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Analysis of Damage Detection Performance in a Concrete Structure using the Finite Element Method

Anjum, Asraar^a; Hrairi, Meftah^a ; Aabid, Abdul^b; Yatim, Norfazrina^a; Ali, Maisarah^c

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^a Department of Mechanical and Aerospace Engineering, Faculty of Engineering, International Islamic University Malaysia, P.O. Box 10, Kuala Lumpur, 50728, Malaysia

^b Department of Engineering Management, College of Engineering, Prince Sultan University, PO BOX 66833, Riyadh, 11586, Saudi Arabia

^c Department of Civil Engineering, Faculty of Engineering, International Islamic University Malaysia, P.O. Box 10, Kuala Lumpur, 50728, Malaysia

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Abstract

The field of civil engineering has been witnessing a significant technological revolution through the application of innovative ideas. One such idea gaining widespread attention is the utilization of smart materials for the health monitoring of structures. This study focuses on the feasibility of employing PZT (Lead-Zirconate-Titanate) patches on concrete buildings as a means of real-time health monitoring using an impedance-based technique. In this work, numerical analyses for damage identification in concrete structures that are both healthy and damaged are made. A finite element-based programme was used to model the beams of healthy and damaged concrete in the ANSYS commercial tool. Furthermore, parametric studies were done to determine the impedance signal in concrete structures with PZT. Based on the current results it has been found the Electromechanical Impedance (EMI) technique is useful to detect damage in healthy and damaged concrete structures. © 2025, Penerbit Akademia Baru. All rights reserved.

Author keywords

concrete structure; Damage detection; EMI; FEM; impedance analyser; piezoelectric materials

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-
- ☐ 1 Park, G., Sohn, H., Farrar, C.R., Inman, D.J.

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(2003) *Shock and Vibration Digest*, 35 (6), pp. 451-463. Cited 1072 times.
doi: 10.1177/05831024030356001

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- ☐ 2 Zhang, Z., Guo, J., Zhang, Z., Song, X.

Mesoscale damage modelling of concrete by using image-based scaled boundary finite element method

(2021) *International Journal of Damage Mechanics*, 30 (8), pp. 1281-1311. Cited 23 times.

<http://ijd.sagepub.com/content/by/year>

doi: 10.1177/1056789521998414

[View at Publisher](#)

- ☐ 3 Khormani, M., Kalat Jaari, V.R., Aghayan, I., Ghaderi, S.H., Ahmadyfard, A.

Compressive strength determination of concrete specimens using X-ray computed tomography and finite element method

(2020) *Construction and Building Materials*, 256, art. no. 119427. Cited 51 times.

<https://www.journals.elsevier.com/construction-and-building-materials>

doi: 10.1016/j.conbuildmat.2020.119427

[View at Publisher](#)

- ☐ 4 Ayres, J.W., Lalande, F., Chaudhry, Z., Rogers, C.A.

Qualitative impedance-based health monitoring of civil infrastructures ([Open Access](#))

(1998) *Smart Materials and Structures*, 7 (5), pp. 599-605. Cited 244 times.
doi: 10.1088/0964-1726/7/5/004

[View at Publisher](#)

- ☐ 5 Aabid, A., Hrairi, M., Ali, S.J.M., Ibrahim, Y.E.

Review of Piezoelectric Actuator Applications in Damaged Structures: Challenges and Opportunities

(2023) *ACS Omega*, 8 (3), pp. 2844-2860. Cited 25 times.

<pubs.acs.org/journal/acsodf>

doi: 10.1021/acsomega.2c06573

[View at Publisher](#)
