Design and Analysis of Road Bicycle Handlebar

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ABSTRACT

The handle is an extremely important component of the bicycle for supporting loads. The handle will sustain very high reaction force and pressure due to rider ’ s stamp and weight. Therefore, the strength and rigidity of handle is an emphasis on design; moreover, the handle must be meets a regulation. In order to establish the research and development energy of CAE in the bicycle structure, the design and analysis of road bicycle handle was studied with numerical method in this study. Based on the EN14766 and DIN79100 regulation, the numerical analysis of regulation test was performed using the ANSYS finite element code. To verify the accuracy of the numerical model, simulation results are compared with the experimental tests. Additionally, a different cross section shape of handle was developed based on the design emphasis of bicycle. The corresponding cross section shape and thickness of pipe with different width handle was proposed for reducing the stress concentration due to the increase in size; moreover, the energy loss in stamp due to handle distortion is improvable. Finally, the shape optimal design of handle was discussed to achieve a lighter and strength road bicycle handle. These results and procedures obtained here have potential for guiding the future development of bicycle designs and technologies.

Keywords : Bicycle, Handlebar, EN14766, DIN79100, optimum design

Table of Contents

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