

# **INFORMATION ABOUT ENGINEERING DOCTORIAL DISSERTATION**

Name of PhD Candidate: DANH HUU TRAN

Name of thesis: **“RESEARCH ON SOME INFLUENCES OF DYNAMIC  
PARAMETERS ON THE DURABILITY OF PROPELLER SHAFT IN TRUCKS  
WITH LOAD OF UP TO 3 TONS”**

Specialization: Mechanical Engineering

Code No: 9.52.01.03

Full name of the scientific supervisor:

Assoc. Prof. Dr. Quang Thanh Nguyen

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Training institutions: National Research Institute of Mechanical Engineering –

Ministry of Industry and Trade

## **SUMMARY OF NEW CONCLUSIONS IN THESIS**

### **1. Scientific significance**

The scientific significance of the thesis has developed a research methodology for the durability of propeller shaft; built the differential equations of the motion of cardan universal joints as well as the equations of motion and kinetics of propeller shaft according to the dynamics of multi-body system as the basis for the design of cardan shaft, constructed a finite element model to investigate the influence of dynamic parameters on the durability of propeller shaft; including:

- Building the equation describing the motion of cardan universal joints and propeller shaft. Solving differential equation of motion and simulating dynamics of the assembly by using Matlab Mupad and Simulink software.
- Using finite element method with ANSYS Workbench software as a simulation tool for the survey of the durability of propeller shaft.
- Developing experimental method to specify dynamic parameters; Designing an experimental platform and wireless transceiver using to receive signals from the rotating propeller shaft.

## **2. Practical significance**

Studying kinetics and dynamics and the durability of propeller shaft in trucks, applying to the design, new fabrication and improvement of durability, replacement of propeller shaft.

Designing experimental platform of propeller shaft with wireless transceiver created to determine the influences of three dynamic parameters (torque, stress, number of revolution) on the durability of propeller shaft. The experimental platform can be applied in practical production and the evaluation of the shaft quality.

The research outcomes of the thesis can be used as reference material for in-depth and extended studies within training and research institutes, as well as for the process of design calculation of propeller shaft.

## **3. New contributions of the thesis**

- Develop a spatial model, establish dynamic equation of the assembly of propeller shaft in the powertrain of the trucks with load of up to 3 tons by kinetics and dynamics of multi-body system;
- Use the Matlab Mupad, Simulink and Ansys Workbench software which are powerful specialized tools for studying some dynamic parameters of propeller shaft, the results of which are the scientific basis of the calculation of propeller shaft durability;
- Establish experimental methods to identify some dynamic parameters and the durability of propeller shaft;
- Design and manufacture the experimental platform for the open power test with modern and standard equipment;
- Design and manufacture of wireless signal transceivers to receive signals from the rotating propeller shaft by non-destructive signal reception;
- Measure the deformation value from the transfer of non-electrical signals to electrical signals, digital signals and identify the specific measurement value through the calibration on the direct stress machine and wireless signal transceiver.

*Ha Noi, date    month    year 2018*

**Supervisor group**

**PhD Candidate**