

# Scientists pioneer new concrete corrosion sensors

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Scientists at Queen's University Belfast have made a major breakthrough in developing sensors which dramatically improve the ability to spot early warning signs of corrosion in concrete.

The sensors, which are more resilient and much longer lasting than traditional corrosion sensors, will make monitoring the safety of structures such as bridges and vital coastal defences much more effective.

The research, which was carried out over a four-year period, was in conjunction with researchers at City University London, and was funded by the Engineering and Physical Sciences Research Council (EPSRC).

Dr Su Taylor from the School of Planning, Architecture and Civil Engineering at Queen's University said: "Because the sensors can withstand long-term placement within [concrete](#), unlike any equivalent sensors currently available, they can constantly monitor conditions, enabling a warning to be sent when conditions for corrosion threshold have been crossed. Thanks to an internet connection, the notification can be sent in the form of an email or text to the structure's maintenance team.

"There is a trio of novel, robust probes at the heart of the team's work: one that monitors temperature, one for humidity while the other senses chloride and [pH levels](#). Changes in these factors indicate the onset of the potentially destructive corrosion. Within the probes are advanced [optical](#)

[sensors](#) specifically designed and built for this project. These have been patented for potential commercial exploitation."

Tong Sun, Professor of Sensor Engineering at City and Principal Investigator on the project, said: "Our design means several probes can be installed semi-permanently in a structure and then connected to a [computer data](#) logger, which will constantly collect readings. This can be left until the readings indicate conditions have changed enough to warrant a full investigation. Remedial work will be simpler, cheaper and more effective at this stage, rather than waiting until there is visible damage, such as parts of the concrete coming away."

Traditional optical corrosion sensors have only a limited lifetime, usually of several weeks, because of the corrosive alkaline levels within concrete. The new sensors are expected to last for several years, with proper protection, even where pH levels are high.

Provided by Queen's University Belfast

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