

Dynamics properties of a Go-kart chassis structure and its prediction improvement using model updating approach

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Model updating is concerned about the correction of finite element models by processing the record of dynamic response from test structures in order to have an accurate model for any simulated analysis. Finite element model updating had emerged years ago as an important subject in structural dynamics. It has been used frequently and has been successfully applied to many fields especially in detecting the dynamic stiffness of a structure. The purpose of this study is to perform model updating of a go-kart chassis structure in order to reduce the percentage of error between the experimental modal analysis (EMA) and finite element analysis (FEA). Modal properties (natural frequency, mode shapes, and damping ratio) of the go-kart chassis structure were determined using both EMA and FEA. Correlation of the modal parameters gathered in FEA and EMA was carried out before optimizing the data from finite element. By adjusting the selective parameters, incongruities between those two analyses are generally reduced. The sensitivity of selected parameters is also obtained. The significant reduction in percentage of error before and after model updating procedure was carried out in this study clearly shows that model updating technique is a reliable method in reducing the discrepancies between EMA and FEA. Therefore, in cases of high discrepancies between analytical and actual test data, model updating can be considered as an option in order to obtain better correlation between those two sets of data.