

Soil-Structure Interaction Modelling of Integral Abutment Bridges

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Abstract

The use of integral abutments to accommodate thermal expansion of bridges has grown in popularity worldwide. The primary advantage of integral abutments is the complete elimination of the expansion joints and bearings, which are expensive to install and maintain during the lifetime of the bridge. As a result, the structure contracts and expands under cyclic thermal loadings during cooler and warmer temperatures, respectively. This mode of deformation induces sequential variations in the stresses in the backfill behind the bridge, in the earth pressures acting on the abutment, and in the stresses in the supporting piles. No standard approach for the analysis of integral abutment bridges appears in the Canadian highway bridge code or in any other international code.

This paper investigates different aspects of the analysis of integral abutment bridges and their implications on the reliability of the developed finite element model.

Keywords: *Integral Abutment Bridges, seasonal temperature change, expansion and contraction, loading-unloading, SSI, finite element,*