

Performance of a 40-year old concrete bridge with embedded pre-stressed galvanized strands

Paulo Helene (1); M.F. Pereira (2); P. Castro (3)

(1) *University of São Paulo, Escola Politécnica PCC.USP, Brazil. Chairman of Rehabilitar Network CYTED XV.F. Deputy-Chairman of fib (CEB-FIP) Commission 5 "Structural Service Life Aspects"*
email: paulo.helene@poli.usp.br

(2) *Architect, PhD Student of University of São Paulo, Escola Politécnica PCC.USP, Brazil*
email: maria.fernanda@poli.usp.br

(3) *Facultad de Ingeniería de la UADY, Permanent affiliation: Centro de Investigación y de Estudios Avanzados del IPN Unidad Mérida, Yucatán, México. Rehabilitar Network CYTED XV.F*
email: pcastro@kin.mda.cintevav.mx

*Departamento de Engenharia de Construção Civil
Av. Prof. Almeida Prado, trav. 2, Cid. Universitária - São Paulo - SP 05508-900*

Resumo

Despite recent literature prevent the use of pre-stressed galvanized steel in concrete, it was detected a bridge constructed with pre-stressed galvanized strands embedded in concrete that has been in service for more than 40 years showing adequate behavior. A detailed inspection of this Uruguayan National Monument was performed using electrochemical, mechanical, physical and chemical techniques on site and laboratory. Contrary to the expected, the results indicated that some strands have developed corrosion that produced ductile failures on only some wires and that deterioration has been mainly due to insufficient concrete cover that produced strand exposure to the atmosphere instead of stress corrosion or hydrogen embrittlement.