

Instrumentation, Monitoring and Execution Control of the New Footbridge over Mondego River in Coimbra

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Abstract

A new steel arch footbridge of unique and appealing geometry is being built in Coimbra, Portugal. The distinctive feature of anti-symmetrical development of both the arch and the deck along the longitudinal axis of the bridge is source to complex behaviour.

One of the main concerns to begin fabrication of the structural steelwork regarded the influence of construction stages on pre-camber design. Due to the time constraint of the project, it has been decided not to alter the pre-camber design and turn the focus into the construction process through analysis and monitoring. The bridge was built with resource to an embankment platform on the river, which allowed propping of the whole structure. As the foundation settlements that might be expected would compromise the geometry of the bridge, hydraulic jacks were installed at the propping structure.

The FEUP/Labest research group was committed to install a monitoring system and to perform a phased three-dimensional finite element analysis considering all the stages of the construction process. The results obtained are the foundation for assessment of the propping system and interpretation of the static monitoring measured values.

The DIANA three-dimensional model, with more than 200000 degrees of freedom, was built using both curved shell and beam elements.