

## Document details

[Back to results](#) | 1 of 1

[Export](#) [Download](#) [Print](#) [E-mail](#) [Save to PDF](#) [Add to List](#) [More...](#)
[Full Text](#) [View at Publisher](#)

IOP Conference Series: Materials Science and Engineering  
 Volume 260, Issue 1, 7 November 2017, Article number 012001  
 6th International Conference on Mechatronics 2017, ICOM 2017; International Islamic University Malaysia (IIUM) Gombak Campus Kuala Lumpur; Malaysia; 8 August 2017 through 9 August 2017; Code 131673

## Effects of Coil Diameter in Thickness Measurement Using Pulsed Eddy Current Non-destructive Testing

(Conference Paper)

Azaman, K.N., Sophian, A., Nafiah, F.

Department of Mechatronics Engineering, Faculty of Engineering, International Islamic University Malaysia, Malaysia

### Abstract

[View references \(10\)](#)

Non-destructive testing (NDT) techniques are used in industry to evaluate the properties of a material, component or structure without causing any permanent damage. Among the techniques, pulsed eddy current (PEC) NDT is regarded as a new technique where a broadband pulse excitation is used, as opposed to single frequencies employed in conventional eddy current NDT. In this study, a 2D axisymmetric electromagnetic model of a PEC probe has been developed and it has been used to study the effects of the excitation coil diameter on the performance of PEC probes in sample thickness measurement. A PEC system has also been built to validate the model. Aluminium plates are used as the sample and they can be stacked up to replicate thickness from 1 mm to 10 mm. The results show that there is a very good correlation between the simulation and experimental results, with an average error of less than 10%. The results also suggest that the larger the diameter of the excitation coil, the deeper the penetration and therefore the larger the thickness measurement range. It has also been shown that although the larger diameters have deeper penetration, the smallest diameter has the highest sensitivity if normalization is not used. These conclusions indicate that coil diameter is an important parameter in a PEC probe design for thickness measurement applications. © Published under licence by IOP Publishing Ltd.

### Indexed keywords

 Engineering controlled terms: [Bridge decks](#) [Eddy current testing](#) [Electric excitation](#) [Probes](#) [Thickness gages](#) [Thickness measurement](#)

 Compendex keywords: [Aluminium plates](#) [Electromagnetic modeling](#) [Excitation coils](#) [Good correlations](#) [Non destructive testing](#) [Permanent damage](#) [Pulsed eddy current](#) [Single frequency](#)

 Engineering main heading: [Nondestructive examination](#)

 ISSN: 17578981  
 Source Type: Conference Proceeding  
 Original language: English

 DOI: 10.1088/1757-899X/260/1/012001  
 Document Type: Conference Paper  
 Volume Editors: Rashid M.M., Hamid S.B.A., Akmeliawati R.  
 Sponsors: Kulliyah of Engineering, International Islamic University Malaysia  
 Publisher: Institute of Physics Publishing

### References (10)

[View in search results format >](#)
 All [Export](#) [Print](#) [E-mail](#) [Save to PDF](#) [Create bibliography](#)
 1 Sophian, A., Tian, G., Fan, M.

#### Pulsed Eddy Current Non-destructive Testing and Evaluation: A Review

 (2017) *Chinese Journal of Mechanical Engineering (English Edition)*, 30 (3), pp. 500-514. Cited 2 times.  
 doi: 10.1007/s10033-017-0122-4

[View at Publisher](#)

### Metrics

[View all metrics >](#)

1 Citation in Scopus

0 Field-Weighted Citation Impact

 PlumX Metrics  
 Usage, Captures, Mentions,  
 Social Media and Citations  
 beyond Scopus.

### Cited by 1 document

Pulsed eddy current imaging of inclined surface cracks

 Nafiah, F., Sophian, A.  
 (2017) *Indonesian Journal of Electrical Engineering and Informatics*
[View details of this citation](#)

Inform me when this document is cited in Scopus:

 

Thickness Evaluation of Aluminium Plate Using Pulsed Eddy Current Technique

 Singh, G., Bapat, H.M., Singh, B.P.  
 (2013) *Journal of The Institution of Engineers (India): Series D*

Pulsed eddy current imaging of inclined surface cracks

 Nafiah, F., Sophian, A.  
 (2017) *Indonesian Journal of Electrical Engineering and Informatics*

Pulsed Eddy Current Non-destructive Testing and Evaluation: A Review

 Sophian, A., Tian, G., Fan, M.  
 (2017) *Chinese Journal of Mechanical Engineering (English Edition)*
[View all related documents based on references](#)

Find more related documents in Scopus based on:

[Authors >](#) [Keywords >](#)