



C. Chen, Y. Li, F.-G. Yuan

Impact and Damage Location Detection on Plate-Like Structures Using Time - Reversal Method

Издательство DEStech Publications, Lancaster, 2011 год

Код: 10273

8 стр; формат: 23,5 x 16 см; библиографический список: 10 единиц
ISBN: 978-1-60595-053-2

Based on time-reversal (T-R) concept, a technique for identifying both impact and damage location is developed in this paper. For the T-R method being an optimal self-focusing technique, the back-propagated wave-field which is reconstructed through the transfer functions and signals from sensors converges toward the location. Low velocity impact experiment on a flat aluminum plate with four piezoelectric sensors is performed to demonstrate the capability of T-R method for impact localization. The plate is first calibrated by transfer functions with discrete spatial spacing. A two-step search algorithm is proposed to rapidly trace the impact location. The effect of the spacing of the calibrated transfer functions on the accuracy of the detected impact location is discussed. The location of the damage is detected followed by the impact location detection technique, considering the damage as a "virtual source" when the structure is excited by the known impact source. A flat plate is employed by finite element method to generate synthetic data to verify this T-R method for locating the damage. The results show that damages with various locations and sizes can be detected successfully by exciting the force at various calibrated points. This potential of applying this technique for complex damages is also discussed. Transfer functions of the structures without damage can be used in both impact location identification and damage location detection, thus T-R method is suitable for structural health monitoring.

Ключевые слова:

Содержание.

Impact and Damage Location Detection on Plate-Like Structures Using Time - Reversal Method