

REDUCING FUEL CONSUMPTION OF INTERNAL COMBUSTION ENGINE BY RECOVERING LOST ENERGY

Goal of the project

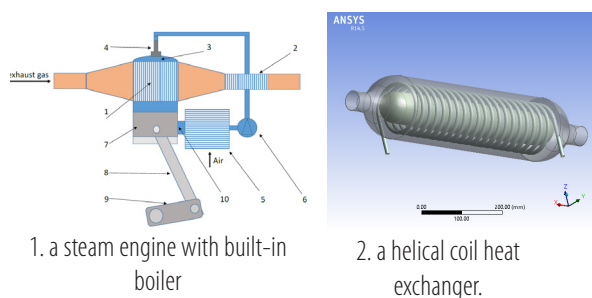
The problem of polluting emissions in the field of transport is becoming more and more stringent, so there is a general interest in finding solutions to reduce pollutant emissions and fuel consumption.

Short description of the project

The following major objectives were proposed:

1. Reduction of pollutant emissions produced by ICE;
2. Reducing fuel consumption by recovering dissipated energy;
3. Increasing global thermal efficiency;
4. Increase the level of knowledge.

For the ICE exhaust heat recovery two system were proposed:



For experimental trials of the proposed system, three internal combustion engine stands have been upgraded and put into operation.

Implementation period

21.11.2017 – 31.12.2018

Budget

46.500 RON (10000 EUR)

Main activities

During this project, the research team was focused on the following activities:

- Development of a mathematical model and simulation of a built-in instantaneous steam boiler engine.
- Verification design of Dynamic Vapor Testing Cell for verifying the developed mathematical model.
- Modernization of three internal combustion engine stands to be used for the study of energy recovery.
- Elaboration of the helical spiral boiler model for FEM analysis.
- Preliminary trials were carried out with the three internal combustion engine stands.

Results

As a result of the activities carried out, a paper was submitted to an ISI journal and 4 papers were presented within international conferences and the papers are classified as ISI proceedings.

- 1. Vaporization of thin film in case of vapor bubbles. New resolution approach, Virgil Stoica, Mariana Ilie.
- 2. Flash boiling steam engine, Virgil Stoica, Gavrilă Trif-Tordai, Mariana Ilie, Delia Calinoiu,
- 3. Experimental bench test for boiling dynamics, Virgil Stoica, Mariana Ilie, Andrei Borborean, Cioabla Adrian, Dorin Lelea,
- 4. Test Bench for the Effects of Water Injection in an Internal Combustion Engine, Andrei Tiberiu Borborean, Virgil Stoica, Dorin Lelea,
- 5. Application of Biogas Inside and Motogenerator – Case Study, Adrian Eugen Cioabla, Virgil Stoica, Francisc Popescu.

Applicability and transferability of the results:

The results obtained to date show that the simple injection of water in the case of internal combustion engines involves a 30% reduction of nitrogen oxides emissions. This solution can be applied with low-costs on series internal combustion engines.

The project being focused on practical solutions applicable in everyday life, we expect that the on-coming results due to project implementation, to be practically applicable in industry.

Research team

Virgil STOICA, Project Director
Gavrilă TRIF-TORDAI, Member
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