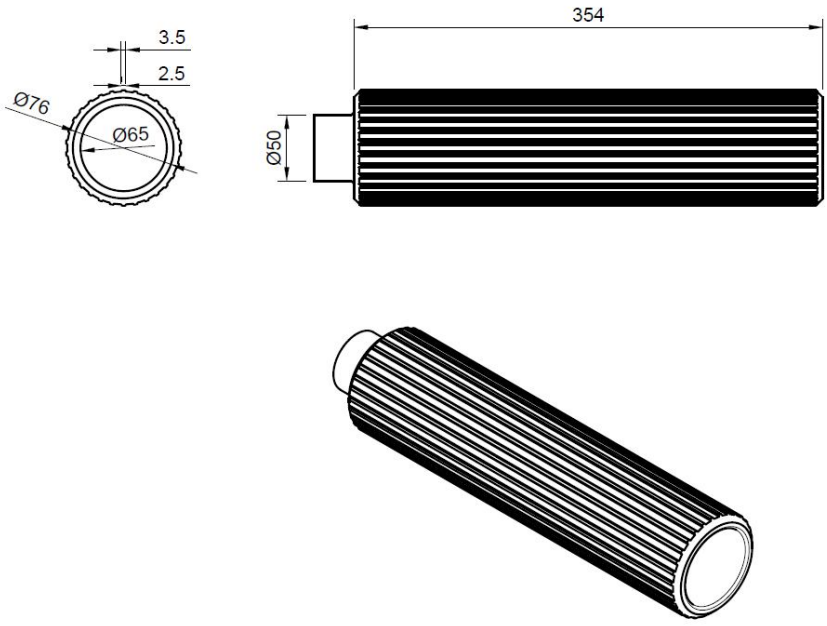

Fig. 4 Dimensions Of Support Shaft

The role of support shaft is to tighten the belt before starting the belt cutting process and relaxing the belt after process is complete. Also provide friction to the belt so that slip of belt can be avoided during the procedure.

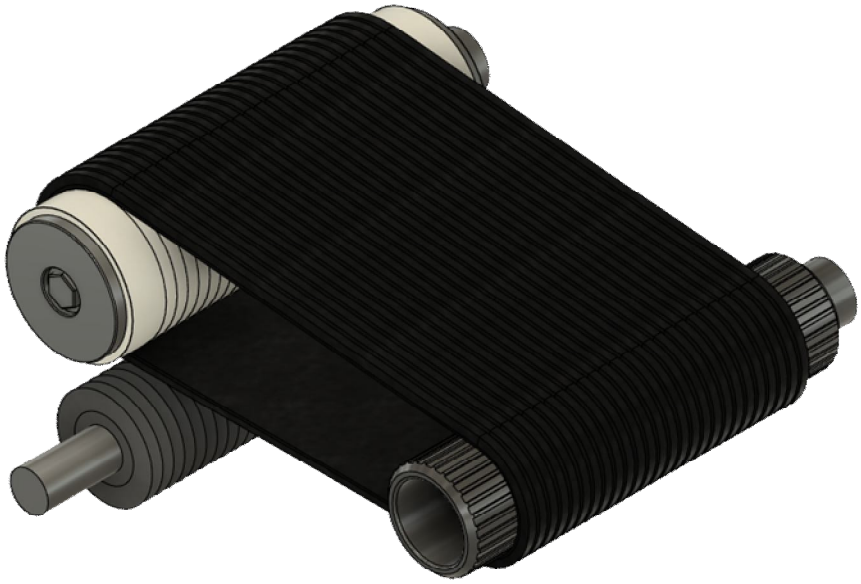

Fig. 5 Assembly Of Belt Base Cutting Machine

Above figure is of assembly of V belt base cutting machine showing Teflon roller, HSS cutter, Support shaft and Rubber sleeve assembled together.

IV. APPLICATION OF 3D MODELLING

Today, 3D models include animation, archaeology, architecture, dentistry, education, fashion, textiles, footwear, forensic medicine, games, industrial design, manufacturing, medicine, movies, multimedia, museums, rapid prototyping of as-built plants, etc. Used in a variety of exciting applications. Reverse engineering, engraving, toys, mold making, web design. 3D modelling has become an important technology in many applications. Research on 3D modelling facilitates the development of monumental protection. There are several heritage conservations projects that use laser scanning.

