

ANALYSIS OF THE EFFECT OF *NOZZLE* PRESSURE VARIATIONS ON THE PERFORMANCE OF A 2400CC 4-STROKE DIESEL ENGINE

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ABSTRACT

This study aims to determine the effect of Nozzle pressure variations on the performance of a 2400 cc four-stroke diesel engine, specifically on torque and power. The Nozzle pressure variations used in this study were 100 bar, 130 bar, and 150 bar. The subject of this study was a 2400 cc Toyota Kijang LSX diesel engine with a conventional mechanical injection system. The research method used was an experimental method with a quantitative approach. Nozzle pressure testing was conducted using a Nozzle tester to ensure appropriate pressure for each variation, while engine performance testing was conducted using a chassis dyno test at engine speeds of 2000 rpm to 4500 rpm. Observed parameters included torque (Nm) and power (hp). The results showed that Nozzle pressure variations affected diesel engine performance. A Nozzle pressure of 130 bar produced the most optimal performance compared to other variations, with a maximum torque of 234.3 Nm at 3000 rpm and more stable power at medium to high revs. A Nozzle pressure of 100 bar produced quite good performance, but experienced a decrease at high rpm due to suboptimal fuel atomization. Meanwhile, a Nozzle pressure of 150 bar showed a decrease in performance because excessively high injection pressure caused a delay in the combustion process. Based on the research results, it can be concluded that Nozzle pressure has a significant impact on combustion quality and diesel engine performance, and 130 bar was the most optimal pressure in this study.

Keywords: Nozzle pressure, diesel engine performance, torque, power, dyno test.