Research & Development Highlights

9O-248Techr~ca1 Series

Cathodic Protection In the Rehabilitation of Reinforced Concrete Parking Structures

Introduction

The Corporation has funded studies to investigate failing structural concrete, and to search for durable remedial measures for these failing structures. It has also provided assistance to provincial and national organizations writing restoration standards. One particular technique, for arresting road-salt-induced corrosion in concrete garages, is the use of cathodic protection (CP) systems.

The objectives of this research were to provide a short report for an uninformed audience and to document the general state of knowledge about CP systems as they are applied to the corrosion of steel in concrete parking garages.

Research Program

The Consultants based their work on a review of the international scientific and technology literature, their own practical experiences, and advice from an eight person Advisory Committee, including two eminent scientific members.

Findings

With a history of over 100 years in retarding corrosion of solid metal structures, CP requires a comprehensive technical understanding and the use of sophisticated matenals and monitoring methods when applied to steel-reinforced concrete. CP systems do have merit and may be selectively used to significantly retard corrosion in some types of steel-reinforced concrete parking garages. These are not applicable to those containing stressed tendons. More research is necessary to establish durability of some materials used in CP systems. The findings also show that research in the study area is not yet sufficiently advanced to have definite CP restoration standards produced.

implications for the Housing Industry

The rate and the extent of concrete deterioration of structural concrete must be known to determine the cost of the structural repairs required, prior to any CP installation. CP does nothing to replace structural integrity, so the cost for CP is over and above that for structur&l repair. The amount of concrete removal required for a structural repair may be less when a CP system is used.

The value and the effectiveness of CP is in controlling corrosion in those parts of the structure which do not require structural repair. For example if 60% of a slab is actively corroding, but only 5% of the slab is delaminated, cathodic protection may be cost-effective. If 40% is delaminated and needs structural repairs, CP is not effective. In another case if 5% only is actively corroding, and if passive protection can stabilize the slab at this level, CP is not likely to be cost-effective.

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Research Report: Factors Affecting the Consideration and Use of Cathodic Protection in the Rehabilitation of Reinforced Concrete Parking Structures (1990)
Research Consultant: Robert Halsall & Associates

A full report on this research project is available from the Canadian Housing Information Centre at the address below.

NHA 6330

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