Large Composite Bridges with Strutted Frame Systems - the Lockwitztal Bridge and the Haseltal Bridge

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Summary

The two bridges discussed have similar longitudinal structure systems and were built by similar construction methods. With respect to cross section and also in certain other respects, different solutions were adopted. The Lockwitztal Bridge and the Haseltal Bridge are both steel-concrete composite bridges. The superstructure is supported in the large central spans by struts that, together with the superstructure and the piers, form a frame system. The steel construction of the superstructure has a constant depth and was built by launching with the use of auxiliary piers. The piers and the struts were built and connected with the superstructure before the casting of the deck slab. This construction method economically combines the launching of steel girders, the support of the superstructure by inclined struts in the main spans, the easy erection of the struts by using the launched superstructure and, furthermore, favorably exploits the fact that most of the load results from the concrete deck slab.The characteristics of the two structures are discussed. The similarities and the differences of the structural elements and the construction methods are shown, and the structure efficiency is evaluated.

Keywords: large valley bridges; composite superstructure; strutted frame system; launching, concrete struts; stayed cantilevering; steel struts; comparative study.

1. Introduction

After the system change in 1989, the infrastructure of the New German Countries had to be rebuilt. As part of this, ca. 2000 km of federal motorways with about 2500 bridges, tunnels and other structures were built during the execution of the traffic projects “German Unity”. In numerous cases, novel methods were adopted and new developments could be promoted. Out of this great number, two structures are chosen and described. Both bridges have similar longitudinal structure systems and were built by similar methods. With respect to cross section, and also in certain other respects, different solutions were chosen.

The Lockwitztal Bridge and the Haseltal Bridge are both steel-concrete composite bridges. The superstructure is supported in the large central spans by struts that, together with the superstructure and the piers, form a frame system. The steel construction of the superstructure has a constant depth and was built by launching, using auxiliary piers. The piers and the struts were built and connected with the superstructure before the casting of the deck slab. This construction method economically combines the launching of steel girders, the support of the superstructure by inclined struts in the main spans, the easy erection of the struts by using the launched superstructure and, furthermore, favorably exploits the fact that most of the load results from the concrete deck slab.

In the next two chapters the characteristics of the structures are discussed. Subsequently, the

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