

INFORMATION OF THE DOCTORAL DISSERTATION

Dissertation title: A study on vibration assisted drilling of deep and small holes on aluminum alloys

Specialty: Mechanical Engineering

Code of Specialty: 9 52 01 03

Traning course: 2012-2016

Ph.D. Student: Chu Ngoc Hung

Supervisor: Assos. Prof. Dr. Nguyen Van Du

Training institution: Thai Nguyen University of Technology, Thai Nguyen University, Vietnam.

NEW SCIENTIFIC FINDINGS OF THE DISSERTATION

- 1) An experiemental system for Ultrasonic Assisted Machining has successfully been set-up in the fist time. The system was built by using available devices, satisfying the practical conditions inside the country.
- 2) Experimental evaluations to validate the advantages of ultrasonic assisted drilling, including production rate, drilling torque and axial force, compared to conventional drilling have been implemented.
- 3) A new mathematical model, which can be used to desribe the dependence of the drilling torque on the drilled depth, has been successfully developed. This would be an important contribution for the trend of modeling and prediction of the total torque in deep drilling.

APPLICATIONS IN PRACTICE AND

RECOMMENDATIONS FOR FURTHER STUDIES

The practical applications:

The study has successfully applied the ultrasonic assisted machining in drilling of small and deep holes. The results obtained would be directly applied in industrial

production processes in order to enhance the eco-technique of the drilling of small and deep holes.

Recommendations for further studies:

Several practicable demands for further investigation can be proposed as below.

- 1) Practically evaluate the advantages of UAD compared to CD on various materials;
- 2) Investigate the effects of vibration parameters on the cutting process, mechanism of tool wear, tool life and machined qualities in UAD;
- 3) Further develop the mathematical model in order to predict the chip evacuation torque and stick-slip torque in drilling;
- 4) Systematically study on the mechanism and frictional force induced in the chip evacuation of drilling processes.

08/09/2019 in Thai Nguyen

Scientific Supervisor



Assos. Prof. Dr. Nguyen Van Du

Ph.D Candidate



Chu Ngoc Hung