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Increasing exhaust temperature to enable after-treatment operation on a two-stage turbo-charged medium speed marine diesel engine

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1 Increasing exhaust temperature to enable after-treatment
2 operation on a two-stage turbo-charged medium speed
3 marine diesel engine.

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6 **Abstract**

Nitrogen-oxides (NO_x) are becoming more and more regulated. In heavy duty, medium speed engines these emission limits are also being reduced steadily: Selective catalytic reduction is a proven technology which allows to reduce NO_x emission with very high efficiency. However, operating temperature of the catalytic converter has to be maintained within certain limits as conversion efficiency and ammonia slip are very heavily influenced by temperature. In this work the engine calibration and hardware will be modified to allow for a wide engine operating range with Selective catalytic reduction. The studied engine has 4MW nominal power and runs at 750rpm engine speed, fuel consumption during engine tests becomes quite expensive (+ - 750kg/h) for a measurement campaign. This is why a simulation model was developed and validated. This model was then used to investigate several strategies to control engine out temperature: different types of wastegates, injection variation and valve timing adjustments. Simulation showed that wastegate application had the best tradeoff between fuel consumption and exhaust temperature. Finally, this configuration was built on the engine test bench and results from both measurements and simulation agreed very well.

7 *Keywords:* medium speed, diesel, selective catalytic reduction, marine,
8 exhaust temperature, wastegate

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