Using Sound Engineering Design Principles to Design, Build, and Test a Moonbuggy Vehicle

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Abstract

This paper describes how a team of Cameron University Technology students designed, built, and tested a Moonbuggy vehicle. Their Moonbuggy was ultimately tested by competing in the 12th Annual Great Moonbuggy Race sponsored by NASA at the Marshall Space Flight Center in Huntsville, Alabama. The objectives of the project were as follows:

A. To promote sound engineering design techniques
B. To research various light-weight materials
C. To research various human-powered propulsion systems
D. To promote sound engineering analysis techniques
E. To research various steering, suspension, and braking systems
F. To promote teamwork
G. To promote communication skills
H. To foster excitement in the fields of science, technology, engineering, and space

The project progressed in four phases. Phase one consisted of forming the team, studying lunar vehicles, researching the moon's terrain, evaluating NASA's design criteria, rules, and regulations, and analyzing previous moonbuggy designs. In phase two the team used the information gathered in phase one to design their moonbuggy. The students used CAD solid modeling software to aid in the design. They also analyzed various aspects of the design on the computer to see if it would meet design criteria set by NASA officials. The construction, testing, and modifications of the moonbuggy were accomplished in phase three. The final phase of the project consisted of transporting the moonbuggy to the race site, racing the vehicle against other Universities, and transporting the vehicle back home. The team then provided information on possible changes to improve the design.

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Mr. Raborn is currently serving at the rank of Assistant Professor of Technology at Cameron University, where he is assigned to the AAS in CAD and BS in Engineering Design programs. His research interests are engineering design, manufacturing strategies, and sustainable products.