

STUDY ON ECONOMICAL PROTECTIVE MEASURES AGAINST CONCRETE SPALLING

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Concrete spalling is a major problem in reinforced concrete structures, especially in public buildings, which were constructed some time ago. In Sri Lanka, many public buildings such as schools and hospitals exhibit this problem. Authorities prohibit the use of the building area, where there is potential for concrete spalling instead of immediately repairing, because the repairing work is expensive and time consuming. This research is to study economical protective measures to prevent falling of spalled cover concrete chunks until the proper repair is done. The research is conducted in two experimental series. Series one consisted of eight small scale concrete slab panels, which were installed with four different materials (plywood sheet, thin aluminium sheet, plastic mesh, and stainless steel wiremesh) by two installation methods (concrete wedge anchors and screws with wall plugs). Initially concrete slab panels were cast, and after 28 days the materials were installed with two distinct installation methods. Then the material installed structure was subjected to area load and failure loads were recorded. Second experimental series was performed with the same size concrete slab panels, three materials (stainless steel wire mesh, plastic sheet, and thin aluminium sheet) and one installation method (wedge anchors) which were used in first experiment. Initially slab panels were cast and kept to gain strength, then the selected three materials were fixed with the above installation method. After that, the material installed slab panels were subjected to cyclic wetting and drying using three percent sodium chloride solution by weight of water to create a spalling condition by the electrolysis process. Then the relevant observations of the material installed structure and concrete slab panels were made with the time. After 28 days, material installed structure was subjected to area load and failure loads were recorded as same as the first experiment. Stainless steel wire mesh installed with concrete wedge anchors showed the highest load carrying capacity.

Keywords: spalled concrete; reinforcement corrosion; repairing methods; economical materials; economical installation methods; electrolysis process

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