



Monitoring of the demolition of the Heidingsfeld bridge in Germany

Abstract

A new bridge has been constructed on the Highways BAB A3, close to the village of Heidingsfeld, in the North-West of Bavaria (Germany). The old bridge, a reinforced concrete composite beam bridge with a total length of 664.4 m over 9 sections, has to be destroyed.

During the demolition of the old bridge the northern carriageway of the new bridge is already in operation. The distance between the two bridges (without cantilever arm) is approximately 21 m, while the distance to the new pier „70-Süd“ is only approx. 8 m.

The company Wölfel Group, partner of Bartec Syscom in Germany, is chosen for the vibration monitoring of the bridge demolition. For this purpose, different ROCK and MR3000C devices are installed on site.

Monitoring Summary

Project:	Demolition of the old Heidingsfeld bridge
Location:	Heidingsfeld, Germany
Objective:	Vibration monitoring of the new bridge during the demolition of the old bridge
Date:	May 14th, 2019
Device type:	- 5 x MR3000C with internal triaxial velocity meter - 2 x ROCK
Data analysis:	SCS (https://scs.bartec-syscom.com)
Output:	Comparison with German norm DIN 4150-3

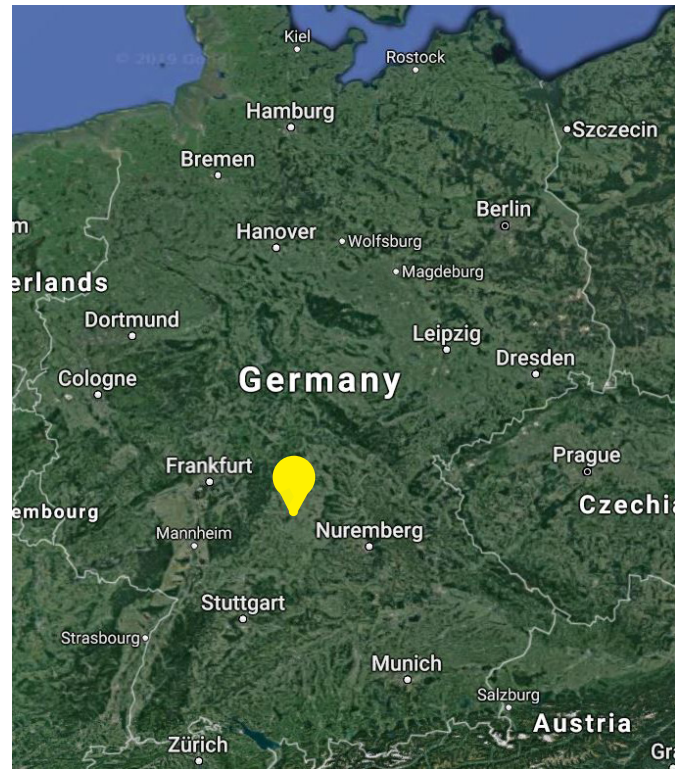


Figure 1. Location of the Heidingsfeld bridge on the map of Germany.



Figure 2. The northern carriageway of new bidge (1), the pier „70-Süd“ (2) and the old bride (3) on the highway BAB A3 in Heidingsfeld, Germany.

The blast and the monitoring

The two front piers of the old bridge are brought to the ground by a two-part blast. Consequently the rest of the 44 m long superstructure field falls/tilts onto the slope.

The rear piers are tilted to the west by a directional drop blast. All 10 charges detonate almost simultaneously. The different heights of the blown up components ensure different ground impact times.

The blast is performed exactly at 11:00 AM of May 14th, 2019. During these operations the traffic on the new bridge is closed.

Before the traffic is released again, the vibrations on the foundation of the new bridge are evaluated according to the German norm DIN 4150-3. The sequence of the blasting is displayed in Figure 3.

The instruments used for the vibration monitoring of the new bridge are 5 MR3000C with internal velocity meter and 2 ROCK. The MR3000C are powered by battery packs.

The vibration velocities were measured on the foundation of the new bridge pier „70-North“, the new bridge pier „70-Süd“ (Figure 4) and on the walls of five neighbouring residential buildings.

