

D 3.2

Preparation of Test Specimens and Experimental Program





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Colophon

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1 Executive summary

To prove the concept of the SUREBridge project, a series of tests and demonstrations were planned. These tests range from small scale material tests to full scale testing of strengthened concrete beams and follow a logic from concept to realization of the project idea.

SUREBridge idea, is based on two innovative solutions developed recently in the field of bridge engineering. The first one, being an innovative FRP deck system, tailor-made for SUREBridge purpose and has been developed by FiberCore Europe in Netherlands. The second one, is an innovative method for strengthening of flexural concrete elements (such as slabs and beams) using pre-stressed FRP laminates which has been developed at Chalmers University of Technology in Sweden.

The FRP deck system used in SUREBridge has a unique feature of integrating webs and face skins during infusion process to eliminate the risk of debonding and/or separation of the face skins from the webs. Debonding and separation of face skins is a common problem observed in other traditional FRP sandwich structures and is accounted as a drawback of many FRP sandwich solutions on the market.

The innovative FRP strengthening system used in SUREBridge project takes advantage of a newly developed pre-stressing device which enables application of pre-stressed CFRP laminates with initial pre-stressing forces up to 100 kN without the need for mechanical anchorage of the strengthening laminate. All the existing methods on the market, involving pre-stressed CFRP laminates, have a requirement of using mechanical anchorage systems to avoid premature debonding of the laminate from the concrete surface. Application of mechanical anchorages, involve a great deal of work and cost for installation, followed by uncertainties regarding the long-term performance of such anchors. The proposed method offers an easier and faster application of such laminates compared to competitor solutions.

This deliverable, presents the tests configurations and experimental program to be carried out in the project to realize the concept of the project, see Figure 1. The basis of the experimental program, can be divided into two major parts: (1) identification of the bond behavior between the FRP deck and the existing concrete deck and how to carry out bonding on site in a convenient manner and (2) to evaluate the behavior of the strengthening at system level, i.e. performance of individual strengthening elements and the bond between them.



The purpose of each test has been explained and planned measurements and instrumentation of the specimens have been elaborated.

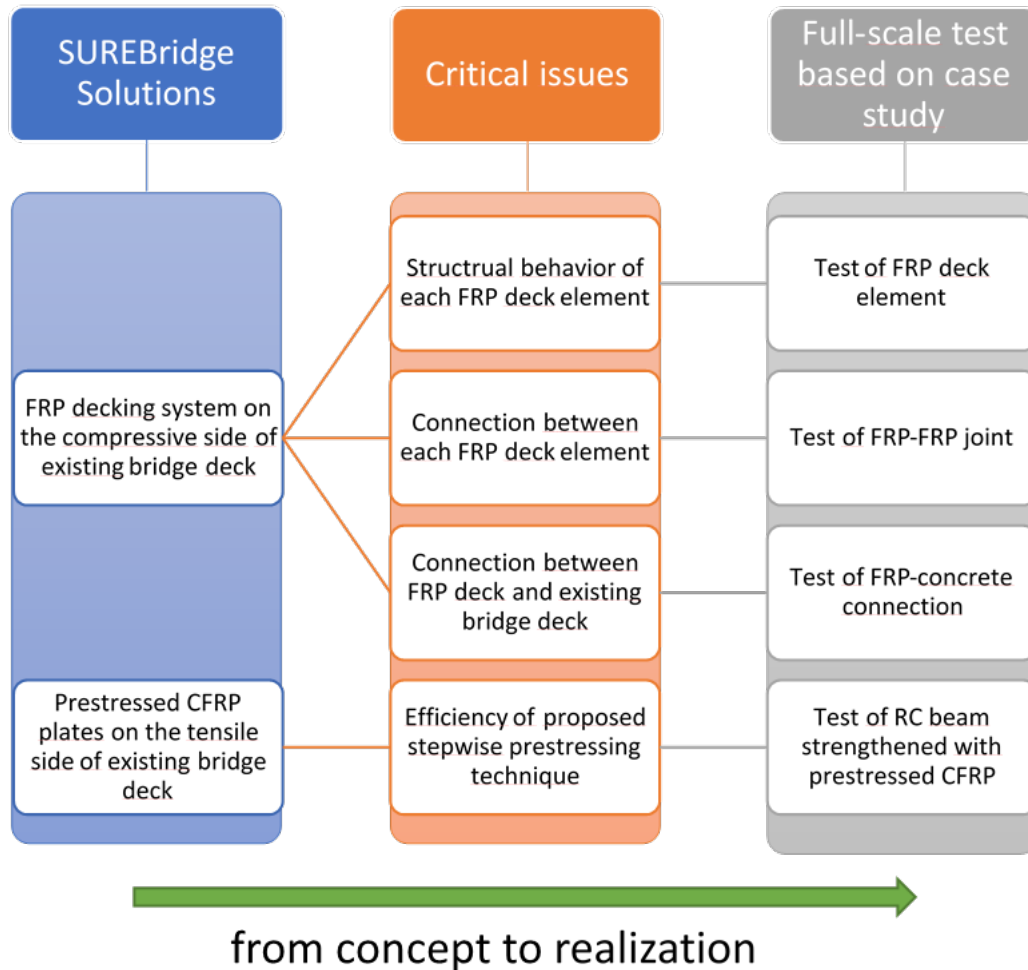


Figure 1. Experimental program and tests in SUREBridge project