



Extension of the Train Station of Bern

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Abstract

The new train station of Bern is built in a confined and complex space. Located under a four story office building, a bus station as well as a multiple story parking lot, and 15 meters above a newly built underground train station, a 90 meters wide underground extension has to be constructed while the train service is fully kept up. This paper describes the structures that were designed to fit into this complex space.

Keywords: Underground train station, temporary bridge.

1 Introduction

Triggered by the growth of public needs, the train station of Berne will reach its limits in a few years and therefore needs an increase in both people capacity and service spaces. Located under a four story office building, a bus station as well as a multiple story parking lot, and 15 meters above a newly built underground train station, the extension has to be constructed while the train service is fully kept up.

The Swiss Federal Railway opted for the construction of a new passage underneath the train tracks, which is planned to be up to 90 meters wide. The passage lies between the existing underground passage in the east and the so-called „Welle“ in the west. It offers new entrances to the train station from the north and the south, as well as direct access to all the tracks and to the new RBS station.

Basler & Hofmann (as part of the engineering team) has been assigned to develop all the phases of the project. This paper describes the structural design of the new underground passage and the temporary structures that have been designed to fit into the complex and confined space for the construction stage. The new structure is built in multiple steps to reduce the impact on the train service. Temporary train and pedestrian bridges, based on micro-pile foundations, are built overnight in order to reduce the traffic interruption and to enable work under service. During construction, loads of the roof structure (up to 18 MN) need to be strutted by steel towers. The new passage itself is constructed out of reinforced concrete. Furthermore, to reduce the impact of stray currents, the use of post-tensioning is foregone. The slab is 1.25m thick, with spans up to 20m and supported by solid steel columns with a diameter of up to 45cm. Finally, the columns dissipate the loads on concrete footings founded on solid rock.