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Application of Composite Material for Drilling Machine Bed to Reduce the Vibration

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Abstract:-During the work it is common for every machining process to affected by the vibration .It may be due to many cause like feed , depth of cut , cutting speed and roughness of work piece . Vibration affect the tool life and surface finish of work piece . In this present work composite material are to be use to reduced the vibration on a drilling machine. To reduce the vibration Glass fibre epoxy and glass fibre polyester are used as a substitute of traditional mild steel bed.

Keyword: Vibration ,feed, depth of cut , cutting speed , composite material ,surface finish, glass fibre epoxy, Glass fibre polyester.

I. INTRODUCTION

Drilling is the very common process used to make a hole from .2mm to 55mm. During the drilling process vibration occurs. Vibration may occur due to one or more reasons i.e. inhomogeneous material, cutting speed (feed), chip and also due to bed. Surface finishing affected by vibration and also it reduce tool life. Krishan Mohan Rao et al [1] conducted experiment analysis of passive damping technique on conventional radial drilling machine tool bed using composite material. It show composite material have tendency to reduce vibration.

II. LITERATURE REVIEW

Krishna Mohan Rao et al.[1] Experimental Analysis of Passive Damping technique on Conventional Radial Drilling Machine tool Bed using composite Material international Journal of Mining ,Metallurgy &Mechanical Engg.(IJMMME) Volume 1,issue2(2013). Ranjeet mahakalidas et al [2] Vibration Damping of machine tool structure using composite Material international journal of research in science& Engg. Volume 2 issue 4(2013). Mayank ladha et al [3]comparative study of different materials 0n drilling machine with vibration singals international journal of latest trends in Engg.& technology(IJLTET) Vol. 3 issue 1 Sep.2013. Adib Bin Rashid et al. [4] investigation of the effect of composite Bed on milling machine to reduce Chatter International Conference on Mechanical ,Industrial and Material Engg.2013. Vijay Mohans et al [5] Experimental analysis on surface finish by controlling the vibration using Composite Material on Radial Drilling Machine. International Journal of current Engg.& Technology Vol.4 No. 3(June 2014). Nisarg M. Trivedi et al [6] Improvement of surface finish by vibration control in Machine tool using Composite Material International Journal of Engg. Research and Applications Vol.4 issue(4) (version) April 2014. Apoorv Nema et al [7] comparative vibration analysis on a Drilling machine by using piezoelectric sensor international journal for scientific research & development vol. 3 issue 07,2015 Sachin Kumar Kashyap et al [8] vibrational analysis of drilling machine bed international journal of advanced engg. Research & science (IJAERS) vol. 2 issue 6, june 2015

III. EXPERIMENTAL SETUP

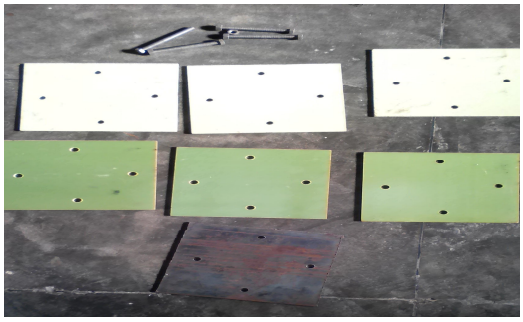

Fig 1 composite

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Fig 2 Experimental setup

As fig 1 show, the specimens of 210x210x5mm are prepaered for glass fiber and glass fiber epoxy. Size of mild steel plate is taken as 210x210x5mm. Drill bit is used of 10mm during experiment. Fiber plate used 4-3-2-1 for experiment.fig 2 show the setup.

IV.RESULTS

Table 1 experimental data for glass fiber polyester

S.No.	Depth of cut(mm)	Number of layers	Signal amplitude (mV)	Time period (µs)	Frequency (KHz)	RMS Amplitude (mV)
1	3	1	50.1	805.1	1.345	10.2
2	3	2	31.7	490.2	1.78	5.87
3	3	3	21.4	976.2	1.02	5.34
4	3	4	43.3	367.1	2.342	9.7

Table 2 experimental data for glass fiber epoxy

S.No.	Depth of cut(mm)	Number of layers	Signal amplitude (mV)	Time period (µs)	Frequency (KHz)	RMS Amplitude (mV)
1	3	1	30.5	856.9	1.12	5.67
2	3	2	26.8	444.7	1.34	5.01
3	3	3	50.7	523	1.54	8.05
4	3	4	56.9	532	1.43	12.9

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Table 3 experimental data for sandwich plates of glass fiber polyester and epoxy

