

INFORMATION ABOUT THE THESIS

Full name of PhD student: **Nguyen Thai Son**

Thesis Title: " RESEARCH ON THE EFFECTS OF SELECTED PROCESS PARAMETERS ON THE QUALITY OF 3D PRINTED – SLM PARTS FROM Ti6Al4V MATERIAL"

Major: Mechanical Engineering

Major Code: 9520103

Scientific Supervisors:

1. Assoc.Prof.Dr. Tran Ngoc Hien
2. Assoc.Prof.Dr. Nguyen Chi Sang

Training Institution: National Research Institute of Mechanical Engineering (NARIME) – Ministry of Industry and Trade

SUMMARY OF NEW CONCLUSIONS OF THE THESIS

1. Scientific Significance

- Clarifying the main process parameters that influence the Selective Laser Melting (SLM) process for Ti-6Al-4V titanium alloy powder.
- Establishing heat source models and heat transfer models, and analyzing temperature distribution during printing as a basis for determining appropriate printing process parameters.
- Developing mathematical models that describe the relationships between output quality indicators and printing process parameters, providing a scientific basis for selecting suitable process parameters for specific output requirements in practical applications.

2. Practical significance

- The research results on the relationships between the printed product quality indicators and the printing process parameters enable the determination of appropriate process parameters set to achieve the desired output quality in practical applications.
- The research results can serve as teaching and research materials, as well as a reference for enterprises applying additive manufacturing technology to improve product quality.

3. Novel contributions of the dissertation

- Further development and refinement of the theoretical framework for metal 3D printing processes applied to Ti-6Al-4V titanium alloy powder.

- Simulation-based analysis of the thermal process during printing, from which the temperature distribution state can be predicted to ensure appropriate material melting conditions corresponding to specific sets of printing process parameters.
- Development of predictive models for printed product quality, including geometric deviation, surface quality, and porosity, in relation to printing process parameters via experimental studies using the SLM process. Based on these models, optimal process parameter sets were determined to ensure product quality under single-objective or multi-objective optimization criteria (minimum surface roughness, minimum geometric deviation, and maximum porosity-free printed area).

Hanoi, date month year 2026

Comments of the Scientific Supervisors

PhD Student

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