

Rehabilitation of bridges with ViaCon Hamco corrugated steel products



Dipl.-Ing. (FH) Christian Hammes / Dipl.-Ing. Dipl.-Kfm. (FH) Serdar Bozkurt

Introduction

The economic success of a country is dependent on the state of its infrastructure. Here, the quality of the infrastructure is significantly characterized by the existing traffic network. An efficient road and rail network makes possible the transport of persons and goods, the reach of industrially and socially interesting regions, etc..

Currently, the problem is often that now many older routes do not meet or no longer resist the requirements regarding the traffic density, load capacity, etc.. Although the necessity for construction of road and rail tracks has detected in many cases at an earlier time, but the now existing traffic density could not be considered in the sizing of the projects.

To ensure an efficient traffic network furthermore, there is the need for many of these sections to repair or expand. Consequently, for all objects relating to these sections reconstructions are necessary. Bridges which serve as underpasses or culverts include inter alia to these objects. The rate of wear and/or the load capacity of the existing bridge give information regarding the future requirements whether the bridge has to be rehabilitated or not. For such construction projects the now since more than 100 years well-known corrugated steel construction method has been proven.

Structurally and economically convincing construction method



With this method the prefabricated corrugated, curved and corrosion protected steel sheets are assembled ring by ring in front of the existing building and pulled successively into the building by a cable pull. After the completion of this procedure and right position of the corrugated steel building inside the existing building follows the gradual filling of the space between new and old building with a commercial available concrete material over the building ends or through the factory-made injection sleeves. To fill the space between the new and old building e.g. a walling including ventilation and control openings is needed. At the same time extending the old building the outside standing areas of the new building (e.g. cut ends) are backfilled layer by layer with soil. After a short drying time of the filling material the load capacity is given according to the traffic load of the requirements.



The corrugated steel construction method is characterized by following features:

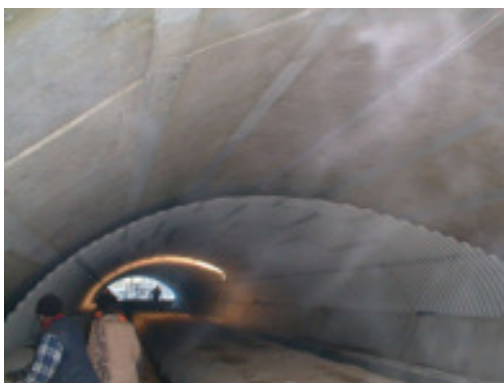
- ✓ low planning costs – no expensive calculations and drawings
- ✓ low effort during the implementation – no demolition of the existing building, no impairment of the road and railway traffic and avoidance of traffic diversion
- ✓ low construction time
- ✓ very low cross-section loss due to wide range of different profile shapes and dimensions
- ✓ long service life through high-quality corrosion protection
- ✓ low long-term maintenance costs
- ✓ building extension possible at the same time – elimination of costly repairs or new construction of front and wing walls with factory-made pieces of embankment

The company and its special projects

In the course of its company history ViaCon Hamco developed many findings regarding the rehabilitation of bridges with corrugated steel products. In the case of a variety of projects such findings have been applied, eg.:

- ✓ Heidelberg castle mountain tunnel
- ✓ Frankfurt port railway
- ✓ Zarnow creek below the German highway 19
- ✓ Lehrter creek below a main line of the German Federal Railway
- ✓ etc.

Exemplary the project ‘rehabilitation of the Zarnow creek bridge below the German highway 19’ shows once again the very good adaptation of the corrugated steel profile to the existing bridge cross-section. The space between corrugated steel profile and polygon concrete bridge building is rated in that way that the reduction of the cross-section is minimal on the other hand, still have enough space for pulling the 68 m long circular pipe arch profile (span 9,29 m, rise 2,99 m) inside the existing bridge.



Picture 3: Pulling of the Hamco corrugated steel profile in the existing polygon concrete bridge without impairment of the highway traffic



Picture 4: Completed corrugated steel pipes