The Durability of Repaired Concrete Structures

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Summary

This paper addresses the performances of concrete repairs in practice as opposed to accelerated laboratory testing. The performances were assessed through case-histories obtained from European countries ranging from Finland in the north to Greece in the south. Some 230 case-histories were obtained for structures up to 150 years old. Corrosion was the most common mode of deterioration occurring in 55 per cent of the cases, other modes included frost damage, cracking and AAR. Types of repair included patching, sprayed concrete, crack injection and restoration of strength. Performances of the repairs were generally disappointing; 20 per cent failed in 5 years, 55 per cent failed in 10 years and 90 per cent failed in 25 years. The longest repair life was 52 years. The types and causes of the failures are discussed.

Keywords: Concrete, Repair, Performances, Corrosion.

1. Introduction

Over the years the state-of-the-art for repair of concrete structures has been continually improving but it has become apparent that performances continue to be poor. If repairs are to be made more durable, it is necessary to have a better understanding of their performances in practice. The data required include:

- Types and causes of the original deterioration of the concrete
- Types of repair carried out
- Success or otherwise of the repair
- Mode of failure of the repair
- Cause of failure of the repair.

To this end data were collected for a range of structures through published case-histories and data provided by all sides of the repair industry viz owners of structures, repairers, materials suppliers, consultants and academe.

Case-histories are especially valuable as they provide data for repairs designed and made under the pressures imposed by the realities of requirements and the rigors of site conditions (as opposed to the relative comfort and cleanliness of work in the laboratory). These pressures generate problems posed by:

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