INFORMATION OF A DOCTORAL THESIS IN ENGINEERING

Name of PhD candidate: **Nguyen Minh Tan**

Name of thesis: **"A Study on Resistance Seam Welding Technology for Restoring Shaft Parts".**

Specialization: Mechanical Engineering

Code No: 9520103

Full name of the scientific supervisor:

1. Dr. Hoang Van Chau

2. Assoc. Prof. Dao Quang Ke

Training institutions: National Research Institute of Mechanical Engineering – Ministry of Industry and Trade

SUMMARY OF NEW CONCLUSIONS IN THESIS

1. Scientific significance of thesis

Research results have scientific implications as follow:

- By experiment, pointing out the relationship between 03 parameters of resistance seam welding: I_h, F, V_h with mechanical properties and microstructure of the welded area, thereby, assessing the welding forming mechanism and material strucutre near the welded regions.

- Proposals for a set of resistance seam welding parameters, pair of steel material C45 or 40Cr with the coating by steel wire C70 on the existing experimental equipment in Vietnam, ensuring the reinstatement quality of the shaft.

- Identification of the combination of 3 parameters: I_h, F, V_h, aiming at gaining the highest mechanical properties in the investigated area and quantify the effect ratio of these parameters on mechanical properties of the hardfacing layer.

2. Practical significance

- Thesis results can be the reference for welding technology field, serving for the application and manufacture research.

- Completing a restoration technology of the shaft machine elements which contributes certain effectiveness in terms of capacity, quality, economy, and protection of natural resources and the environment in our country.

- Construction of proper assessment methodology for the hardfacing layer by using resistance seam welding technology for shaft components with low abrasion.

3. New contributions of the thesis

- Broadening the application scale of resistance electric seam welding technology in the field of repairing and restoration of shaft for good productivity, quality, low costs, and environmental safety in our country.

- Identifying the role of influence of some technology parameters (I_h, F, V_h,) toward the quality of reinstatement welding layer, serving as a scientific base for the other similar studies.

- Constructing the regressing equation that presents concurrent relationships of parameters I_h, F, V_h influencing mechanical properties of hardfacing layer on conducting resistance seam welding for restoring of shaft parts.

- Conducting Grey Relational Analysis (GRA) in combination with the Taguchi and Double division algorithm to find out the optimal value, the percentage of influenced technological parameters that simultaneously meet multiple objectives of mechanical properties of the welded joint

Hanoi, March 19th, 2019

Supervisor group **PhDcandidate**

Dr. Hoang Van Chau **Assoc. Prof. Dao Quang Ke** **Nguyen Minh Tan**