

## ABSTRAK

Kendaraan bermotor mengalami perkembangan yang cukup pesat. Meningkatnya jumlah kendaraan memiliki dampak negatif bagi lingkungan karena gas buang berupa NOx yang dapat menyebabkan polusi udara yang berbahaya bagi manusia dan lingkungan sekitar. *Exhaust Gas Resirculation (EGR)* merupakan salah satu cara yang efektif untuk menurunkan NOx, sekaligus meningkatkan efisiensi EGR terhadap BSFC (*brake specific fuel consumption*) serta EGR yang berdampak positif terhadap BSFC dan mesin (*engine*) serta mengurangi kandungan gas NOx.

Tujuan penelitian sistem EGR *hot* dan *cold* pada *gasoline engine* diharapkan mampu meningkatkan performa engine, *brake power*, dan *brake torque* dengan menggunakan bahan bakar pertamax. Metode yang digunakan variasi laju aliran EGR *hot* dan *cold* 25%, 50%, 75%, 100% serta menggunakan variasi pembebanan 25%, 50%, 75%, 100% dengan kecepatan 5000 rpm (*revolutions per minute*).

Hasil pengujian menunjukkan adanya peningkatan *brake torque* dan sebesar 7% dengan laju aliran EGR *cold* 75% temperatur B dan terjadi peningkatan pada *brake power* sebesar 10% dengan laju aliran EGR *hot* 100% temperatur B, penurunan *brake specific fuel consumption* terendah sebesar 15% dengan laju aliran EGR *cold* 75% temperatur B, sementara itu peningkatan *brake thermal efficiency* tertinggi sebesar 17% dengan laju aliran EGR *cold* 75% temperatur B menggunakan 5000 rpm.

Kata kunci : *Engine*, *Exhaust Gas Recirculation (EGR)*, bahan bakar pertamax RON 92.

## **ABSTRACT**

Motorized vehicles have developed quite rapidly. The increasing number of disasters has a negative impact on the environment because the exhaust gas is in the form of NOx which can cause air pollution which is harmful to humans and the surrounding environment. Exhaust Gas Resirculation (EGR) is an effective way to reduce NOx while increasing EGR efficiency against BSFC and EGR has a positive impact on BSFC (brake specific fuel consumption) and soot (soot) and reduces NOx gas content.

The research objective of the EGR system on a gasoline engine is expected to be able to improve engine performance, brake power and brake torque by using Pertamax fuel. The method used was a variation of the hot and cold EGR flow rate of 25%, 50%, 75%, 100% and used a loading variation of 25%, 50%, 75%, 100% with a speed of 5000 rpm (revolutions per minute).

The test results show an increase in brake torque and by 7% with a cold EGR flow rate of 75% temperature B and an increase in brake power by 10% with a hot EGR flow rate of 100% temperature B, a decrease in the lowest brake specific fuel consumption by 15% at the lowest rate. EGR cold flow is 75% temperature B, meanwhile the highest brake thermal efficiency increase is 17% with EGR cold flow rate 75% temperature B uses 5000 rpm.

Keywords: Engine, Exhaust Gas Recirculation (EGR), Pertamax RON 92 fuel.