

Capsule-like smart aggregate sensor for wireless impedance monitoring of PSC anchorage

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ABSTRACT

This study presents an innovative method for monitoring prestress forces in a prestressed concrete (PSC) anchorage using a capsule-like smart aggregate (CSA)-based wireless impedance technique. The CSA sensor is developed with a pre-determined frequency of less than 100 kHz. A wireless impedance sensor node, SSeL-Pi, is designed by combining a Raspberry Pi platform and an impedance board. The SSeL-Pi node is integrated with the CSA sensor to make a new wireless impedance measurement system. An impedance test is performed on the CSA-embedded post-tensioning anchorage zone under prestress (PS) forces. The variations in the obtained impedance signatures are then quantified to assess the feasibility of the proposed system (CSAs and SSeL-Pi) for PS force monitoring in the anchorage. The results demonstrate that the proposed method shows the potential for accurately identifying PS forces in PSC structures.

REFERENCES

- Huynh, T.C. and Kim, J.T. (2017), "Quantitative damage identification in tendon anchorage via PZT interface-based impedance monitoring technique", *Smart Struct. Syst.*, **20**(2), 181-195.
- Pham, Q. Q., Dang, N. L., Ta, Q. B. and Kim, J. T. (2021), "Optimal Localization of Smart Aggregate Sensor for Concrete Damage Monitoring in PSC Anchorage Zone", *Sensors*, **21**(19), 6337.

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