

D2 motorway restoration in the Czech Republic

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Civil engineering/ Infrastructure



Factbox

Client: Ředitelství silnic a dálnic

Contractor: PORR a.s.

Project Type: Infrastructure, Traffic route construction

Scope: Complete restoration of a 9km-long section of the D2 motorway

Contract Volume: EUR 10.5 million

Construction Start: 10/2017

Construction End: 12/2017

Within eight weeks, PORR a.s. executed the complete restoration of the road surface structure on a 9km-long section of the D2 motorway in the Czech Republic.

18,000m³ of the existing concrete surface was demolished and recycled during these renovation works. To complete the complex project within tight budget constraints and on schedule, work on the construction site had to continue around the clock.

The tremendous increase in traffic volumes since the opening of the 80.1km-long D2 motorway between Brno and Bratislava in 1980 has made an impact on the surface over time. Decades of heavy traffic have left serious damage in many areas. Although many minor repair efforts have been made over the years, various faults such as cracks, crumbled edges and corners and significant vertical shifts of the concrete slabs on the road surface were apparent. Furthermore, the road surfaces adjacent to bridges also showed signs of pronounced distortion and cracks. In 2017, a 9km-long stretch was completely refurbished. PORR a.s. was awarded the contract for these works. With an eye to the large volume of work expected in this sector in the future, for the first time in its history PORR a.s. – a company specialising in road surfaces and bitumen construction – applied concrete surfacing technologies in the Czech Republic. In view of the complexity of the undertaking, sister company Österreichische Betondecken Ausbau GmbH (ÖBA) was invited to bring the extensive know-how and relevant experience of its team on board.

Over a period of eight weeks, road construction machines and PORR staff members were busy on the Brno lane between kilometres 11.9 and 3.2. Along with the reconstruction of the concrete surface, there were also numerous other tasks to complete. Traffic signposting had to be realigned, roadside ditches were cleaned out and improved, a bitumen surface was applied to the slip road, bridges were renovated and even the roadway surface around the motorway parking area near Chrlice was refurbished.

When PORR handed over the stretch of motorway at the end of 2017, the entire surface was smooth and level and traffic was once again able to flow without obstruction.

The project

Diagnostic inspections before works commenced allowed PORR specialists to determine that the existing 240mm-thick concrete surface would need to be demolished, a 40mm-thick bitumen intermediate layer inserted and the substructure bolstered by a 120mm-thick layer of cement stabilisation. Only then was a new two-layer 270mm-thick concrete surface, making use of the recycled materials from the demolished concrete surface, to be applied.

To avoid disrupting traffic flow during the refurbishment works, numerous telematics systems and a mobile warning system were installed before construction began, to give early notice of congestion. These precautions

avoided the need for time-consuming bypasses, and work on the roadway was able to begin immediately.

During the first step, the existing roadway surface was rubblised with a resonance concrete breaker. This proved to be an efficient and effective measure for removing the concrete slabs. This construction machine, model RB 500, was able to literally crush the existing cement concrete in a short period of time, operating at higher frequency (55Hz) and lower amplitude (19mm). Some 18,000m³ of rubble was accumulated in total, which was later recycled into the new construction.



Cumulative know-how at D2: Together with our sister company ÖBA, we finalized the project in only eight weeks.

Petr Pausar
Project Manager, PORR a.s.

Gallery



Working day and night



RB 500 resonance crusher - construction machine for demolishing the concrete substructure. Image: PORR AG

Efforts to uncover the roadway surface also served to expose the ancient cabling, which had evidently been laid at varying depths. This presented major challenges for the team. Finally, it was a matter of ensuring the smooth operation of the road surface paver in order to create the necessary completely level concrete surface. After the successful demolition, the next step entailed the manufacture of a new concrete surface over an area of more than 90,000m². This was executed by the ÖBA with a WIRTGEN concrete surface layer. Due to the limited construction period, concrete deliveries had to be provided by two concrete-mixing works. Towards the end of the project, the roadway was being worked on constantly in multiple shifts, day and night, in order to keep to the tight schedule.

Technical data

Section length	9km
Recycled crushed concrete	18.000m³
New cement concrete surface layer	90.000m²
Number of concrete mixing plants involved	2

Summary

This project was noteworthy in several respects. The construction works had to be carried out under the difficult weather conditions common to October and November, under the constraints of a tight schedule of just eight weeks.

On 2 December, the section of road was handed over to the Czech motorway authority right on schedule. Both sister companies displayed outstanding teamwork in the course of this project - as was also noted by the client.