

# **Wireless sensor for railway concrete infrastructures using self-sensing concrete modules**

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In this study, a wireless sensing system using self sensing concrete was developed for self monitoring of concrete infrastructures in a railway system. A self sensing concrete is able to monitor their own mechanical behaviors based on fractional changes of resistivity. The self sensing concrete module was manufactured by cement based materials with 1.0 vol.% of Multi Walled Carbon Nano Tubes (MWCNTs) for making electrical pathway in the cement composites. A wireless sensing system that is able to be attached to the self sensing concrete was designed and manufactured. This system can transmit, receive, and store the wireless sensing signals from self sensing concrete under the load. This system was tested under a cyclic compression behavior in the laboratory. It was also tested under the actual railway environment. A transmission data loss rate was tested according to the distance between the transmitter and the receiver, and based on the results, the distance at which the wireless sensor can transmit stable data was measured for open space, railway station, and railway track on the ground with railway sleepers. Based on the test results, this wireless sensing system with self sensing concrete can be expected to be used up to 3.5 years.