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## **International expert group of the National Heritage Institute confirms feasibility of renovation of the Vyšehrad railway bridge with long-term service life**

### **PRESS RELEASE**

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**An international expert working group appointed by the Director General of the National Heritage Institute (Národní památkový ústav) reached a majority conclusion that the existing steel structure of the Vyšehrad Railway Bridge is technically restorable while preserving its heritage value, with an expected service life of 100 years. This is contingent upon regular maintenance and the renewal of anti-corrosion protection. The conclusions are based on expert diagnostics, international experience, and a direct assessment of the bridge's condition.**

Historically, the prevailing approach to the maintenance of metal bridges—in Czechoslovakia and subsequently in the Czech Republic—involved neglecting regular upkeep, which inevitably led to the structures reaching the end of their service life and being replaced with new ones. Demolition thus gradually came to be viewed as the standard: the “common,” “only possible,” and “more cost-effective” solution, even within professional circles. As a result, a large part of of the historic metal bridge stock has been irreversible lost, while some original structures have survived only after being stripped of their original function.

In the case of the Vyšehrad Railway Bridge, a significant component of a monument with international status, the question of its renovation was therefore also assessed through international expert analysis and comparison with current European practices.

The multidisciplinary working group brought together leading European experts in bridge engineering, the service life of steel structures, railway infrastructure management, historic preservation, and industrial heritage from the Czech Republic, Switzerland, and Belgium. Prominent technical universities were represented, such as prestigious ETH Zürich and the Czech Technical University in Prague. The working group included experts with practical experience in the maintenance of historic railway bridges, specialists in steel bridge structures, representatives of the International Council on Monuments and Sites (ICOMOS), and experts with experience in managing railway infrastructure within UNESCO World Heritage sites.

The assessment focused primarily on issues such as the structure's service life, material fatigue, the scope of possible interventions, operational safety, and the relationship between the bridge's technical and heritage values.

### **The bridge is restorable and has a long service life**

The working group concludes that the Vyšehrad Railway Bridge **is restorable while retaining its function and heritage value**. With an appropriate scope of intervention—including the restoration, replacement, or reinforcement of individual components—a **service life of at least 100 years can be achieved**, provided that systematic maintenance and regular renewal of corrosion protection are carried out. Prof. Dr. Andreas Taras (ETH Zürich), an internationally respected expert in the field of steel structures, made a significant technical contribution to the discussion on the structure's lifespan and load-bearing capacity. He added that, in addition to bridge maintenance, its long-term service life also depends on the realistic assessment and regular verification of projections for the volume and composition of rail traffic on the bridge. Thorough, regularly repeated inspections of all components and critical details are essential.

### **Temporary relocation of the bridge during repairs**

The working group recommends **temporarily dismantling the bridge and relocating it to the riverbank during repairs**. This will allow for

- the replacement of components without load and the use of more suitable tools and machinery than would be possible during repairs over the river
- an objective and thorough assessment of individual components, their subsequent complete removal of corrosion, and, in the case of new components, treatment with metallization

### **Assessment of Individual Bridge Components**

Based on a thorough assessment, those bridge sections that, due to their condition and corrosion, must be dismantled into individual components will be selected **to allow for their thorough cleaning and subsequent anti-corrosion treatment**. Practical experience from recent projects involving the restoration of riveted bridges in Switzerland and Italy provides examples of the use of specific anti-corrosion systems, including a duplex system for the most critical areas.

Components with excessive plastic deformation, corrosion, or damage should be replaced. An inspection and diagnostic assessment of the condition of the Vyšehrad Railway Bridge demonstrated the need to replace the stringers, which are standardly considered “wearable” components in bridges with open decks. The crossbeams will require individual assessment.

### **Authenticity of Technology**

From the perspective of heritage conservation and based on practical insights gained from recent restorations of railway structures in Europe, the National Heritage Institute recommends preserving the original structural principles of the structure, particularly **the primary use of riveting** as an authentic fastening technology and the use of high-strength bolts in structurally justified cases as a supplementary measure (e.g., for stringers), but not within a single joint together with rivets.

