**Evaluation of Stiffness Loss Indicators using Displacement Influence Lines for Homogeneous Beams**

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**Abstract.** In this work, the simple girder and continuous beam with two spans—two popular types of girder structures—were examined under various conditions. To assess the loss of stiffness of beams subjected to moving loads, the study uses the influence line of displacement approach in particular. The goal of this study is to identify damage (occurrence, position, and degree of stiffness deterioration) in beam structures using influence line displacement diagnostics in conjunction with finite element modeling to mimic structural behavior. A variety of damage evaluation indices are produced to assess the damage in the assessed beam object based on the displacement influence line data that was received from the simulation results of various failure scenarios. Seven indicators, including DAC (Displacement Assurance Criterion), DBI (Displacement Based Index), CC (Correlation Coefficcient), CCD (Correlation Coefficcient Deviation), RMSD (Root Mean Square Deviation), MAPD (Mean Absolute Percentage Deviation), and normalized index, are chosen for evaluation in this study.

**Keywords:** Displacement Influence Line, Damage Detection Technique, Elastic Modulus Reduction.