

## ABSTRAK

### PENGARUH VARIASI PER SKEP KARBURATOR DENGAN FILTER UDARA CAMPURAN ZEOLIT DAN *FLY ASH* TERHADAP PRESTASI MESIN SEPEDA MOTOR 4 – LANGKAH

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Penelitian ini bertujuan untuk menganalisis pengaruh variasi per skep karburator dan penggunaan filter udara campuran zeolit dan *fly ash* terhadap performa mesin sepeda motor bensin 4-langkah. Variasi per skep yang digunakan meliputi per skep pendek (5 cm), standar (8 cm), dan panjang (10 cm), dengan perbandingan filter udara standar dan filter zeolit *fly ash*. Pengujian dilakukan pada sepeda motor Yamaha Vega ZR 2009 melalui uji akselerasi, uji jalan, uji stasioner, dan uji emisi pada kondisi kerja mesin yang stabil. Parameter yang diamati meliputi waktu akselerasi, konsumsi bahan bakar, konsumsi bahan bakar stasioner, serta emisi gas buang CO dan HC. Hasil penelitian menunjukkan bahwa variasi per skep dan penggunaan filter zeolit *fly ash* berpengaruh terhadap karakteristik pembakaran dan performa mesin. Kombinasi per skep pendek dengan filter zeolit *fly ash* menghasilkan waktu akselerasi tercepat 6,60 detik meningkat sekitar (2,8%), sedangkan kombinasi per skep panjang dengan filter zeolit *fly ash* memberikan efisiensi terbaik dengan nilai konsumsi bahan bakar sebesar 44,44 km/L (hemat 14,8 %) serta emisi terendah, yaitu CO 2,52% (reduksi 18,7 %) dan HC 353 ppm (reduksi 71,7 %). Dengan demikian, per skep pendek lebih sesuai untuk peningkatan akselerasi, per skep panjang dengan filter zeolit *fly ash* lebih optimal dalam meningkatkan efisiensi bahan bakar dan menurunkan emisi gas buang.

**Kata Kunci :** Per skep karburator, filter udara, zeolit, *fly ash*, performa mesin.

**ABSTRACT*****THE EFFECT OF CARBURETOR SLIDE SPRING VARIATIONS WITH A ZEOLITE–FLY ASH AIR FILTER ON THE PERFORMANCE OF A FOUR-STROKE MOTORCYCLE ENGINE******BY*****VIKKY ARYA KUANDI**

*This study analyzes the effects of carburetor slide spring length and zeolite–fly ash air filters on the performance of a four-stroke gasoline motorcycle engine. Three spring types were tested: short (5 cm), standard (8 cm), and long (10 cm), combined with either a standard air filter or a zeolite–fly ash filter. Experiments were conducted on a 2009 Yamaha Vega ZR through acceleration tests, road operation, stationary fuel consumption measurements, and exhaust emission evaluations under stable engine conditions. The observed parameters included acceleration time, fuel consumption, stationary fuel use, and exhaust emissions of carbon monoxide (CO) and hydrocarbons (HC). The results show that both spring length and filter type significantly influence engine performance. The short spring combined with the zeolite–fly ash filter produced the fastest acceleration at 6.60 s improved by approximately (2.8%). Conversely, the long spring with the same filter achieved the highest fuel efficiency of 44.44 km/L, representing a 14.8% improvement, and generated the lowest emissions, with CO at 2.52% (18.7% reduction) and HC at 353 ppm (71.7% reduction). Thus, the short spring is preferable for acceleration, whereas the long spring with a zeolite–fly ash filter is optimal for fuel economy and emission reduction.*

***Keywords:*** Carburettor slide spring, air filter, zeolite, fly ash, engine performance.