Design of Angle wise Multi Tool Machine

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Abstract: Considering manufacturing there are several conventional machine for every operation. In the current scenario there several automatic system to perform operation and to reduce time but the initial cost to setup the system is high and that is not good for the financial health of small scale industry and medium scale industry and also disturb the main goal of employment generation. here it is taken into considered to compile several operation in one machine along with the most angular moment to the tool and the working table .materials like plastic ,wood and light metal sheets can easily be machined with this machine .for holes drill is required or on lathe can be performed from tailstock arrangement but this machine is helpful for fast procedure and at all angle holes are possible along the several operation like polishing ,cutting ,buffing also .making the manufacturing process easy and increase the productivity of the manufacturing process.

Index Terms **– Bevel gear, Lead screw, Drill chuck with drift key, drill bit, cutter, grinding, angle wise, multi operation.**

1. INTRODUCTION

A significant part of the investment is usually used up for installation purposes in machines. Therefore the work proposed was envisioned in such a way that the operations like drilling, sawing, shaping, grinding and other lathe functionalities do not consume additional costs for such operations. Various machining process in manufacturing industries are carried out by separate machining devices. It needs more space and time that involves high expenses. But the fabrication of multi-tool operating mechanical device encompasses five operations on a single machine. The operations are categorized as drilling, cutting, shaping, grinding and circular sawing. It is a new concept specially meant to reduce the work time and save the cost. Instead of using a shaping machine, a special arrangement for shaping operation which is involved in the drilling machine, is also used for the cutting operation. This is done to save the added investment cost that occurs during drilling and shaping the device in the industries. The machine operates the drilling machine with the bevel gear arrangements. Hence we can carry out exactly the above mentioned five operations on the machine. Driller, bevel gear, drill bit, chuck, bearings, slotting tool, shaping tool and grinding wheel are the significant parts of the machine.

2. Literature Survey

Drilling processes are widely used in aerospace, aircraft, and automotive industries. Although modern metal cutting methods have improved in the manufacturing industry, like electron beam machining, ultrasonic machining, electrolytic machining, and abrasive jet machining, conventional drilling is still the most common machining processes

[Kurt, 2008; Bagci, 2008].
On the other hand, in drilling processes, cutting fluids are used to lubricate the process and reduce the effects of high temperature. In the last few years, environment problems had forced the development of cutting fluids of low environmental impact in order to minimize the usage of cutting fluid. The reason why this lubricant needs to be minimized the usage because it will because hazard and also will difficult to dispose the lubricant or coolant. Therefore, some researchers have been investigating the alternative methods like dry machining or minimum quantity lubricant

[Kelly, 2002; Cotteral, 2002].
Good dimensional accuracy and fine surface integrity both are desired for finished product. Coolant plays the major role to bring all the elements within acceptable limits by reducing temperature. Large amount heat is produced during machining which leads to high cutting zone temperature. High temperature very quickly wears the tool and due to tool wear, rubbing is made in between tool and work material. For this dimension, accuracy is found worst. Coolant enters in to the tool-chip interface, reduce friction-welding by its lubricating property and also bring away temperature by its cooling property. Better surface finish can be obtained for any level of feed rate when cutting speed is high in dry mode.
Drilling is the most frequently employed machining operation for fiber reinforced materials owing to the need for joining structures.

Drilling of CFRP is difficult to carry out due to the anisotropic, non-homogeneous and high abrasiveness of their reinforcing carbon fibers. In aircraft industry poor hole quality accounts for an estimated 60% of all part rejection (Hocheng and Tsao 2006). The increasing popularity of carbon composites in industry and the constant need to maximize productivity has led researchers to look at 28 methods of optimizing the drilling process. In this chapter a review on the various research trends taking place in the area of drilling CFRP is discussed.

