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ABSTRACT

Among the numerous vibration based damage detection methods, some are using dynamically measured flexibility matrix to detect and locate damage in the structure. One of the methods in this category is damage locating vector (DLV). It is based on extracting a set of load vectors from flexibility shifts that cause the same deformation in damaged and undamaged structures. As a result, the damaged member can be located by studying the characterizing stress of all members. In this study, the application of DLV method on damage detection of 3D frame structure was conducted. Some factors like the number of measured DOFs and the accuracy of modal data were assumed to be ideal so that other parameters could be examined. The characterizing stress for a 3D structure and the accuracy of damage index in different damage scenarios are discussed.

Keywords: damage detection; damage locating vector; frame structure; modal analysis; stiffness matrix; vibration.

1. INTRODUCTION

Research on the use of vibration and modal data to detect, locate and quantify damage in civil structures has vastly increased in the past two decades. Vibration-based damage detection methods are promising because they can detect structural damage quickly and cost-

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