Design and Development of Needle Miss and Rotation Check System for Thrust Bearing

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Abstract - The aim of the research project is to design fully automatic needle missing fault checking in the bearings used for automobile sector. The first part of the research paper presents development of electrically controlled system to check fault of the bearing during manufacturing process. The second part of the paper presents details of development of project using PLC programming and the third part of the paper presents experimental analysis including hardware implementation

Key Words: optics, photonics, light, lasers, templates, journals

1.INTRODUCTION

In today's world there is need of less fuel consuming vehicles and fuel vehicles performance is depending upon several factor such as weight, type rotations, design and a bearing used in it. The aim of research project is to find the losses of bearing such as frictional loss, heat loss etc. The manufacturing units are developed with minimal losses which are dependent on the processes used to manufacture the bearing. It is observed that frictional losses are depending on the type of needle used in it. Hence during manufacturing process, the separate track is kept on it. However, during the manufacturing process. It may happen to miss a roller needle and the failure may occur. Presently the needle used in the bearing is manually verified and is time consuming processes during the manufacturing the bearing. Hence effort has been taken to make inspection machine to verify the presence of needle in the bearing.
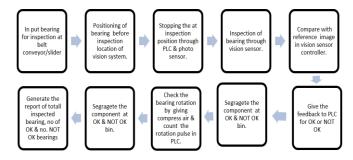
2. LITERATURE SURVEY

Currently industry is facing problem of manual checking of any fault online. This leads to failure of these components on field. In order to solve the problem of the bearing failure a system is developed. In the research paper [1] problem of bearing failure and detection with diagnosis in Induction Motor is presented. A park transform approach & Concordia transform are compared. In paper [2] seven different condition are reviewed and discussion on major advantages and dis-advantages. In the research paper [3],[4] current based bearing fault diagnosis technique are presented. A survey paper [5] describe fault diagnosis with deep-learning algorithm [DL].

The paper [6] describes state of art knowledge on bearing current and diagnosis tools which rely on shaft voltage and bearing current phenomenon. However, a less attention is paid on development of missing part with fault detection using PLC system.

3. SYSTEM DEVELOPMENT

The Important goad of the system is to design a automatic needle missing check in the thrust bearing. In order to solve the manual issue, a automation system is developed. The developed system is also useful to check frictional rotation of a thrust bearing following is the block diagram of system which is developed for fault analysis.
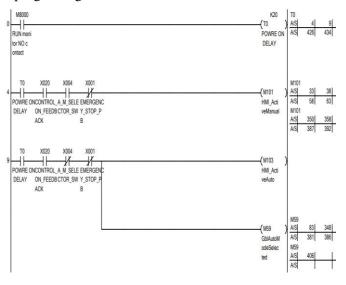

A block diagram describes the overall system. if the all needle is present & showing free rotation, then the developed system takes the decision to send the bearing in prescribed collector bin. On other hand if the needle is missing or frictional force observed, then the bearing is automatically rejected & transferred to faulty bin.

4.PLC PROGRAMMING

The PLC software base programming is developed to identify and analysis the faulty bearing. A PLC indicates various control switching action such as forward, reverse for various activity. A suitable PLC programming is developed using ladder logic programing.

Figure1: PLC Ladder Logic

5.HARDWARE IMPLEMENTATION

A suitable hardware prepared for implementation of system for fault detection. It consists of Mitsubishi make PLC with its own PLC software (GX work 2). The HMI screen (Proface make) is place in front side panel. The RS232 communication cable is used to interface the overall system.

6.EXPERIMENTAL RESULTS

After implementation of system various bearings are tested for any missing needle & frictional losses. Following figure 02,03 show the accepted & rejected bearing.

Figure2: Accepted bearing.　　Figure3: Rejected bearing.

6. CONCLUSIONS

Auto needle miss & rotation check panel for needle thrust bearing will overcome most of the disadvantages of manual inspection concept. It is cost efficient system, low maintains cost, the production of needle thrust bearing can be manufactured by use of automation which is new way for rapid and quality production.

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