

ANALYSIS OF LATHE MACHINE CONDITION IN THE TOOL WORKSHOP ON METRIC THREAD TURNING

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ABSTRACT

This study aims to analyze the effect of lathe machine condition on the quality of metric thread turning at the Tool Workshop of Politeknik Negeri Bengkalis. The study used five conventional lathes with AISI 4140 steel as the workpiece material. The cutting parameters were kept constant, using a carbide tool and a spindle speed of 200 rpm. The research method employed was experimental, with vibration measurements taken using a vibration meter at three main points: headstock, toolpost, and bed. During the thread turning process, the highest vibration values were recorded on machine B12, reaching 0.68 mm/s (headstock), 1.22 mm/s (toolpost), and 0.66 mm/s (bed), while the lowest vibration values were found on machine B14 at 0.46 mm/s, 0.41 mm/s, and 0.36 mm/s, respectively. Thread quality was evaluated based on thread height error. The results showed that machine B12 produced the largest error of 0.35952 mm with a measured thread height of 1.89202 mm, while machine B14 produced the smallest error of 0.19977 mm with a thread height of 1.73227 mm. Other machines (B9, B15, and B3) showed errors of 0.28987 mm, 0.30910 mm, and 0.27239 mm, respectively. The findings indicate that higher vibration levels lead to greater thread height errors, whereas lower vibration results in better thread quality. Therefore, the dynamic condition of the lathe significantly affects thread turning quality, and vibration measurement can be used as an indicator for machine condition evaluation.

Keywords: *lathe machine, vibration, metric thread, AISI 4140.*