D4.1

Standard operating procedure for the assessment of existing bridges

SURE BRIDGE
Sustainable Refurbishment of Existing Bridges

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Colophon

This publication is produced by SUREBRIDGE work group:

The main authors are: Fabio Ricci, Paolo S. Valvo

Co-authors are: Juan Carlos Miranda Santos, Erika Davini, Cristiano Alocci, Antonfranco Pasquale

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1 Executive summary

This report presents deliverable D4.1 from Work Package 4 of the SUREBridge project, defined in contract documentation as "Standard operating procedure for the analysis of existing bridges". In the title, the word "analysis" has been replaced here by the word "assessment", which turned out to be mostly used in the investigated literature. However, the contents of this deliverable are not different from those outlined in contract documentation.

The work behind this report has been carried out from January to December 2016. The responsible partner for deliverable 4.1 was AICE Consulting Srl (AIC) with scientific support from the University of Pisa (UniPI). The adopted approach was to study the literature – including national regulations and standards – on the subject in light of AIC's direct experience in the field. AIC was founded in 1990 by a merger with a previous company founded in 1980. During its 35 years of activity, AIC has carried out more than 1000 specific commissions regarding buildings and other civil constructions. In particular, AIC has investigated approximately 100 existing bridges of various types, mainly made of concrete and masonry.

Based on the above, a standard operating procedure (SOP) for the assessment of existing bridges has been defined. The suggested flow of operations includes both experimental activities and theoretical analyses. The SOP is intended to help bridge owners, consultants, and designers to evaluate the load-carrying capacity of existing bridges and envisage the needs for strengthening. Focus is on bridges falling within the scope of the SUREBridge project, namely bridges with steel or concrete girders and reinforced concrete deck.

In Chapter 2, the literature on the structural assessment of existing bridges is first briefly recalled. Then, the main tasks involved in the developed SOP are introduced.

Chapter 3 is devoted to the detailed description of the structural investigations suggested by the SOP. Experimental activities are aimed at obtaining the values of the parameters needed for the theoretical analysis and verification of the structure, as well as for the subsequent design of the strengthening intervention.

Chapter 4 furnishes guidelines for modelling the structure and the actions on it, as well as for conducting the structural verifications. It should be made clear, however, that in the assessment of a real bridge and in the design of a real strengthening intervention, it will be the designer's responsibility to choose the appropriate testing techniques and modelling approaches to ensure the fulfilment of structural verifications in accordance with national regulations and standards.

A separate Appendix [1] illustrates the application of the SOP to the assessment of the San Miniato bridge, chosen as case study for the SUREBridge project.