

Press release

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According to experts from Czech Technical University, technical condition of the bridge is deteriorating. Recently replaced railway bridge in Děčín had similar problems, they point out

Two bridges, similar story. While the Výtoň bridge is still standing twenty years after reaching its design life, the bridge in Děčín is already a history and this year it was replaced by a new bridge construction. Since 2020 the Výtoň bridge has been under the supervision of experts from Czech Technical University in Prague (CTU), who have to subject it to further examination now due to its deteriorating technical condition. For this reason, Správa železnic must close the footbridges alternately until 12 November.

Experts from the Faculty of Civil Engineering of CTU examined the corroded parts of the railway bridge in Děčín, which was replaced by a new bridge this year after almost 100 years. In the video, they show that the tests of the old Děčín structure confirm the doubts about the reparability of the bridge on Výtoň. None of the modern methods of combating corrosion are completely effective in these cases, and therefore a complete replacement of the bridge structure of the Výtoň bridge is the only long-term optimal and sustainable solution. *"The Děčín and Výtoň bridges are twins in age, material, and type of construction. Therefore, the conclusions can be applied to confirm the correctness of the decision to build a new bridge at Výtoň,"* says Pavel Paidar, Director of Construction Planning Department of Správa železnic.

"The elements taken from the bridge in Děčín were exposed to relatively high corrosion. All of them have a similar character to those found on the bridge in Prague at Výtoň. After rigorous testing, we saw that there was no perfect blasting with either water or sand. In the joints and harder to reach parts of the treated structure, corrosion continues, albeit slower. Therefore, local problems with corrosion protection can be expected after about 5 years after the bridge has been treated. In other words, the steel structure is further degrading from the inside. These problems do not occur in the case of modern load-bearing elements," says Professor Pavel Ryjáček, Head of Department of Steel and Timber Structures at Faculty of Civil Engineering, CTU.

The full video about the conclusions of the tests of the Děčín bridge and its application to the Výtoň bridge can be found at:

<https://fb.watch/nhlO5Uk3dB/>



Photo source: video by Správa železnic, testing by Faculty of Civil Engineering, CTU
– corrosion in the place of the vertical of the Děčín bridge

Additional sensors. Preventive monitoring had to be expanded

Due to the deteriorating condition of the Výtoň bridge, Správa železnic had to extend the preventive monitoring system to ensure transport safety, which can immediately warn when limit values are exceeded and detect risky conditions. The bridge is now in its third year under supervision of the CTU.

"Experts from the CTU's Faculty of Civil Engineering have installed additional sensors for acoustic emissions on the Výtoň bridge. They will also carry out an additional diagnostic survey focusing on the critical nodes of the diagonals at the lower zone of the structure," says Pavel Paidar. To detect possible fatigue damage to the material, the nodes are first cleaned by blasting. All works will be non-destructive and will not affect the steel structure but will require the closure of the adjacent footbridges.

"Recently, there has been an increase in emission phenomena that signalled the beginning of fatigue cracks. Therefore, it has now been decided to add additional sensors to the system. In addition, areas where fatigue cracks may form, we diagnose by cleaning with a high-pressure water blast. We then blast them with coarse-grained sand and then diagnose the cracks with an endoscope, measure the residual thickness of the material and use it as a basis for the subsequent static assessment," explains Prof. Ryjáček and adds that so far only fatigue cracks have been detected on the longitudinal members of the bridge deck. Furthermore, extensive corrosion, even corroding through, has been detected in the investigated areas. *"These are narrow, hard-to-clean, hard-to-repair places. Unfortunately, even when we deploy multiple cleaning options, we still do not have methods to paint or repair them in a long-term, high-quality anti-corrosive way. We do not even consider sealcoating and repainting because that will not solve the problem – the steel will continue to corrode under the sealant, it just will not show,"* Ryjáček means.

The action also includes an endoscopic survey of the internal spaces and crevices between the bars of diagonals. *"The testing conducted to date have shown significant corrosion damage, which in many cases has been covered by paint or corrosion products,"* Prof. Ryjáček adds.

Video of the endoscopic probes can be downloaded HERE:

https://drive.google.com/file/d/1_4FtRf19_6_88NmC0mYcOzTvqE7MkCzM/view?usp=sharing



Photo source: video by Faculty of Civil Engineering, CTU, corrosion captured by endoscopic probe on the diagonals of the Výtoň bridge, September 2023

New railway bridge at Výtoň

Since 1901, the Výtoň bridge has been an important part of the railway infrastructure. However, its steel structure has been beyond its design life for over twenty years.

The bridge has been under Správa železnic's administration since 2008. Since then, it has been engaged in an expert assessment of the technical condition of the current bridge to evaluate its future fate. Based on a number of expert opinions, which demonstrated the problematic nature of repairing the bridge in its current form, and after considering the growing needs of rail transport, it decided to organise a competition for a new complex solution of the bridge.

The winning design best met all the criteria of the assignment. It offers a compact solution with the extension of the line to three tracks instead of the existing two, a new railway stop Výtoň with a connection to the tram and the cultivation of the bridge surroundings, at Výtoň for leisure activities and on the Smíchov side for sports. In addition, pedestrian and cyclist accessibility and safety will be improved. The architectural design is being refined by an expert group consisting of representatives of the organisations involved in deciding on the final design now. In parallel, the discussion on the reparability of the bridge in its current form continues.