
节能车车架设计及优化

摘 要

近年来，节能减排是汽车行业重要的发展方向，本田公司主办的 Honda 中国节能车竞技大赛就是以节能减排为目的开展的一项考验赛车节油性能的比赛，旨在培养大学生的节能、创新的设计意识。本设计为一款可调节的梯形式节能车车架，在保证轻量化及强度需求的同时，还能根据驾驶员的体型及整车空气阻力需求进行尺寸调整。本设计利用多孔位配合的方式完成可调节座椅支架、脚踏、转向系统支架的设计，并根据车架设计原则完成整体设计；利用 ANSYS Workbench 软件完成车架满载静置及满载制动力两种工况的静强度分析；根据强度计算结果完成结构优化，新车架质量减少 4%，强度提升 3%，强度满足使用需求。

关键词：车架，梯形式结构，有限元仿真，优化

ABSTRACT

In recent years, energy saving and emission reduction is an important development direction of the automobile industry. Honda China energy saving car competition is a competition to test the car's fuel saving performance for the purpose of energy saving and emission reduction, aiming to cultivate college students' awareness of energy saving and innovative design. This design is an adjustable trapezoidal energy-saving car frame, which can not only ensure the lightweight and strength requirements, but also adjust the size according to the driver's body shape and air resistance requirements. In this design, the adjustable seat bracket, foot pedal and steering system bracket are designed by the way of multi hole position coordination, and the overall design is completed according to the frame design principle; the static strength analysis of the frame under full load static and full load braking force is completed by using ANSYS Workbench software; the structural optimization is completed according to the strength calculation results, and the new car frame and quality are reduced by 4%, and the strength is increased by 3% , the intensity meets the use demand.

Key words: Frame, Truss structure, Design, finite element simulation, Optimization

目 录

1 绪论.....	1
1.1 引言.....	1
1.2 选题背景.....	2
1.3 国内外研究现状.....	3
1.4 论文的主要内容.....	3
2 可调节能车车架设计要求及参数.....	5
2.1 Honda 节能竞技大赛有关车架的规则确定.....	5
2.2 节能车车架结构的确定.....	5
2.3 车架材料选取.....	6
2.4 节能车车架的相关参数的确定.....	7
3 可调节能车车架设计.....	8
3.1 可调节能车车架本体设计.....	8
3.2 可调脚踏板设计.....	9
3.3 可调座椅支架设计.....	9
3.4 发动机支架设计.....	10
3.5 可调转向系统支架设计.....	11
3.6 后轴可调支架设计.....	11
4 节能车车架有限元强度分析.....	13
4.1 有限元分析法简介.....	13
4.2 ANSYS Workbench 软件简介.....	13
4.3 材料定义及网格划分.....	13
4.4 位移约束及载荷约束.....	14
4.5 强度校核.....	16
5 优化设计.....	20
5.1 车架优化分析.....	20
5.2 优化方案.....	20
5.3 优化后车架静载工况分析.....	21
5.4 满载制动优化工况分析.....	22

以上内容仅为本文档的试下载部分，为可阅读页数的一半内容。如要下载或阅读全文，请访问：

<https://d.book118.com/048112033070006100>