

## Analisa CAM duration pada mesin otto satu silinder empat langkah berkapasitas 65 CC = Analyze CAM duration on one cylinder four stroke 65 CC spark ignition engine

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### Abstrak

Penggunaan bahan bakar minyak bumi yang semakin tinggi sedangkan cadangan yang semakin berkurang membuat kaum akademi dan berbagai pihak yang bersangkutan berkompetisi melakukan penghematan bahan bakar. Eco-marathon salah satu kompetisi yang memperlombakan penghematan bahan bakar diadakan oleh salah satu perusahaan minyak dunia. Kompetisi ini diikuti oleh akademisi dari berbagai belahan dunia termasuk mahasiswa Departemen Teknik Mesin Fakultas Teknik Universitas Indonesia. Mahasiswa yang mengikuti kompetisi ditantang untuk membuat, merancang, dan menguji kendaraan dan mesin yang telah dibuat. Mesin hasil desain dan buatan mahasiswa Teknik Mesin Universitas Indonesia berkapasitas 65 cc dengan satu silinder dan Double Overhead Camshaft (DOHC). Mesin dengan desain DOHC lebih mudah dalam memvariasikan cam duration. Tiga variasi cam yang dilakukan penulis yaitu cam standar, advanced cam duration, dan retarded cam duration. Kondisi advanced cam duration memiliki overlap yang lebih besar dibanding kondisi cam standar, akan tetapi kondisi retarded cam duration tidak mempunyai overlap. Kondisi standar buka dan tutup yang digunakan adalah Intake Open 7 ATDC, Intake Close 20 BBDC, Exhaust Open 24 ABDC, dan Exhaust Close 9 ATDC. Cam Intake memiliki nilai puncak pada 80 ATDC sedangkan cam exhaust pada 112 ABDC. Dari pengukuran yang telah dilakukan didapat karakteristik cam dari mesin 65 cc dengan intake valve memiliki durasi 153 derajat dan full lift pada 3,97 mm sedangkan untuk exhaust valve memiliki durasi 164 derajat dan full lift 3,85 mm.

.....The use of petroleum fuels that higher while the amount of reserves is diminishing make the academics and various related parties compete to thrift on fuel. Eco marathon is one of competition which competed on the efficiency of fuel usage. This competition was hold by one of world's oil company and followed by the academics from around the world, including the college students of Mechanical Engineering Department, Engineering Faculty of Universitas Indonesia. The college students which followed this competition were challenged to made, designed, and examined vehicles and machine that have been made. The machine has been designed and made by them had the 65 cc of capacities with a Double Overhead Camshaft and cylinder (DOHC). Machine with a DOHC design is easier to vary the cam duration. Considering the reason which is explained, the author is varying the cam duration and analyze its impact on power and torque. Three variations were done by the author are cam standard, advanced cam duration, retarded cam duration. The condition of advanced cam duration has a greater overlap than cam standard cam's condition, whereas the condition of retarded cam duration doesn't have an overlap. Open and close standard conditions are used Intake Open 7 ATDC, Intake Close 20 BBDC, Exhaust Open 24 ABDC and Exhaust Close 9 ATDC. Intake cam has a peak value at 80 ATDC while the exhaust cam at 112 ABDC. From the measurements that have been done cam characteristics obtained from 65 cc engine with intake valve has a duration of 153 degrees and at full lift of 3.97 mm while the exhaust valve has a duration of 164 degrees and a full lift of 3.85 mm.