

Project identification

Rupel tunnel

Type of project

Existing tunnels (immersed)



Client

Waterwegen en Zeekanaal, Afdeling Zeekanaal

In co-operation with

Agentschap Wegen en Verkeer, Departement mobiliteit en openbare werken

Project assignment

Design measures to allow for deepening of the channel crossing the Rupel tunnel and propose measures to investigate and repair leakages

Country

Belgium

Location

Boom

Project duration

2015-2017

Project phase

-

Construction cost

-

Consultancy fee

€ 150.000
(excl. VAT)

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Project description

To promote shipping traffic between Brussels and Antwerp the Brussels-Schelde channel is being prepared to allow passage of ships up to a Gross Register Tonnage of 10.000 (GRT). The channel will be prepared by deepening to a water depth of 9.50 m over at least 25 m width. TEC studied the impact of deepening of the channel on the structural integrity of the existing tunnel.

Construction of the Rupel tunnel started in 1972 and the tunnel opened for road traffic in 1982. The Rupel tunnel comprises a 6-lane motor road, about 1,650 m long with a closed tunnel length of 595 m. The tunnel contains two main tubes, each with a 3-lane roadway, a narrow central gallery and is made up of two submerged tunnels (under the river Rupel and under the channel) connected by a tunnel constructed in situ.

Based on the original design documents buoyancy, cross-sectional and longitudinal analyses were performed to analyse the impact of deepening of the channel on the structural integrity of the tunnel. The analyses were validated by comparing calculated deformations with recent settlement surveys. Also a design for the dredging and protection of the river bed above the tunnel was made.

The anticipated settlements would lead to additional rotations in already leaking segment joints. The cause of leakage was investigated, multiple proposals for repair were given and weighed to risk and costs. Eventually an integral plan for deepening of the channel in association with the repair of a leaking joint and monitoring of settlements during dredging was delivered.

Scope of work

- Research characteristics of the fairway and the shipping traffic
- Checking of structural integrity of the tunnel due to deepening of the channel
- Design of tunnel protection
- Inspection of the tunnel
- Proposal for repair of a leaking segment joint
- Review of tunnel's dredging monitoring plan