Design and Fatigue Analysis on the Frame of a Karting

黃政介、李春穎 陳志鏗

E-mail: 9419546@mail.dyu.edu.tw

ABSTRACT

For lacking of suspension system, the design of frame of a racing karting with load transfer function during cornering is the key to maintain wheel traction and driving speed thereof. This thesis aims at the development of the frame for a karting with better performance. At the early phase of this study, the metallic frame acquired from the product in the market is analyzed and tested in order to establish its specification on performance. During racing, the dynamic loading due to the track profile variations and impact on the curb or other vehicles is unavoidable. With the chosen material, the finite element analysis of the whole frame both in static and dynamic loading is conducted. The simulated results are verified by the experimental measurements both from the static torsion testing and modal testing. The simulated torsional stiffness of a commercial karting frame is found to be within 2% difference with the measurement. Via the design tool of FEA, an adjustable and removable device for tuning the torsional stiffness of the karting frame is presented. This innovative design is able to provide the adjustment of the torsional stiffness within 20% of the basic frame structure.

Keywords : karting, frame, Finite element analysis, computer-aided engineering

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