
Departmental Seminar

Seminar Title	: Repair and service life extension of grouted, post-tensioned concrete bridges
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Abstract	: Grouted, post-tensioned concrete systems are commonly used for constructing bridges with an intended corrosion-free service life of 100+ years. However, the use of inadequate grout materials and improper grouting techniques has caused voids at the anchorage regions, resulting in premature corrosion (say, within one or two decades) of strands. This study focused on the development of non-invasive chemical methods (re-alkalization) and electrochemical methods (galvanic cathodic protection) to repair the anchorages of grouted, post-tensioned concrete systems. The results indicated that 1 M Ca(OH) ₂ solution can restore the pH of carbonated grouts in approximately one day. Additionally, electrochemical impedance spectroscopy studies demonstrated that this solution can re-passivate the embedded strands within a week. Experiments were conducted to evaluate the viability of galvanic anodes in protecting the anchorages. The findings revealed that a thin layer of grout surrounding the strand is sufficient to provide ionic conductivity for the galvanic anode connected to the strand-end outside the anchorage, in effectively protecting the strand portions inside the anchorage. The study presents recommendations for repairing the anchorage regions using chemical and electrochemical methods. Key words: Corrosion; Post-tensioned concrete; Service life; Strand