



MODULAR COMPOSITE BRIDGES WITH INTEGRAL SHEET PILING ABUTMENTS FOR A TIME EFFICIENT CONSTRUCTION

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Abstract

Composite bridges with sheet pile abutments using modular elements proof to be both economical and ecological efficient under a holistic assessment of costs. However, a standardized solution with widespread acceptance is currently missing in practice. In the present paper, a concept of a modular connection between superstructure in steel composite construction using hot-rolled profiles and integral steel sheet pile abutments is presented: A concept applying combined sheet pile walls for bridge spans up to 30-45m and referencing the Knife Edge-Support (KES). The load paths are analysed numerically, and the influencing parameters are identified. Finally, the experimental test campaign to proof the suitability of the connections will be shown. The research work is supported technically and financially by the FOSTA (Research Association for Steel Application) with funding from Stiftung Stahlanwendungsforschung, Essen (Germany).

Keywords: Composite bridges, integral abutments, modular construction, sheet pile abutments

1 Modular Composite and Integral bridges: future Solutions

A large portion of today's bridges are 50-60 years and need refurbishment. Further, the traffic volume increased significantly, contributing to widespread degradation of the bridge infrastructure. As a result, many of those bridges have to be replaced by new structures before the end of their intended design life.

For a long time, solely the construction costs of the bridge were the governing criteria for the assessment of the economic efficiency and the selection of bridge solutions. Over the last years, bridge authorities and owners tend to a holistic approach to assess the economic efficiency of a bridge structure [1], [2], [3]. This approach accounts for not only the construction costs but also the construction time and the maintenance costs of the bridges as the main criteria for the final decision. A limitation of the traffic disturbance during the construction of the bridge and of the