D3.3
Validation of the SUREBridge solution

SURE BRIDGE
Sustainable Refurbishment of Existing Bridges

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Colophon

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1 Executive summary

The SUREBridge project aims to develop a sustainable refurbishment solution for existing concrete bridges. The SUREBridge concept utilizes two innovative solutions to accomplish this. The first one is a glass-fibre reinforced polymer (GFRP) decking system developed by FiberCore Europe, applied at the top of the bridge, the second one is a pre-stressed carbon fibre polymer (CFRP) strengthening system developed by Chalmers University, applied at the bottom of the bridge.

Combining these two systems has the potential to more effectively strengthen an existing bridge than any of the two on its own. To accomplish this, novel connection methods between these strengthening systems to the existing (possibly deteriorated) concrete structure have been developed.

This deliverable presents the results of the tests done at the component level (the GFRP deck, joint between GFRP decking elements, joint between GFRP and concrete) as first presented in deliverable 3.2, and the test-setup for the full-scale test, based on the results from these component tests.

This continues the test program outlined in Deliverable 3.2, shown in Figure 1-1 below.

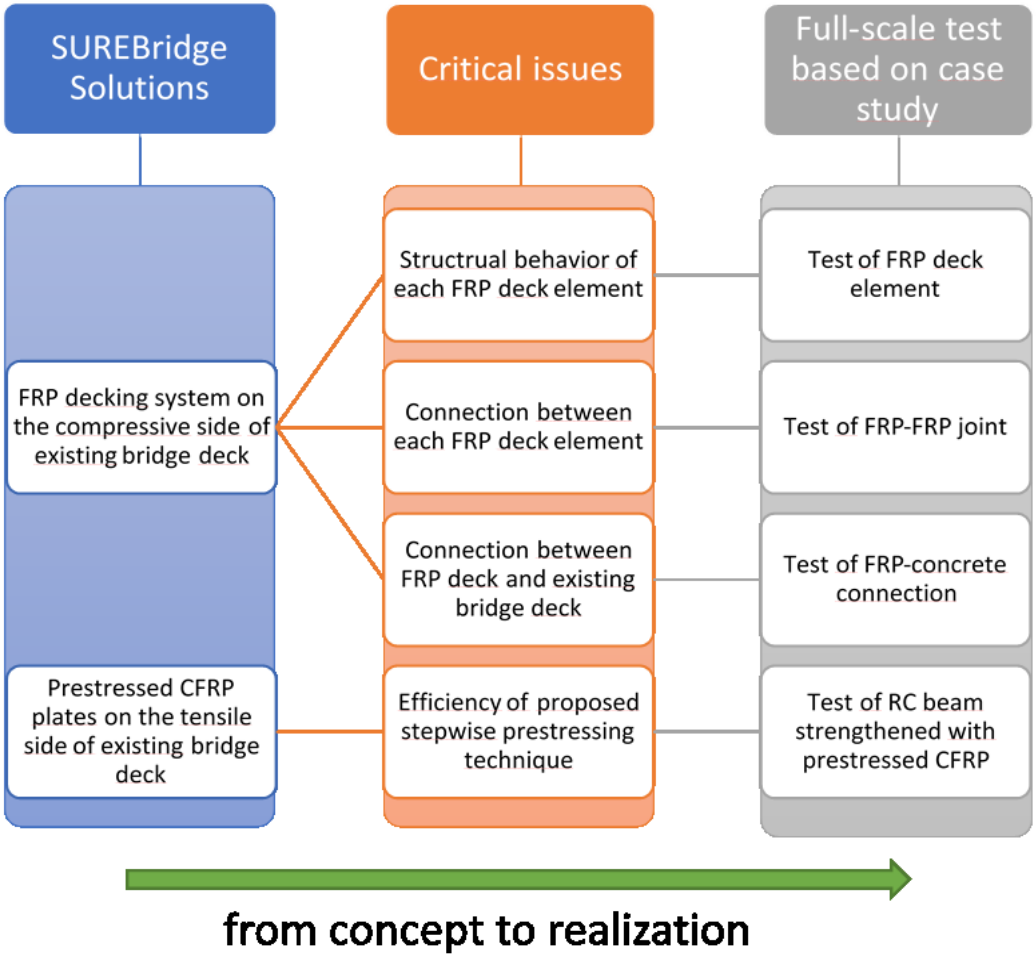

Figure 1-1: Experimental program and tests in the SUREBridge project (source: deliverable 3.2)

The design of the full-scale test sample is based on the SUREBridge case of the San Miniato bridge, which is described shortly in this deliverable. This case is used to derive design requirements and test requirements for the component tests for the selection of the components in the full-scale test.

Although a good match between the San Miniato design case and the test setup is achieved, and tests will provide specific results, real-life cases must be approached.

The results of the tests will be evaluated further and compared to the predicted values. This will be reported in the next and final Deliverable, where also the Design Tool will be presented, which is the specialist area of the third consortium partner, AICE Consulting, and its subcontractor the University of Pisa. The feasibility of the SUREBridge solution can be evaluated on a case-by-case basis using that Design Tool.

In addition to the tests and their results, the fabrication of the components and their installation on a representative concrete beam, were part of the experiment as well. Experiences and lessons-learned in doing so have been captured and will serve future constructions.

Although the preliminary conclusion is that a good match between the San Miniato design case and the test setup has been achieved and tests will provide specific results, real-life cases must still be approached. The first step for this is finding a pilot project bridge refurbishment and performing all necessary steps. These steps are both technical and organisational, mimicking a real-world application.