Lathe Machine Trueing Tool

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Abstract— The lathe machine trueing tool which is used for Aligning components that are cylindrical about an axis. It can be used for machining cylindrical surfaces, both external and internal. An additional feature of the lathe, is its ability to cut screw threads on a cylindrical surface that has already been machined. The accuracy of the work done on a lathe depends on the skill and experience of the operator. A lot of time is taken for tool changing, tool setting, etc. workshops for the making of prototypes, and also for maintenance work. The lathe is one of the oldest and most important machine tools. Wood lathes were in use in France as early as 1569. During the Industrial Revolution in England the machine was adapted for metal cutting.

Keywords: Lathe Machine Trueing Tool

I. Introduction

Definition Lathe is a machine, which removes the metal from a piece of work to the required shape and size.

- Lathe is one of the most important machine tools in themetal working industry. A lathe operates on the principle of a rotating work piece and a fixed cutting tool.
- The cutting tool is feed into the work piece, which rotates about its own axis causing the work piece to be formed to the desired shape.
- Lathe machine is also known as “the mother/father of the entire tool family”.
- Henry Maudsley was born on an isolated farm near Gigghle swick in North Yorkshire and educated at University Collage London.

He was an outstandingly student, collecting ten Gold Medals and graduating with an M.D. degree in 1857.

Introduction chinning of industrial parts with high speed and high material removal rate is a major requirement for manufacturing companies to be able to produce their products with minimum cost and compete with other manufacturers. In this context, chatter vibration is a limiting factor for increasing material removal rate. Chatter is an undesirable self-excited vibration that is generated mainly due to regenerative effect. It causes harmful effects such as poor surface finish, premature tool wear, potential damage to the machine or the tool, and load noises. Application of smart materials and instruments as sensors and actuators for vibration suppression has attracted significant attention in recent years.

In this research, an integrated model of a lathe and a smart magneto rheological (MR) damper along with a fuzzy control algorithm is presented to avoid chatter occurrence in a lathe machine. Due to importance of chatter reduction, a lot of researches have been conducted in this field. Available literature can be divided in four categories. The first category includes researches which treat this problem in passive mode.

II. Literature Survey

1) Y. Altintas, S. Engin, and E. Budak, “Analytical Stability Prediction and Design of Variable Pitch Cutters,” ASME Int. Mech. Eng. Congress & Exposition, Anaheim, California, MED 8 pp. 141–148, 1998.
2) Y. S. Tarng, J. Y. Kao, and E. C. Lee, “Chatter Suppression in Turning Operations with Tuned Vibration Absorber,” Int. J. Mach. Tools & Manuf., vol. 43, pp. 55–60.
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4) P. Pagliarulo, H. Kuhnen, C. May, and H. Janocha, “Tunable Magnetostrictive Dynamic Vibration Absorber,” Int. J. Mach. Tools & Manuf., vol. 59, pp. 105–127, 2003.
5) D. Sathianarayanan, L. Karunamoorthy, J. Sri Nivasan, G. S. Kandasami, and K. Palanikumar, “Chatter Suppression in Boring Operation Using Magneto rheological Fluid Damper,” Materials & Manufacturing Processes, vol. 23, pp. 329–335, 2008

III. Materials

The tool needs a bar and a bearing as a revolving component. while working on lathe the tool has to face many conditions for which it needs different mechanical properties.

- Hardness, hot hardness and pressure resistance.
- Bending strength and toughness.
- Inner bonding strength.
- Wear resistance. oxidation resistance. small prosperity to diffusion and adhesion. abrasion resistance. edge strength.

We used bearing in this particular tool as a revolving part. The selection criteria of material of bearing is as follows:

By offering a wide choice of materials and heat treatments for rolling bearings, performance and operating life can be optimized, even for the most demanding industrial applications, says Dr Steve Lacey, Engineering Manager at Schaeffer UK.

In recent years, there has been a significant increase in the demand for rolling bearings that, even under extreme operating conditions – including lubricant starvation, highly corrosive or high temperature environments – still provide a long operating life and optimum performance.

