

Press release

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CONCRETING UNDER TRAFFIC FOR EFFICIENT BRIDGE REHABILITATION

CO₂ savings and longer service life of structures: AIT and Smart Minerals GmbH work on groundbreaking FFG project COUNT for the rehabilitation of bridges under upright traffic

Vienna (AIT): The COUNT (Concreting under traffic) project, funded by the Austrian Research Promotion Agency, supports the ambitious goal of maintaining the considerable existing stock of transport infrastructure through efficient refurbishment, thereby saving significant amounts of CO₂ compared to new construction. The focus is on extending the lifespan of existing structures such as road or railway bridges, thereby avoiding road closures for new construction and at the same time making a sustainable contribution to reducing environmental impacts.

Reinforced concrete structures are subject to high requirements in terms of structural safety and durability. A potential problem with such structures are weak points that allow water, de-icing salt or similar substances to penetrate. These arise from various stresses over time and impair the load-bearing capacity and durability of reinforced concrete, making extensive renovation or even new construction necessary.

Concreting under traffic: Efficient renovation without closure

The big challenge in rehabilitation measures on bridges is that the concrete needs "rest" while it hardens and the bridge therefore often has to be closed for this time. COUNT aims to enable concreting on bridges under running traffic. This is to avoid closures or costly support structures underneath concreting joints.

As part of the project, this innovative remediation method is being investigated under real conditions for the first time. Here, test specimens are systematically stimulated to vibrate using the AIT's [Mobile Seismic Simulator \(MoSeS\)](#). In further test series, reinforced concrete slabs are shaken to investigate the effects of vibrations on the interaction between concrete and steel. After a 28-day curing phase, comprehensive investigations will be carried out by Smart Minerals to analyse the effects on strength and durability and to be able to derive structural changes due to the vibration excitation with accompanying microscopic investigations. The main common objective of the project is to establish a limit value for harmless vibrations in the

curing of concrete. Different types of vibrations and concrete formulations used in practice are at the centre of the investigations in order to apply the knowledge gained in a targeted manner for future repair work.

Innovative measurement technology for authentic results

An important aspect of the project is the applied measurement technology. Real vibration signals are used to achieve authentic results. In addition, fibre-optic measurement is used, in which glass fibres are embedded in the concrete to record vibrations and cracking. Project coordinator Smart Minerals analyses the different concrete samples using thin-section microscopy as part of the project.

The concrete occasion for the project was the renovation of the Neilreich Bridge on Vienna's Südosttangente, where an urgent need for concreting under traffic became apparent. The two-and-a-half-year COUNT project was then initiated in cooperation with Smart Minerals and AIT and launched as an FFG industry project.

Top-class consortium from industry and research

In the COUNT project, builders, the construction industry, planning and research work closely together. [Smart Minerals](#) and [AIT](#) are able to work together with the consortium consisting of [ASFINAG](#), [ÖBB](#), [MA 29](#), [PORR](#), [STRABAG](#), [HABAU](#), [Doka](#), [IBBS-ZT GmbH](#), [KMP-ZT GmbH](#) and [Mayer Ingenieurleistungen ZT](#) to refer to comprehensive expertise in the fields of construction dynamics, concrete technology and transport infrastructure and thus jointly develop innovative solutions for concreting under traffic in order to reduce the CO₂ footprint in the field of transport infrastructure.

As a scientific partner, the AIT Austrian Institute of Technology contributes its expertise in the fields of construction dynamics and vibration forecasting. The AIT experts are thus significantly involved in the definition of a limit value for vibrations that keeps the concrete-steel bond stable and thus enables concreting under traffic.

As a link between science and the construction industry, Smart Minerals GmbH is focusing for the first time in the project on concrete technology on the relationship between the strength of concrete, the concrete-steel bond and the concrete-concrete bond under a defined vibration excitation. "Of great relevance is the assessment of possible structural damage when a limit value to be defined in the project is exceeded," says project manager Lukas Hausner, Smart Minerals.

"Extending the life cycle of transport infrastructure structures is a very decisive contribution on the way to climate-friendly mobility. The knowledge gained and techniques developed in the COUNT project can be used in refurbishment projects in the future to minimise the carbon footprint while maximising the lifespan of the structures," says Christian Gasser, project manager at AIT.

Further information

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