Linear Regression Analysis of the Eurocode 2 Creep Model with Bayesian Update

Elise Zgheib

Saint Joseph University (USJ), École Supérieure d'Ingénieurs de Beyrouth (ESIB), Dekwaneh, Lebanon.

Lebanese University, Doctoral School of Sciences and Technology (EDST), Hadath, Lebanon.

Wassim Raphael, Rafic Faddoul

Saint Joseph University (USJ), École Supérieure d'Ingénieurs de Beyrouth (ESIB), Dekwaneh, Lebanon.

Contact: elise.zgheib@net.usj.edu.lb, elise-zg@hotmail.com

Abstract

The important evolution in the construction field nowadays call for an accurate prediction of creep deformations which have an important impact on the long-term behaviour of structures. To evaluate the accuracy of the Eurocode 2 creep model, a comparison between the predicted creep compliance and experimental results is performed using the CEB statistical methods. The large database used in this study is established from international laboratories and research centres. This comparison shows that the Eurocode 2 creep compliance is inaccurately estimated. To overcome this difference, the Eurocode 2 equations are calibrated by adding corrective coefficients using the Bayesian linear regression method. Using these corrective coefficients will help to predict accurately the creep deformations in the design stage and the long-term deflection. Then, the required precautions can be applied to avoid excessive deflections after construction.

Keywords: concrete; creep; linearization; Bayesian analysis; Eurocode 2; correction coefficients.

1 Introduction

An important evolution in the construction field is noticed nowadays. New high-rise buildings, bridges and dams are taking place all over the world. Therefore, an accurate prediction of the behaviour of these constructions is a must. Since the creep deformations have an important impact on the long-term behaviour of structures, an accurate prediction of these deformations is needed [1]. To evaluate the accuracy of the Eurocode 2 creep model, a comparison between the predicted creep compliance and experimental results is performed using the CEB statistical methods. The large database used in this study is established from international laboratories and research centres [2]. An inaccurate estimation of the creep compliance according to the Eurocode 2 is noted.