But selecting a suitable material or heat treatment process for rolling bearings often requires expert advice and guidance, normally from the manufacturer of the bearings. Selection depends on the application itself and the specific environment in which the bearings will operate. This means a number of factors require careful consideration, such as the mechanical, chemical and thermal requirements placed on the bearings, as well as lubrication conditions, particularly if the application requires dry running bearings.

There is a key role here for the type of materials used for the various bearing components (i.e. rings, rolling elements, cage, etc.) and how these interact. Some of these materials are industry-recognised standard steels (in rolling bearing quality), but others may need to be specially developed by the manufacturer or might involve special surface or heat treatment processes to give the material a certain set of characteristics that are deemed critical for a certain application.

A. Standard rolling bearing steels

For most industrial applications, standard through hardened rolling bearing steel (100Cr6) is sufficient. This versatile material is heat treated (martens tic-hardened and tempered at low temperatures), which provides consistently high hardness (between 62 and 64 HRC) distributed over the circumference and cross-section. The main attributes of this material are high hardness and wear resistance, as well as good resistance to over-rolling (solid particles can produce surface indentations of raceways in rolling-sliding lubricated contacts).

Depending on the wall thickness of the components, it may be necessary to use a higher-grade alloy taking account of harden ability. The material also permits operating temperatures up to 120 deg C, with some grades offering up to 200 deg C. Typical applications include small combustion engines and fan bearings for steel mills.

A slight variation on the above is bainitic hardened 100Cr6 steel. With this material, there is a considerable reduction in the risk of crack formation, even with surface damage. Typical applications for these bearings include wheelset bearings for bucket wheel excavators and trams.

Case hardened steel (St4) in rolling bearing quality has good forming characteristics and provides high hardness and wear resistance, as well as good resistance to over-rolling. This material is well suited to small components that are manufactured in high volumes, such as universal joints, drawn cup needle roller bearings with closed ends and swing arm bearings.

If there is a high risk of particle over-rolling and poor lubricating conditions (e.g. refrigerating compressors, gearbox bearings for construction/agricultural machinery), carbonitrided steel (100CrMnSi6-4) is the preferred choice. This material is heat treated to provide excellent dimensional stability and hardness up to 66 HRC in the outer functional layer by using increased residual austenite content. The result is a material that provides higher resistance to surface damage and high wear resistance, leading to extended bearing life in poor lubrication conditions, especially where there is a high risk of contamination.

IV. CONSTRUCTION AND WORKING

Construction and working: This tool works on principal of applying side thrust on either side of cylindrical rotating job about an axis. the tool is firmed at tool post ,after that the feed is given to tool post and it applies longitudinal force to job and it aligned the job about its axis of rotation.
This job is suitable for cylindrical bar, shaft; bush, etc.

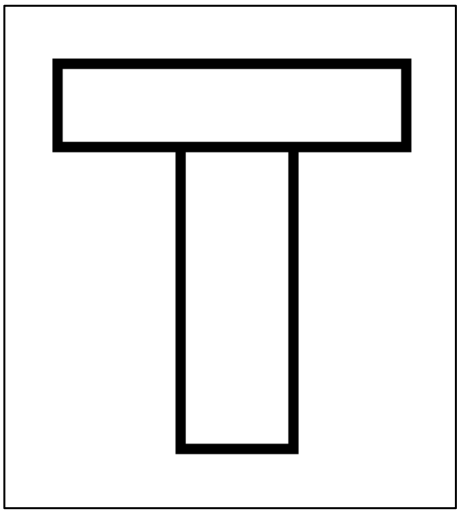

Fig. 1: lathe machine treeing tool

V. CONCLUSION

By using this truing tool the cycle time of true operation of circular job has been reduced This tool is easy to handled and skilled person required The controller significantly improved the system’s stability characteristics, and the obtained results showed quite successful performance of the proposed ideas in enhancing the stability of treeing process.

ACKNOWLEDGMENT

First of all we would like to thank our project guide Mr Nikam Sir Assistant Professor, then Prof.Amol Khatode Head of department, mechanical engineering, We extend our sincere thanks to our Dean ‘’Dr. A. J. Patil…”, Department of mechanical engineering for giving us this wonderful opportunity to work in desired area of interest.

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