International experience confirms that this approach corresponds to common practice in the restoration of historic railway bridges in the European context. The combination of traditional technologies and modern material processes makes it possible to achieve a long service life for the structure while preserving its authenticity.

### **Clearance Profile and Capacity**

The possibility of widening the clearance profile and increasing capacity was assessed from a technical and heritage perspective. **Most experts recommend maintaining the existing profile**. Most members of the working group recommend addressing any necessary increase in capacity by placing **a third track on a separate new structure**, ideally on the south side of the bridge, at a minimum distance from the existing structure, with a subtle and architecturally

restrained design. This approach allows for separating capacity requirements from the preservation of the historic structure and represents a solution also used abroad.

### International Expertise as a Key Contribution

The exceptional level of expertise within the international working group made it possible to approach the issue in a way that considered current international technical experience with historic riveted structures. In addition to Czech experts, foreign experts with direct experience in the restoration of historic railway bridges in a European context also contributed to the conclusions. Of particular significance is the participation of Prof. Andreas Taras, whose expertise in assessing the service life of steel structures and his involvement in the development of European standards provide the group’s conclusions with an internationally comparable technical framework.

### Next Procedures

Based on these conclusions, the National Heritage Institute will prepare binding conditions for the restoration of the Vyšehrad Railway Bridge cultural monument in accordance with Act No. 20/1987 Coll., on State Monument Protection. These conditions will serve as a technical basis for the investor’s next steps.

The working group’s conclusions provide a technical basis for the investor’s further decision-making within the applicable legal framework and build on the long-term cooperation between the National Heritage Institute and Správa železnic in the restoration of culturally significant railway structures.

### Members of the expert working group

Name	Institution	Country	Specialization	Relevance to the Vyšehrad Railway Bridge
<b>Andreas Taras</b>	ETH Zurich, a member of national and international professional and standardization commissions and committees. He contributes to the development of European standards for the design of steel structures	Switzerland	Material fatigue, structural service life, steel bridges, European standards	Assessment of the Service Life and Repairability of a Steel Bridge Structure
<b>Karl Baumann</b>	Independent consultant, formerly with the Rhätische Bahn	Switzerland	Railway bridges, infrastructure management historic viaduct	Experience with the restoration of railway infrastructure in a UNESCO environment
<b>Bernard Espion</b>	Université Libre de Bruxelles – professor emeritus	Belgium	History of construction, steel structures, railway bridges	Historical and structural development of bridge engineering
<b>Pavel Ryjáček</b>	Czech Technical University in Prague –	Czechia	Steel Bridges, Structural	Assessment of the technical condition and

<b>Name</b>	<b>Institution</b>	<b>Country</b>	<b>Specialization</b>	<b>Relevance to the Vyšehrad Railway Bridge</b>
	Faculty of Civil Engineering		diagnosis, bridge reinforcement	possibilities for extending the service life of the bridge
<b>Tomáš Efler</b>	Czech Technical University in Prague – Faculty of Architecture	Czechia	Heritage Protection. architecture, restoration of historic buildings	The Relationship Between Historic Preservation and Contemporary Construction Projects
<b>Šárka Jiroušková</b>	ICOMOS – Czech national committee	Czechia	UNESCO, international standards for heritage conservation	Assessment of the bridge in the context of World Heritage and international obligations
<b>Miloš Matěj</b>	National Heritage Institute – Methodological Center for Industrial Heritage	Czechia	Industrial heritage, technical heritage sites, conservation methodologies	Assessment of the Architectural and Historical Value of the Railroad Bridge
<b>Alena Borovcová</b>	National Heritage Institute – Methodological Center for Industrial Heritage	Czechia	Industrial heritage, technical building documentation	Research and documentation of historic railway structures
<b>David Měska</b>	National Heritage Institute –Regional Office in Prague	Czechia	Technical and transportation heritage sites, railway infrastructure	National Heritage Institute ´s technical expert for Vyšehrad Railway Bridge

**Contact:** Blanka Černá, Press Spokesperson, 724 511 225, [cerna.blanka@npu.cz](mailto:cerna.blanka@npu.cz)