

# **Grouting inspection of PC bridge girder using Ultrasonic Pulse Echo Tomography and multiparameter evaluation procedure**

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Assessing the condition of grouting in post-tensioned tendons within Prestressed Concrete (PC) structures stands as a challenge in the field of civil engineering infrastructure maintenance. Current non-destructive testing (NDT) techniques employed for grouting assessment have certain constraints. For instance, the Impact-Echo method exhibits relatively low accuracy, while the X-Ray method proves to be costly and demands significant time and labor resources. Simultaneously, there exist promising alternative NDT techniques that offer potential for grouting inspection. In this study the authors used commercially available Ultrasonic Pulse Echo Tomography device with an array of dry-contact sensors and multiparameter method of evaluation. The evaluation method uses amplitude of ultrasonic pulse reflected from PC sheath, backwall and phase of reflected ultrasonic pulse. The experimental study on large-scale specimens confirmed that the evaluation method allows to achieve higher accuracy, as compared to existing methods of evaluation. The developed procedure was applied for inspection of PC bridge girder on an existing road bridge. The inspection was carried out on one of the spans of the bridge, which had 4 I-shaped PC girders. The results of Ultrasonic Pulse Echo Tomography were confirmed by means of drilling and borescope inspection method. The results of both methods showed good correlation.