

## **Design of an Automated Vibration Monitoring System for Condition Based Maintenance of a Lathe Machine (Case Study)**

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### **Abstract**

This article presents an automated vibration monitoring system for a lathe machine. This study was motivated by the fact that machine production time was wasted during planned maintenance when, most times, the machines did not require any maintenance at all. Also, the periodic intervals used did not depict the correct ageing of the machine components which resulted in unexpected failure of the machine. Planned maintenance schedules are done with the assumption that the machine is going to breakdown after a certain period of time. The aim of this research was to come up with a vibration monitoring system for a lathe machine, which included incorporating an electronic circuit in the system, use of liquid crystal display for improved user interface and use of vibration sensors to determine the vibration level of the machine. Experimental research design was used to determine the acceptable ranges of vibration amplitudes in order to classify the amplitude into 4 groups namely: extremely rough, rough, acceptable and smooth. The designed system produced consistent vibration amplitudes for both machining and non- machining operation. The system used different indicators linked to the main processor of the circuit which monitors the machine real-time performance. It was capable of alerting the user when the vibration amplitude was out of range and also to switch off the machine when the vibration threshold was exceeded. The vibration monitoring system helps in damage control and enables preventive measures to be taken before damage occurs.