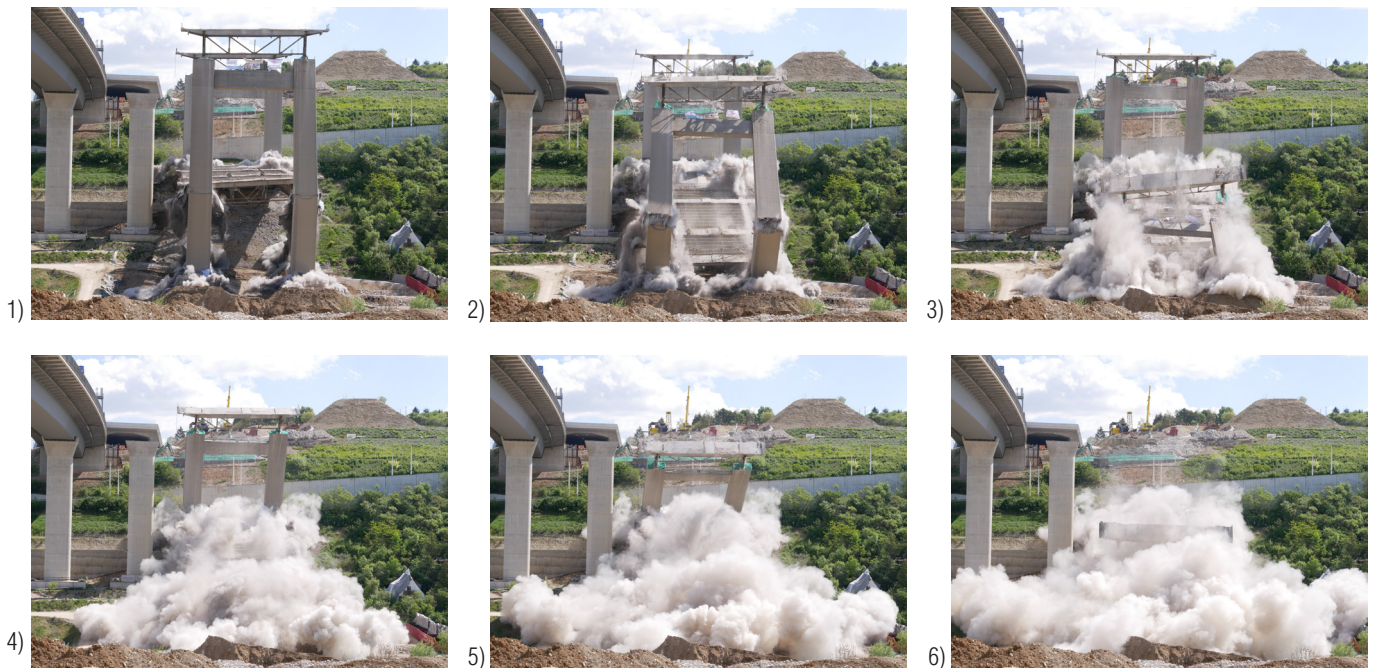


Figure 3. Successive frames of the bridge demolition.



Figure 4. Instruments installed closed to piers of the new bridge: A) a ROCK. B) a MR3000C with its battery pack.

