

## Non Linear Dynamic Analysis of Cantilever Beam with Breathing Crack Using XFEM

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**Abstract :** In this paper, breathing crack is considered for the non linear dynamic analysis. The stiffness of the cracked beam is found out by using influence coefficients. The influence coefficients are calculated by using Castigliano's theorem and strain energy release rate (SERR). The equation of motion of the beam was derived by using Hamilton's principle. The stiffness and natural frequencies for the cracked beam has been calculated using XFEM and Eigen approach. It is seen that due to presence of cracks, the stiffness and natural frequency changes. The mode shapes and the FRF for the uncracked and breathing cracked cantilever beam also obtained and compared.

**Keywords :** breathing crack, XFEM, mode shape, FRF, non linear analysis

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