S.No.	Depth of cut(mm)	Number of layers	Signal amplitude (mV)	Time period (µs)	Frequency (KHz)	RMS Amplitude (mV)
1	3	2	55.4	420.2	2.08	12.3
2	3	4	53.8	497.8	1.92	11.8
3	3	6	30.9	659.8	1.53	6.89
4	3	8	46.7	719.6	1.21	11.2

Table 4 experimental data for mild steel

S.No.	Depth of cut(mm)	Number of layers	Signal amplitude (mV)	Time period (µs)	Frequency (KHz)	RMS Amplitude (mV)
1	3	1	55.9	587.3	1.543	13.4

V. CONCLUSION

In this research we perform many experiments and found that the results are as same as result found by previously by lot of researchers. Use of composite material reduces vibrations of the system as desired. With the increase in number of layer of composite at an optimum level, the vibration is decreased.

The result of experiment show, glass fiber epoxy material can be used for machine tool structure to reduce the undesirable effects of vibration.

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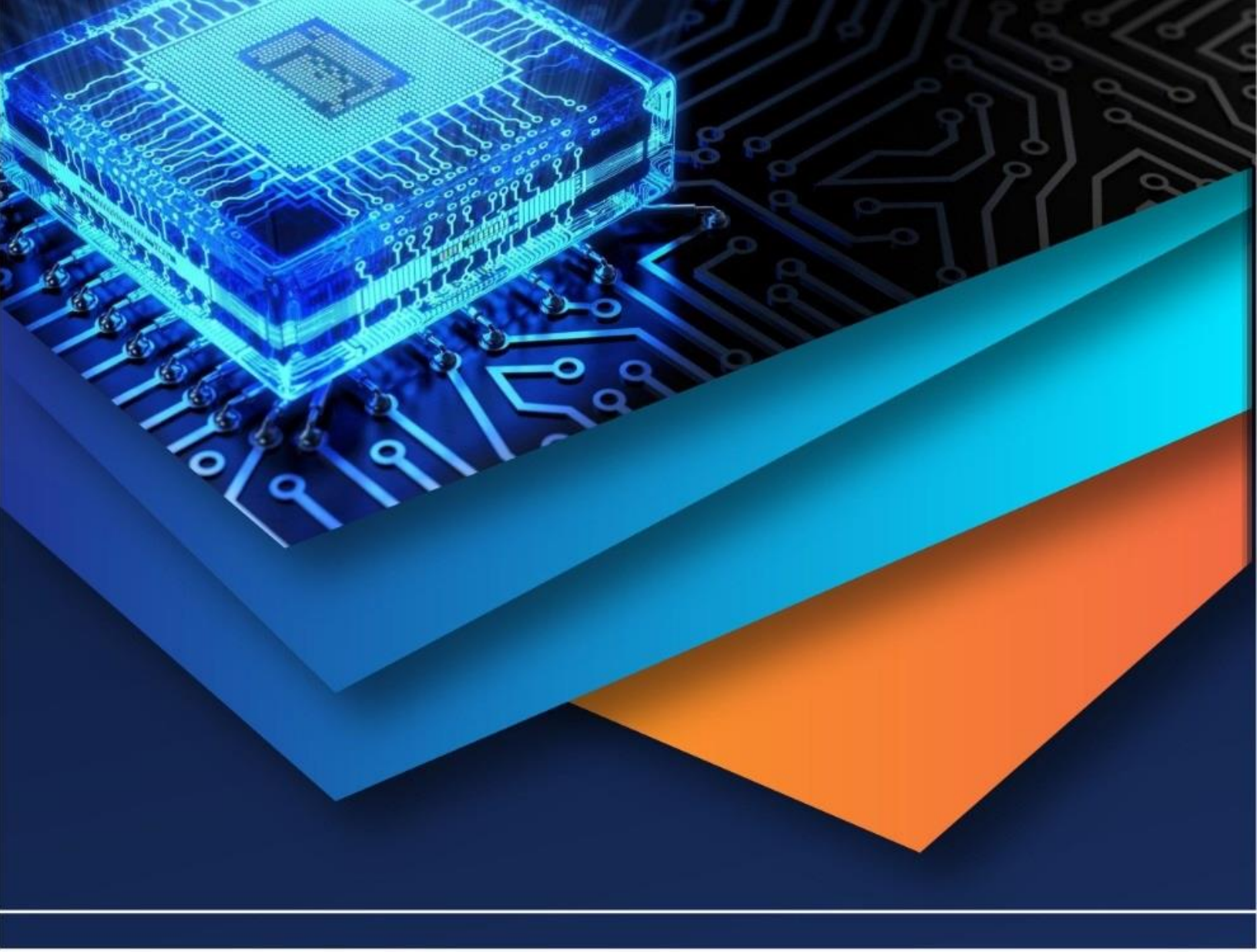

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