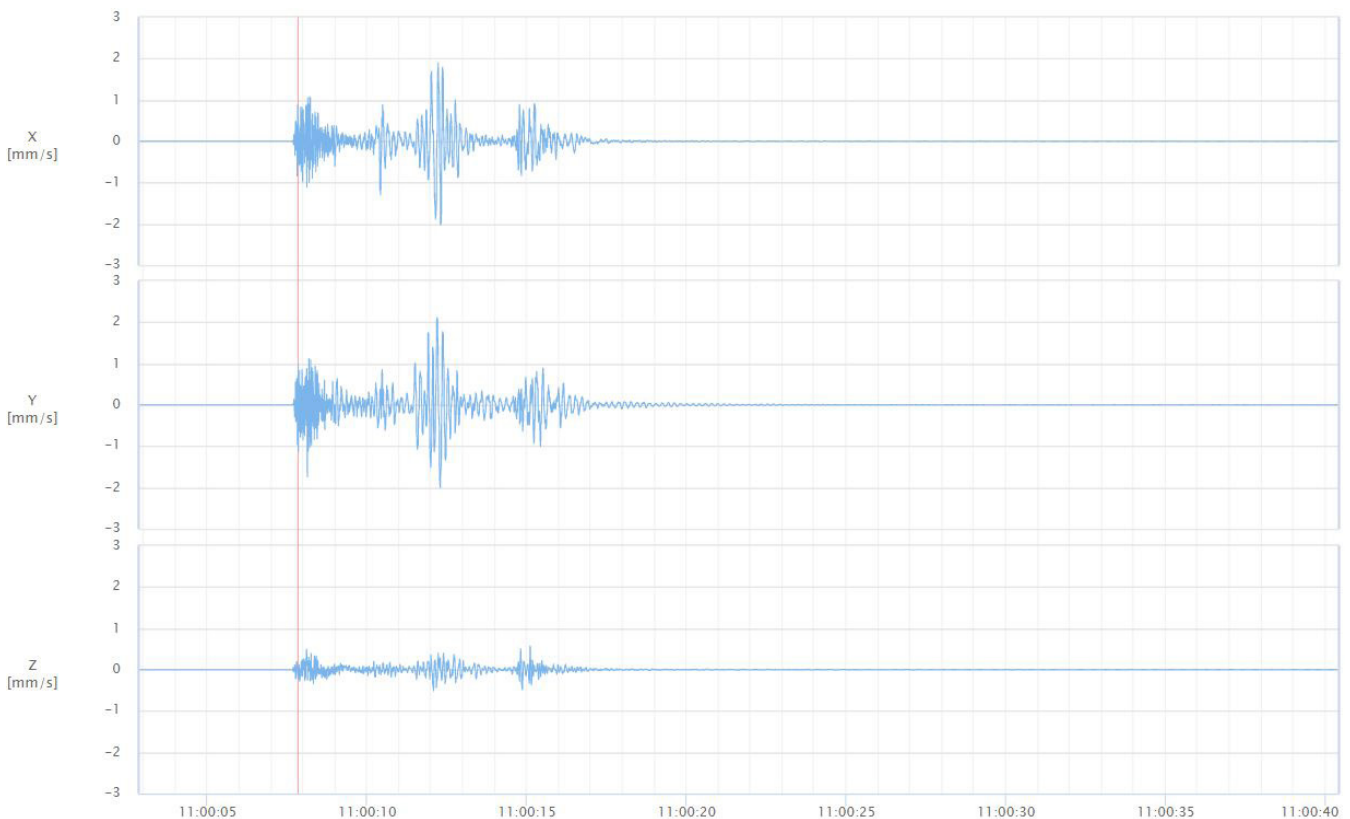


Figure 5. Recording of a MR3000 at the basement of a pier of the new bridge.

Data analysis with SCS cloud software

The recordings are exactly at 11:00 AM, time at which the bridge is demolished. Data are immediately transferred to the SCS cloud software (<https://scs.bartec-syscom.com>), by means of the internal modem present in the devices.

In Figure 5 the event recorded by a MR3000 at the basement of a pier of the new bridge is displayed. The entire demolition process lasts about 10 seconds.

The maximum values and the dominant frequencies calculated per each axis are compared to the norm DIN 4150-3, to check that the entire demolition is compliant with it (Figure 6). This allows to release the traffic on the new bridge.

Conclusions

The MR3000C and ROCK devices from Bartec Syscom are installed for the vibration monitoring of the demolition of the old Heidingsfeld bridge in Germany.

By means of the internal modem, the data recorded are immediately transferred to the SCS cloud software in order to compare them with the DIN 4150-3 norm. This procedure allows to quickly evaluate the effects of the demolition on the surrounding new bridge, speeding its traffic release.

Special thanks to Wölfel Group who allowed us to write this case study.

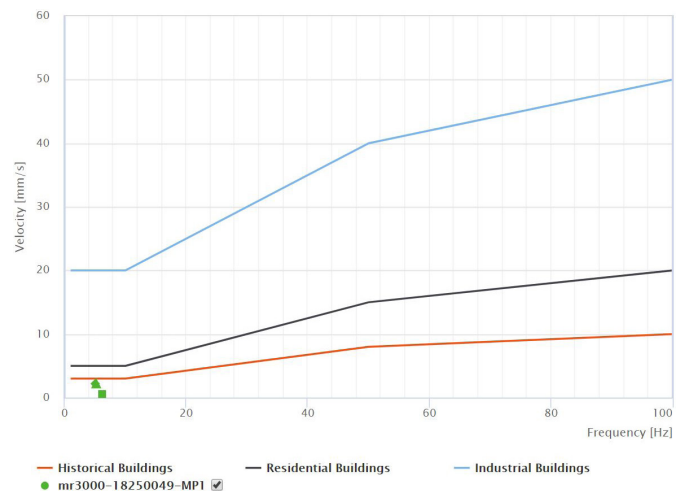


Figure 6. Comparison of the event recorded with the DIN 4150-3 norm.

About BARTEC SYSCOM

SYSCOM Instruments SA is a subsidiary of BARTEC GROUP, a multinational manufacturer of industrial safety equipment. SYSCOM Instruments SA is a leading provider of vibration and seismic monitoring equipment for civil engineering and safety related markets, especially for NPP and LNG plants. SYSCOM Instruments SA reputation rests on the reliability of its products, coming from a meticulous control of every design and production aspects.