

# **ANALISIS PENGARUH COMPRESSOR PRESSURE RATIO TERHADAP SPECIFIC THRUST DAN SPECIFIC FUEL CONSUMPTION ENGINE TURBOFAN GE90-85B PADA KONDISI CRUISING**

Ditulis oleh:  
**ILHAM MUHAMAD ALWI T**  
**NIM. 15040088**

Pembimbing 1 : Dedet Hermawan S., S.T., M.T.  
Pembimbing 2 : Dr. Okto Dinaryanto, S.T., M.M., M.Eng.

## **ABSTRAK**

*Sistem turbin gas yang paling sederhana terdiri dari tiga komponen yaitu kompresor, ruang bakar dan turbin gas. Kompresor adalah alat mekanik yang berfungsi untuk meningkatkan tekanan fluida, yaitu udara. Kompresor dibagi menjadi dua yaitu low pressure compressor dan high pressure compressor. Pada engine pesawat terbang, kompresor digunakan untuk meningkatkan tekanan udara yang akan dibakar di dalam combustion chamber. Tujuan peningkatan tekanan adalah untuk meningkatkan efisiensi pembakaran, sebab pada saat pesawat udara beroperasi yaitu terbang di ketinggian terbang cruising maka temperatur udaranya sangat rendah sehingga sangat sulit untuk dilakukan pembakaran. Oleh karena itu peningkatan atau penurunan compressor pressure ratio akan berpengaruh pada performa engine pesawat udara yakni specific thrust dan specific fuel consumption.*

*Salah satu cara untuk mengetahui pengaruh compressor pressure ratio terhadap specific thrust dan specific fuel consumption dapat dilakukan dengan metode parametric cycle analysis of real engine pada kondisi cruising, kemudian menganalisa nilai hasil perhitungan yang didapat dengan inputan variasi compressor pressure ratio yang berbeda.*

*Pada hasil analisa perhitungan performa diperoleh hasil engine GE90-85B kondisi cruising 35000 feet didapatkan hasil specific thrust sebesar sebesar 14,2011 lbf/(lbf/s), specific fuel consumption sebesar 0,5838 (lbm/h)/lbf, efisiensi thermal sebesar 38,3 %, efisiensi propulsive 76%, dan efisiensi overall 29,4%.*

*Nilai performance engine diketahui mengalami penurunan dan kenaikan seiring meningkatnya dan menurunnya variasi nilai dari parameter yaitu compressor pressure ratio, sehingga apabila nilai dari parameter tersebut semakin besar, maka konsumsi fuel pada saat pesawat beroperasi akan menjadi lebih sedikit dan thrust akan mengalami penurunan.*

***Kata kunci:*** compressor pressure ratio, specific thrust, specific fuel consumption.

# **ANALYSIS OF EFFECT RATIO OF PRESSURE COMPRESSOR SPECIFIC FUEL CONSUMPTION TURBOFAN GE90-85B ENGINE CONDITIONS ON CRUISING.**

Ditulis oleh:

**ILHAM MUHAMAD ALWI T**  
**NIM. 15040088**

Pembimbing 1 : Dedet Hermawan S., S.T., M.T.

Pembimbing 2 : Dr. Okto Dinaryanto, S.T., M.M., M.Eng.

## **ABSTRAK**

*System simplest gas turbine consists of three components: a compressor, combustor and turbine. The compressor is a mechanical device which serves to increase the pressure of the fluid, ie air. The compressor is divided into two low pressure compressor and high pressure compressore. In aircraft engines, compressors are used to increase the air pressure that will be burned in the combustion chamber. Interest is increasing pressure to improve combustion efficiency, because during the operation of aircraft that fly in cruising flight altitude of the air temperature is very low so it is very difficult to do the burning. Therefore, an increase or decrease in compressor pressure ratio will affect the engine performance aircraft that is specific fuel consumption. One way to determine the effect of compressor pressure ratio of the specific thrust and specific fuel consumption can be achieved by parametric cycle analysis of real engine at cruising conditions, then analyze the results of calculations obtained by the input variations of different compressor pressure ratio.*

*The results of the performance calculation engine GE90-85B at 35000 feet cruising conditions showed specific thrust amounted to 14,2011 lbf / (lbf/s), specific fuel consumption ebesar 0.5838 (lbf / h) / lbf, thermal efiensi of 38,3%, 76% propulsive efficiency, and the overall efficiency of 29,4%.*

*The value of engine performance is known to decrease and increase with increasing and decreasing variation of the value of the parameter compressor pressure ratio. So that if the value of these parameters is greater, the fuel consumption when the aircraft operates will be less and the thrust will decrease. In addition to change the value of the output due to the influence of the compressor pressure value, variations in altitude are also very influential where the higher the aircraft, the resulting output value will be smaller*

**Keywords:** *compressor pressure ratio, specific thrust, specific fuel consumption.*