

ABSTRACT

ANALISIS *PREVENTIVE MAINTENANCE* MESIN BUBUT CNC BERDASARKAN JAM OPERASI PRAKTIKUM DI LABORATORIUM CNC POLITEKNIK NEGERI BENGKALIS

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This study analyzes the *Preventive Maintenance* implementation of an *CNC* lathe at the *CNC* Laboratory of Bengkalis State Polytechnic based on practicum operating hours, evaluates the technical condition of key components, determines *Maintenance* priorities, and develops an operating-hour-based *Maintenance* schedule. A descriptive-evaluative case-study approach was applied. Primary information was obtained through observation, interviews, documentation, and machine-use records; the workbook reproduced in Appendix 12 contains a simulated dataset used to demonstrate processing of failure, *Downtime*, *temperature*, vibration, *run-out*, *backlash*, and *Alignment* records. The estimated machine utilization from January to June 2026 was 540 h, corresponding to ten 50-h intervals, five 100-h intervals, two 250-h intervals, and one 500-h interval for planning purposes. The simulated workbook dataset produced 56.52 h of effective operation, three disturbances, 2.08 h of *Downtime*, a descriptive *MTBF* of 18.84 h/event, an *MTTR* of 0.50 h/repair, and an operational *Availability* of 96.44%. The maximum *temperature* rise of the main motor was 18.63 °C above ambient at 2,000 rpm, the maximum vibration was 1.947 mm/s RMS, test-bar *run-out* reached 0.029 mm, and the maximum *backlash* values were 0.021 mm on the X-axis and 0.029 mm on the Z-axis; the evaluated *Alignment* parameters remained below the dataset evaluation limits. The carriage, *chuck*, *Coolant* system, and lubrication system were classified as high-priority components. A *Preventive Maintenance* schedule was therefore developed for every use and at 50, 100, 250, and 500 operating hours, supported by operating logs, condition-monitoring sheets, disturbance histories, *checklists*, and technical validation.

Keywords: *Preventive Maintenance*, Operating Hours, *Maintenance* Scheduling, CNC Lathe.