DIPLOMA THESIS

DEVELOPMENT OF SCR THERMAL MODEL AND PERFORMANCE OF TRANSIENT SIMULATIONS WITH AN ENGINE SIMULATION CODE

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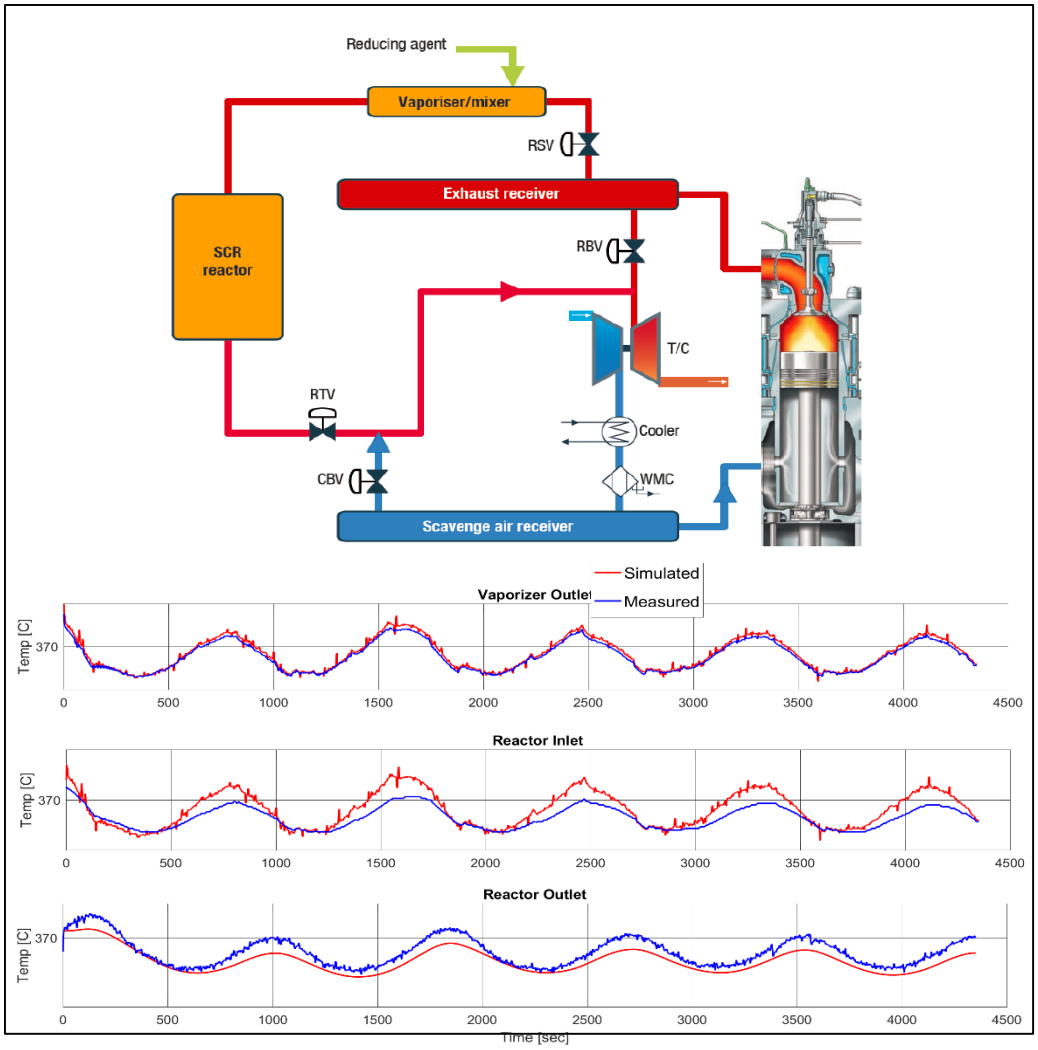

The present Thesis focuses on the development of an SCR thermal model that can accurately predict the temperature dynamics of an SCR system installed on a marine diesel engine. Steady and transient simulations for a two-stroke marine diesel engine equipped with an SCR system are performed in order to investigate the effect of the installed valves on the engine operation.

In order to study the thermal response of a marine SCR aftertreatment system in transient loading of a two-stroke marine diesel engine, an SCR model is developed and validated using measurements from a full scale engine-SCR testbed. It is assumed that SCR consists of three parts: vaporizer, intermediate pipe and reactor. The equations that approach the aforementioned modeling are partial differential equations (pde), which are solved in time using two methods: an explicit and an implicit method. The output of the model is the SCR outlet temperature. The above mentioned models were validated using testbed measured data from a large two-stroke marine diesel engine. The validation process included tests both in steady and transient engine loads.

Validation was followed by the connection of the SCR model to an existing engine simulation code (MOTHER) and the performance of steady and transient simulations. The effect of the onboard valves on the operation of the engine was investigated.

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