

INFORMATION ON DOCTORAL THESIS

1. Full name : Pham Minh Phuc 2. Sex: Male
3. Date of birth: 05/12/1978 4. Place of birth: Hai Duong
5. Admission decision number: 778/QĐ-CTSV. Dated 21 August 2017 by the Rector of UET.
6. Changes in academic process: No
7. Official thesis title: Studying the effect of cracks on the stability and vibration of FGM plate structure.
8. Major: Engineering mechanics 9. Code: 9520101.01
10. Supervisors: Professor Dr.Sci. Nguyen Dinh Duc

Dr. Doan Hong Duc

11. Summary of the **new findings** of the thesis:

- Successfully applied Phase-field theory to simulate the crack state, making the structure continuous, thus making the formulation and solving equations easier.

- Successfully applied the finite element method based on Shi's higher order shear deformation theory, which is a theory without shear correction factor, used for plates with thickness medium and large thickness.

- Stability analysis of FGM plate with crack of different location and size. The author surveyed with plates with: constant or variable thickness; with or without elastic base.

- Analysis of free vibrations of cracked FGM plates with linear, nonlinear thickness changes placed on an elastic foundation and in a temperature environment.

12. Practical applicability, if any:

- The thesis has handled the general problems of Mechanical Engineering perfectly. The obtained results of the thesis show the effectiveness of using phase-field theory in the problem of plate structure with cracks. From there, more complex problems in reality will be expanded for future research.

- The results obtained from the thesis will be a contribution to Vietnam's Mechanics Engineering industry with a new numerical method, phase-field method. The research results are a reference in testing some types of FGM plate structures when cracks appear.

13. Further research directions, if any:

- Study on the effect of cracks on stability and vibration of reinforced ribbed FGM sheet structures subjected to combined mechanical and mechanical-thermal loads.
- Research on the effects of cracks in plates with composite materials and in different environments.
- Consider other types of loads acting on the problem of stability and vibration of FGM plate structures with cracks such as static loads, mobile loads, explosive loads, ...
- Research on the structure of piezoelectric FGM, nano FGM sheets with cracks.
- Research on crack development in FGM plate under different loads.
- Study the effect of cracks in the shell structure.

14. Thesis-related publications:

- Doan Hong Duc, Do Van Thom, Pham Minh Phuc, Nguyen Dinh Duc (2018). Validation simulation for free vibration and buckling of cracked Mindlin plates using phase-field method. *Mech. Adv. Mater. Struct*, Vol.26 (12), pp. 1018-1027 (Taylor & Francis, SCIE, Q1, IF=3.517).
- Pham Minh Phuc, Do Van Thom, Doan Hong Duc, Nguyen Dinh Duc (2018). The stability of cracked rectangular plate with variable thickness using phase field method. *Thin-Walled Structures*. Vol. 129, pp. 157–165 (Elsevier, SCIE, Q1, IF=5.881).
- Pham Minh Phuc, Nguyen Dinh Duc (2019). The effect of cracks on the stability of the functionally graded plates with variable-thickness using HSDT and phase-field theory. *Composites Part B*. Vol. 175, pp. 107086 (Elsevier, SCI, Q1, IF=11.322).
- Pham Minh Phuc, Do Van Thom, Doan Hong Duc and Nguyen Dinh Duc (2018). Phân tích dao động tự do của tấm chiều thay đổi có nứt dựa trên lý thuyết Phase-Field và lý thuyết biến dạng cắt bậc cao (in Vietnamese). National Conference on Solid Mechanics XIV, Tran Dai Nghia University, Ho Chi Minh city, pp.478-485.
- Pham Minh Phuc, Do Van Thom, Doan Hong Duc and Nguyen Dinh Duc (2019). Phân tích ổn định của tấm cơ tính biến thiên có nứt trên nền đàn hồi theo lý thuyết Phase-Field và lý thuyết biến dạng cắt bậc cao (in Vietnamese). National Conference on Engineering Mechanics, celebrating the 40th anniversary of Institute of Mechanics – Viet Nam Academy of Science and Technology, Ha Noi.
- Phạm Minh Phúc (2019). Phân tích dao động tự do của tấm cơ tính biến thiên có vết nứt với chiều dày thay đổi theo lý thuyết phase field (in Vietnamese). *Transport and Communications Science Journal*. Vol. 70.2, pp. 122-131.

- Pham Minh Phuc (2020). Using phase-field theory and third-order shear deformation theory to study the effect of cracks on free vibration of rectangular plates with varying thickness. *Transport and Communications Science Journal*. Vol. 71.7, pp. 853-867.
- Pham Minh Phuc, Nguyen Dinh Duc (2020). The effect of cracks and thermal environment on free vibration of FGM plates. *Thin-Walled Structures*. Vol. 159, pp.107291 (Elsevier, SCIE, Q1, IF=5.881).
- Pham Minh Phuc, Duong Tuan Manh, Nguyen Dinh Duc (2021). Free vibration of cracked FGM plates with variable thickness resting on elastic foundations. *Thin-Walled Structures*. Vol.161, pp.107425. (Elsevier, SCIE, Q1, IF=5.881).