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Ashutosh Sharma, Shruti Sharma, Sandeep Sharma, Abhijit Mukherjee

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MONITORING INVISIBLE CORROSION IN CONCRETE USING A COMBINATION OF WAVE PROPAGATION TECHNIQUES

Ashutosh Sharma[1], Shruti Sharma[2], Sandeep Sharma[3], Abhijit Mukherjee[4*]

[1] Research Scholar, Civil Engineering Department, Thapar University, Patiala

[2]Associate Professor, Civil Engineering Department, Thapar University, Patiala

[3]Assistant Professor, Mechanical Engineering Department, Thapar University, Patiala

[3] Professor, Civil Engineering Department, Curtin University, Bentley WA 6102, Australia

*Corresponding author, Tel: +61 8 9266 7609, Email: abhijit.mukherjee@curtin.edu.au

Abstract

The paper reports two non-destructive techniques based on wave propagation for monitoring onset of corrosion in concrete before it is visible. Reinforced concrete beam specimens were subjected to anodic corrosion at a constant voltage. The specimens were instrumented with surface mounted Acoustic Emission (AE) sensors to record acoustic events inside the specimens due to corrosion. They were also monitored using the Ultrasonic Guided Wave (UGW) technique by passing an ultrasonic pulse through the bar. The results are correlated with well-established electrochemical techniques. From simultaneous monitoring of corrosion using the three technologies pros and cons of each technology have been determined. It can be concluded that a judicious combination of electrochemical and wave technologies can reveal the state of corrosion from its early stages.