V. CONCLUSIONS

Today, more and more areas require and are adopting 3D modeling technology. There are many directions in which we need to move forward. First and foremost is the search for 3D models. 3D model characteristics such as shape, topology, and texture are used to measure model similarity. These characters are difficult for the user to explain and complicated to calculate, but the integrated 3D modeling system requires effective search capabilities. Today, visual quality is one of the main focal points. There is a growing demand for more loyal 3D content. It was not possible to completely collect information about scenes and objects during 3D data collection, some data was inevitably lost, and it was not possible to restore the actual words from the videos and photos of the current design. Therefore, it is worthwhile to study new methods.

Real world digitization. Dynamic models are a new direction for future work. Dynamic models can simulate the interaction of objects. This is also very useful for studying the field of developing things.

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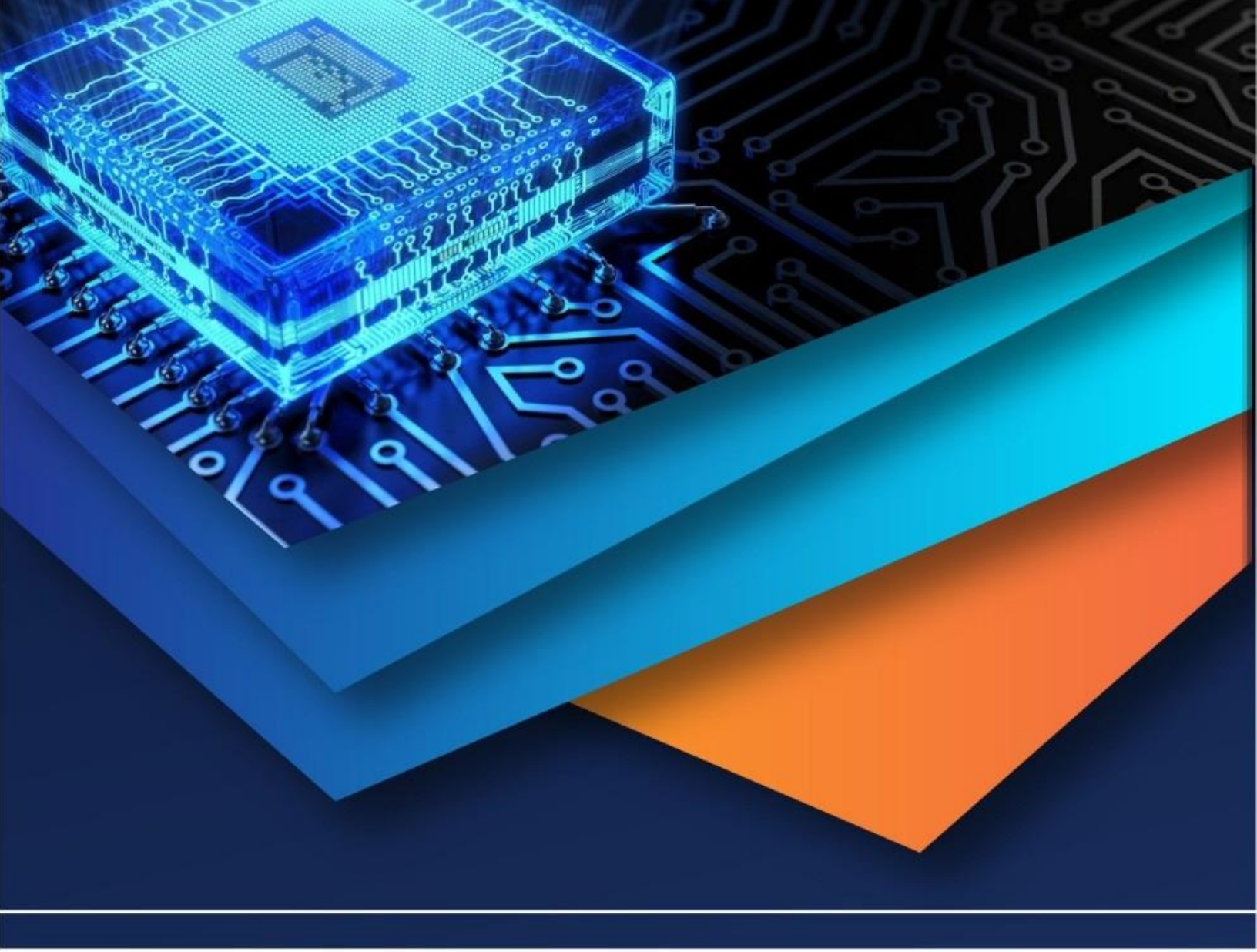

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