

Design of an Environmentally Responsible Off-Road Bicycle using SolidWorks

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EXTENDED ABSTRACT

Introduction

With the increase in consumer concern for the long term well being of the environment and the sustainability of products; there is a need to offer environmentally responsible products despite the tendency for such products to be more expensive. At the forefront of this new wave of concerned consumers are the outdoor recreationists. The bicycle design under consideration here is intended to be made with materials and manufacturing processes that are environmentally responsible and 'green'. In addition, the bicycle's aesthetics have been specifically designed to mimic the simplicity of nature. It is also designed with off-road capabilities, able to withstand a significant amount of stress. This 3D design project was performed using SolidWorks.

Roles of Team Members

The three members of the team had individual responsibilities. Ryley served as a leader in aesthetic design, supervising and coordinating aspects such as visual frame design and geometry, as well as overall color schemes and marketability. Kaitlyn performed materials research and design work, and made final decisions as to which materials were both suitable and coherent with our design. Matthew served as the project manager and coordinator, also designing the mechanical systems and sub-systems of the bicycle as well as SolidWorks modeling supervision.

Overview of Parts

Although the bicycle consists of numerous components, the main parts are the bamboo frame, wheels and rims, tensioner, continuously variable transmission (CVT), and the forks. Many of these parts are concealed carefully within the bicycle's frame. Each individual part received special attention in order to maintain overall harmony with the design. Bamboo was specifically chosen because it is a material that is both strong and lightweight and also has a high elasticity making it suitable for the shock absorption required of an off-road bicycle. An important aspect of the CVT is that it is belt driven, allowing for a more quiet, smoother ride.

Conclusions

This 3D design of an off-road bicycle using SolidWorks presents a bicycle that is not only made of 'green' materials and manufacturing processes, but the overall simplistic design also reflects an organic design. Future work will involve further analysis of the structural and load carrying capabilities of the design.