

Optimization of Turbocharged Diesel Engines

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Abstract : The turbocharger and turbocharging have been the inherent component of diesel engines, so that critical parameters of such engines, as BSFC(Brake Specific Fuel Consumption) or thermal efficiency, fuel consumption, BMEP(Brake Mean Effective Pressure), the power density output and emission level have been improved extensively. In general, the turbocharger can be considered as the most complex component of diesel engines, because it has closely interrelated turbomachinery concepts of the turbines and the compressors to thermodynamic fundamentals of internal combustion engines and stress analysis of all components. In this paper, a waste gate for a conventional single stage radial turbine is investigated by consideration of turbochargers operation constrains and engine operation conditions, without any detail designs in the turbine and the compressor. Amount of opening waste gate which extended between the ranges of full opened and closed valve, is demonstrated by limiting compressor boost pressure ratio. Obtaining of an optimum point by regard above mentioned items is surveyed by three linked meanline modeling programs together which consist of Turbomatch®, Compal®, Rital® modules in concepts NREC® respectively.

Keywords : turbocharger, wastegate, diesel engine, concept NREC programs

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