



## On-site Study of the Time-dependent Behaviour of Concrete: Evaluation of the Application of EC2 Prediction Models in Algeria

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### Abstract

A study of the time-dependent behaviour of concrete carried out on-site in a viaduct in Algeria provides an excellent opportunity to assess the suitability of the use of EC2 in non-European countries. This paper presents creep and shrinkage experimental values measured during five years and compares them with the values predicted by EC2 models. A procedure for experimental identification of the parameters included in EN1992-1-1 prediction models of is proposed and tested.

**Keywords:** concrete; creep; shrinkage; predictive models; on-site behaviour.

### 1 Introduction

The concrete creep and shrinkage prediction is strongly related to a great uncertainty due to great variability of many parameters, namely those connected with the in situ environment conditions, such as temperature, humidity or rainfall. This uncertainty should be reflected in the creep and shrinkage modelling to be adequately taken into account in the time dependent behaviour of concrete for the structures analysis.

For this purpose, the concrete codes have been upgrading its prediction models, as it is the case of EC2, currently being used in some other countries outside Europe leading to some doubts about its applicability.

An on-site study of concrete time-dependent behaviour in the Salah Bey Viaduct, in Constantine, Algeria, provides a unique occasion to assess the suitability of the use of EC2 in non-European countries, in very specific environmental conditions.

Indeed, the environmental conditions in Constantine, with wide thermo-hygrometric amplitudes, are quite different from those in Europe.

For this study, sixteen specimens have been kept on-site, being exposed to the same environment conditions: six specimens for creep study and other six for the study of shrinkage were placed inside the box girder; four other specimens for shrinkage characterization have been kept on the deck.

In order to contribute to the assessment of the suitability of using EC2 in conditions very different from the Europeans, this paper presents creep and shrinkage experimental values measured during five years, comparing them with the values provided by EN1992-1-1 [1] creep and shrinkage predictions models. A procedure for identifying the parameters included in these models from experimental data is proposed and tested.