Evaluation of structural damage in beam structures by strain energy method

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In this paper the problem of using displacement influence lines to detect, locate and evaluate degree of damage in beam structures is investigated. The main problem in many researches due to a limited number of the measurement instruments is overcome in methods presented in papers [1-3] by using displacement influence lines. According to Stimac et al. [1,2] one measurement point at each span in beam structures enables locating the damages reliably by using the displacement influence line curvature method. But the mentioned curvature method is not always reliable for damage evaluation. Therefore, the strain energy method has been applied to evaluate rate of damage in the damaged section. It is shown through numerical examples that even if there are more then one damaged section the proposed algorithm is quite suitable for engineering purposes. The main advantage of the presented method is a need for only a few measuring points in the structure.

References

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