

DOCTORAL DISSERTATION INTRODUCTION

Full name of PhD student: **Van Khoan Bui**

Dissertation title: *“Research on the influence of plasma spray technological parameters on the properties of Al₂O₃-TiO₂ ceramic coating on steel substrate”*

Major: Mechanical Engineering

Training program code: 9520103

Full name of scientific supervisors:

1. Assoc. Prof. Dr. Thu Quy Le

2. Dr. Thach Ho Phan

Training facility: National Research Institute of Mechanical Engineering

SUMMARY OF THE DISSERTATION NOVEL CONCLUSIONS

1. Regarding scientific meaning

- Provided an effective approach in determining the appropriate range of plasma spray parameters affecting the properties of Al₂O₃-40TiO₂ ceramic coatings.

- Determined the influence of 3 main spray parameters (injection current, spray distance, and powder feed flow) on 4 coating quality properties (microhardness, adhesion strength, porosity, coefficient of friction); Constructed mathematical functions describing the relationship between Al₂O₃-40TiO₂ coating quality properties with 3 parameters of spray mode.

- Determined the optimal single-target and multi-target spray parameters for the coating quality of the Al₂O₃-40TiO₂ system.

2. Practical significance

- Research results can be used as a reference to select technology, equipment, and spray coating mode for restoration or new fabrication of worn machine parts in order to promptly meet production and limit imports, and can also be used as materials for teaching and scientific research in specialized fields.

3. Novel contributions of the dissertation

- Building regression functions showing the relationship of simultaneous influence of 3 factors of spray technology (I, L, M) on the objective function are 4 important mechanical properties of the coating.

- Used OEC overall evaluation criteria to find out the appropriate level of coating technology parameters to simultaneously meet multiple output mechanical properties of Al₂O₃-40TiO₂ coating.

- Fabrication of spray jigs, and molds to test the adhesion strength for ceramic coatings on flat sheet steel.

Hanoi, 02 November 2022

Signature of Supervisors

Signature of PhD student

Assoc.Prof. Thu Quy Le

Dr. Thach Ho Phan

Van Khoan Bui