The development of a sensors based technology for remote monitoring, prediction and optimisation of structural failure parameters

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Research within NCEM* is being conducted to develop a holistic system based on two types of monitoring sensors i.e. μ-LPR and MEMS-strain gauge sensors. μ-LPR corrosion sensors provide a real-time measurement of the electrochemical activity for uncoated metallic parts of a structure. MEMS-strain gauge sensors provide with the real time measurement of stresses within the coatings for the coated parts of a structure. A large number of these two types of sensors are interconnected by using low-power energy efficient and low-cost wireless nodes as shown in fig.1.

The data from wireless nodes is then fed in to the system through enhanced antennas and internet which is then processed by an efficient software, designed and developed in SDRC. This software can predict the future failure of coated and uncoated components of a structure and is also able to provide with the optimised values of failure parameters. These optimised values, when applied, will decelerate the process of structural failure. This type of system will also be designed for a hand held device so that onsite inspectors can also monitor and will be able to predict and obtain optimised parameters. This research will accelerate the development of structural health monitoring and will ultimately improve the safety of aging infrastructures.