Abstract

The strengthening or upgrading of reinforced concrete girders with carbon fiber reinforced polymer (CFRP) composites has become a common procedure in the last years. However, the lack of standards or codes proposed within the same design philosophy of the Eurocode, and which are capable of assuring an adequate confidence level for the CFRP as for steel or concrete, often implies that the safety of prestressed girders strengthened with CFRP has to be evaluated using probabilistic tools. This manuscript presents a reliability study of a Portuguese prestressed high strength concrete (HSC) girder strengthened with CFRP. The selected bridge is representative of what has been constructed in Portuguese highways during the last two decades. First, the reliability level and the importance of design and load variables are computed using the following two codes: Portuguese RSA (1983) and European EC1 (2002). Next, partial safety factors are determined for the CFRP.