

DESIGN AND FABRICATION OF ROCKER BOGIE MECHANISM

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Abstract—

The Project work "Rocker Bogie mechanism Geosurvey Rover" deals with the important aspect of improving the rover from its previous designs. The Geosurvey rover has to operate on rough and harsh environments for which it was designed but several factors restrict its operational capabilities, so the focus of our research is to overcome restrictions or to decrease it to within an acceptable range for its smooth performance. Our research on the restrictions of the rover conducted by our team focused mainly on the drive system and its drive modules which were not efficient, the linkage, the overturning or tilt range of the rover and the battery inefficiency from the other restrictions and problems that were obtained from the literature review and research so, we conducted research on how to improve that. The rover has been completely made from PVC to increase its capability to withstand shocks, vibrations and mechanical failures caused by the harsh environment where it is operated on.

I INTRODUCTION

The rocker-bogie suspension design has become a proven mobility application known for its superior vehicle stability and obstacle-climbing capability. Following several technology and research rover implementations, the system was successfully flown as part of Mars Pathfinder's Sojourner rover. When the Mars Exploration Rover (MER) Project was first proposed, the use of a rocker-bogie suspension was the obvious choice due to its extensive heritage. The challenge posed by MER was to design a lightweight rocker-bogie suspension that would permit the mobility to stow within the limited space available and deploy into a configuration that the rover could then safely use to egress from the Lander and explore the Martian surface. When building a robot you'd like it to be as simple as possible. In most cases you'd never need a suspension system, but there were several instances when a suspension system cannot be avoided. The term "bogie" refers to the links that have a drive wheel at each end.

ii PROBLEM DEFINITION

1.Increasing the mobility of Mars rovers by improving the locomotion systems and their control algorithms.

on past developments for planetary surface exploration, the design is a hybrid concept that combines elements of the GM rover 23,24 and JPL's Mars rockerbogie suspension rovers. Wide and relatively largediameter wheels are chosen in the design to maintain low ground pressure to address the potential need to handle low-friction soils.

III.Autonomous planetary Vehicle Development

. However, these robots typically suffer poor terrain adaptability, and wheeled drive configurations are generally limited to environments with flat, hard ground surfaces. While some specialized wheeled configurations can possess high terrain adaptability, such as the rocker-bogie system used on the NASA Mars rover [5], they tend to require a long while.

iv Design and field testing of a rover with an actively articulated suspension system in a Mars analog terrain

THE SIX-WHEEL TYPE: THIS IS FOR TRAVELING ACROSS ALL DIFFERENT CONDITIONS OF THE ROAD (MUD, GRASS, ASPHALT) AND CAN CLIMB OBSTACLES [15]. THIS INFLUENCED BY THE ROCKER-BOGIE MECHANISM [16][17][18]. THESE CHARACTERISTICS ARE PERFECT TO DRIVE THE ROBOT TROUGH FOREST ENVIRONMENT. .

V CONCLUSION

Presented situation was faced presenting two modes of operation within same working principle which is a rocker-

bogie system with a robust obstacles traverse features and another is an expanded support hexagon achieved by rotating the bogies of each side of the vehicle. The proposed paper produces a novel design in pursue of increasing the rocker-bogie mobility system in conventional heavy loading vehicle behavior when high-speed traversal is required. The proposed modification increases in the stability margin and proved with valuable and profitable contrasting with the 3D model simulations done in SOLIDWORKS. In future, if the system installed in heavy vehicles and conventional off road vehicles, it will definitely decreases the complexity as well as power requirements to retain bumping within it. Future scopes of Rocker Bogie Mechanism are in military operations as a weapon carrier & for locating coal deposits in coal mines.

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