Title:

A comparative analysis on the Long-Term performance of a T-shaped girder by using 1D, 2D and 3D FE approaches

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Abstract:

In today’s world, progress towards sustainable transportation networks is a priority where demands for a prolonged life-time, sometimes more than 100 years, is an important issue. For the particular case of prestressed concrete bridges, the long-term assessment plays a crucial role in order to better plan the maintenance requirements in accordance with future demands. The time-history, the construction phases, the mechanical properties of concrete and the effective loads applied are crucial inputs for a deeper and accurate predictions based on FE models.

Further to a laboratorial test on a scaled T-shaped girder, this work aims to promote a comparative analysis on how different FE approaches to simulate the beam behaviour leads to different long-term predictions. More precisely, these FE approaches considered (i) beam elements, (ii) shell elements and (iii) solid elements. Monitoring data will support a discussion on the accuracy of each approach.

Conclusions from this discussion also aims, as a marginal contribution, to better understand the essential requirements for the long-term performance of prestressed concrete bridges towards their lifetime.