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Defects in concrete structures and remedial measures

This study was done with the following main objectives: a) to identify and define the types of defects in concrete structures, b) to determine the most common types of structural defects and defective elements in concrete structures, c) to evaluate the structural problems or distresses, and d) to determine the feasibility of refurbishing the existing structures. This study was done as a postgraduate project at the Department of Civil Engineering, University of Peradeniya.

The condition survey was done in detail on twenty seven buildings in the districts of Matale and Kandy. Twenty one buildings of these were reinforced concrete structures. Preliminary and detailed investigations consisted of one or more steps to ascertain the type of defect. The preliminary investigation was to provide initial information regarding the condition of the structure, the type and seriousness of the problems affecting it, the feasibility of performing the intended rehabilitation, and information on the need for a detailed investigation. The higher defects density was found in the following categories: a) Buildings constructed between 1980 to 2000, b) Buildings constructed with the involvement of engineers and professional contractors, c) Single storeyed buildings, d) Buildings constructed for educational institutions, e) Non-concrete elements, when consider all the elements of the structure, f) Reinforcement corrosion related defects, when consider the concrete elements, and g) Strength related defects, when consider the non-concrete elements.

The results show that the density of defects in reinforced concrete structures or members of the structure are mainly dependent on the age, involvement of engineers and professionally qualified contractors, type of usage, type of construction practice, number of storeys, cover to the steel reinforcement, quality of concrete, type of element and exposure conditions. Conclusion of this study can be used to formulate guidelines for the design and construction of reinforced concrete structures with minimal defects.