

SUMMARY OF THESIS DOCTOR OF TECHNICAL DISCUSSION

Title: “Research on the use of ULSD-Biodiesel fuel blend on marine diesel engines”.

Field of study: Mechanical Engineering

Code: 9520116

Ph.D candidate: Tran Viet Dung

Year course: 2017

Supervisors: 1. Assoc. Prof. Dr. Hoang Anh Tuan
2. Prof. Dr. Le Anh Tuan

Training Institution: Ho Chi Minh City University of Transport.

1. Goals

- Overview on solutions of using ULSD fuel for marine diesel engines;
- Research, design, and fabrication of equipment/system using ultrasonic waves to produce homogeneous fuel blend of ULSD and Biodiesel;
- Carrying out experimental studies to evaluate the techno-economic aspects, and emission and combustion characteristics, and performance parameters of a marine diesel engine when using the homogenous fuel blend of ULSD-Biodiesel as an alternative fuel.

2. Object and scope

- Small ship diesel engines with the range of power from 50 hp to 100 hp;
- Traditional diesel fuel with 0.05% sulfur content, ULSD with 0.001% sulfur content, and Biodiesel originated from coconut oil;
- Fabrication of ultrasonic wave-based equipment/system to produce homogeneous fuel blend;
- Fuel supply system, exhaust system, and control and test system of the engine;
- Testing equipment for engine power and emissions parameters.

3. Novelty

- Building and systemizing the theoretical basis for homogenous mixing of two liquid phases by ultrasonic waves;

- Successful design and fabrication of a system for produce a homogenous blend of ULSD-Biodiesel by ultrasonic waves aiming to meet the current technical and quality standards of Vietnam;
- Carrying out the standard tests and critical evaluation of the techno-economic characteristics of marine diesel engines when using ULSD-Biodiesel homogenous fuel blend.

4. Scientific and practical significance

4.1. Scientific significance

The results obtained from this doctoral dissertation are considered as a reliable scientific basis and could be used as a good reference for research institutes and universities in the maritime field for teaching and researching the use of very low sulfur fuel for marine diesel engines.

4.2. Practical significance

Combining ultra-low viscosity fuel (ULSD) with high-viscosity Biodiesel fuel to form a homogeneous blend with the required viscosity, renewable properties, and reduced operating costs has offered great significance in terms of economy, technology, and emissions.

5. Structure

The doctoral dissertation consists of an introduction, 4 chapters of main study content, a general conclusion, and a development direction.

Chapter 1: Overview

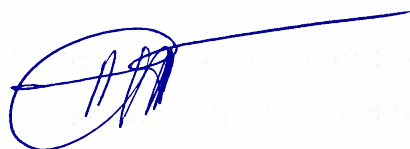
Chapter 2: Theoretical basis of mixing ULSD and Biodiesel fuel and applicability in diesel engines of ships

Chapter 3: Design, manufacturing, and assessment of ultrasound mixing-equipment quality for ULSD and Biodiesel

Chapter 4: Experimental study

Supervisors

Ph.D candidate



Assoc. Prof. Dr. Hoang Anh Tuan

Prof. Dr. Le Anh Tuan

Tran Viet Dung