3. 3D design of angle wise multi tool machine

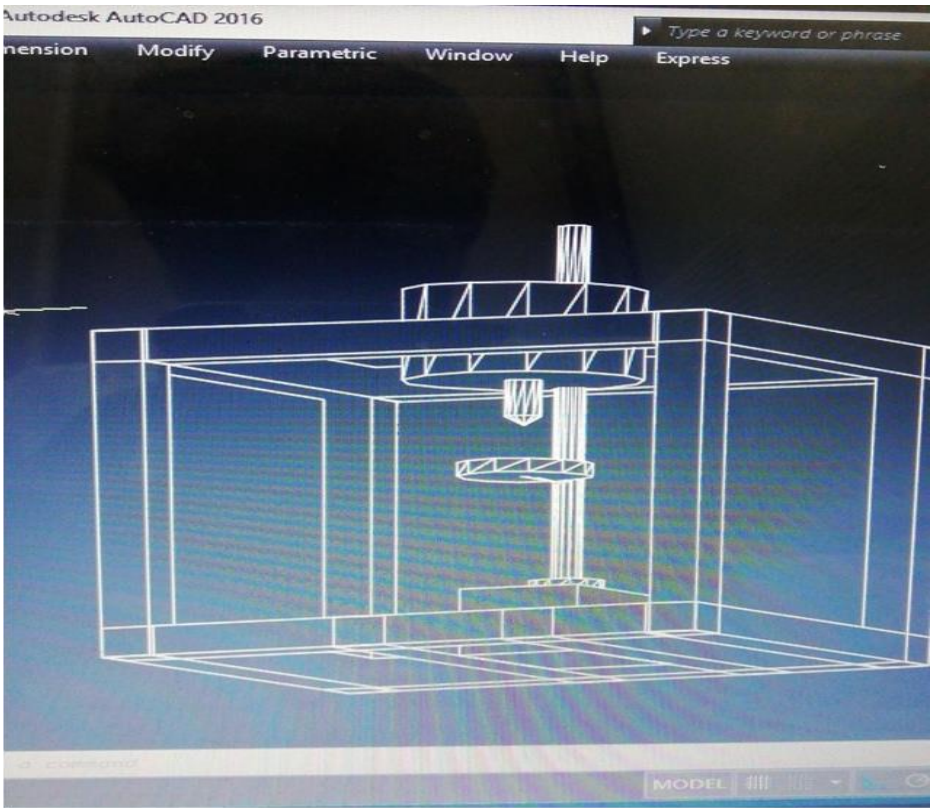

Fig. 1: Conceptual Design of Multi Tool Machine

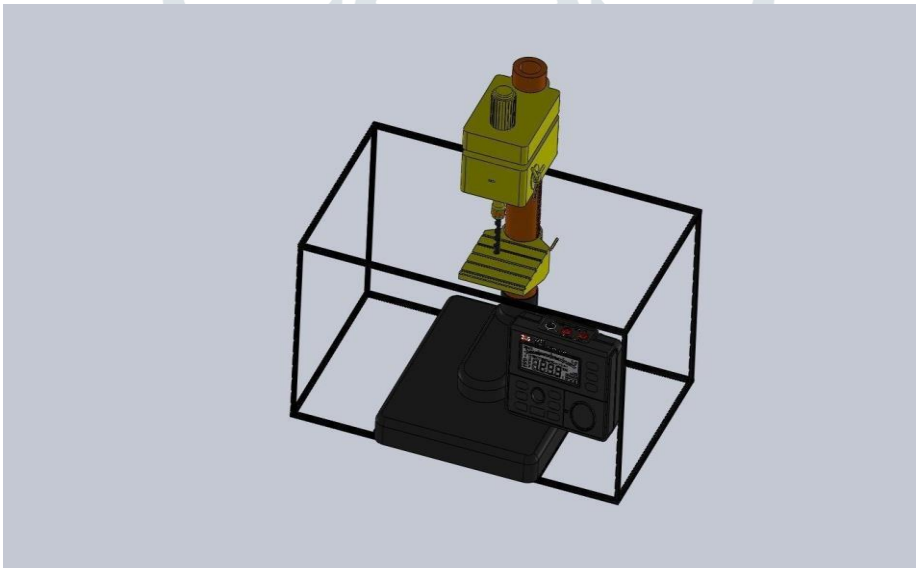

Fig. 2: 3 Dimensional Model of Multi Tool Machine

Fig. 3: Prototype Model of Multi Tool Machine

4. Designing

Last time we made one tentative design which can solve our problem definition and now this time we are going for the proper, technical and valuable design for that we selected solid work software in which we planning to make design.

Parts of our design: -

1. Base Structure
2. Plate
3. Drill Housing
4. Drill Column
5. Base for Job
6. Motor
7. Spindle
8. Temperature Sensor
9. Support
10. Sensor Strip
11. Sensor
12. Electronic Circuit
13. Power supply

ITEM NO.	PART NUMBER	QTY.
1	**Base Structure**	**1**
2	**Plate**	**1**
3	**Drill Column**	**2**
4	**Spindle**	**1**
5	**Temperature Sensor**	**1**
6	**Motor Strip**	**1**
7	**Motor**	**1**
8	**Sensor**	**1**
9	**Electric circuit**	**1**
10	**Support**	**1**
11	**Grinding Tool**	**1**
12	**Drill Tool**	**1**
13	**Raw Material**	**1**
14	**Buffing Tool**	**1**

Conclusion

Frame designed with minimal vibration and temperature sensing device to safeguard the machine at higher temperature and the several operation possible on this multi operation anglewise machine.

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