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Estimation of Existing Prestress Level on Bonded Strand Using Impact-Echo Test

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This work introduces a non-destructive way to evaluate existing prestress level on bonded seven-wire strands embedded in a post-tensioned concrete structure. The approach utilizes the experimental result that the longitudinal stress wave velocity varies with respect to applied stress level on the strands. A set of prestressed concrete beam specimens with different tensile stress levels have been prepared, and various impact-echo tests are conducted. It turns out that longitudinal elastic wave velocity of the strands is nonlinearly increased as the applied tensile stress level increases. To investigate field applicability and feasibility of the proposed approach, the longitudinal impact-echo tests are conducted for two prestressed bonded tendons embedded on a nuclear power plant. The estimation results clearly show that the existing prestress level of the tendon is close to the design value. It seems that the proposed impact-echo technique is feasible and applicable for the unique identification of existing prestress level on an individual strand embedded in a real post-tensioned concrete structure.

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Ключевые слова:

Содержание

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Longitudinal Impact-Echo test
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Field test setup
Conclusion and discussion
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