

Long-term behaviour of a viaduct made with precast beams

Carlos Sousa, Helder Sousa, A. Serra Neves & Joaquim Figueiras
University of Porto, Portugal

This communication presents the strategy employed in the analysis of a large viaduct which has recently been constructed in Portugal. The structure is composed by 13 continuous spans which are made with precast prestressed beams. The deck is monolithically connected to circular piers and piles.

The long-term behaviour of this viaduct was monitored for 3 years. Strains and temperatures were recorded at various critical cross-sections. Moreover, information regarding the material properties was collected during the construction, which provided valuable data for validation of numerical models.

The long-term behaviour of this structure was analysed using DIANA. This communication presents some features of this analysis, which are considered the most relevant. Given the fact that the sequence of construction has a non negligible effect, a phased analysis was conducted. In addition, a smeared cracking approach was used, which allows for the simultaneous consideration of concrete creep, shrinkage, cracking and temperature influence.

This presentation shows how different user-supplied subroutines were employed to model the concrete creep function (which was fitted to the experimental data) and the relaxation of the prestressing strands. Moreover, the presentation describes how the DIANA neutral file was used to efficiently read the calculation results for the different phases.

Finally, the comparison between numerical and experimental results is exposed. Close agreement is observed, a fact that confirms the adequacy of the adopted models and strategies.