

Investigation of Wheel Robot Grouser Width Parameter Effect on Robot Mobility in Soft Sand Terrain Using Sand Test Bed



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Abstract Much research has been done to investigate the most ideal grouser parameters to improve a robot's wheel mobility in sandy terrain. However, their area of research mainly focused on the normal wheel with fixed grousers. This paper showcases the study of performance of the assistive grouser wheel moving on a flat surface sandy terrain attached with different grouser width parameters. Two different grouser shapes were fabricated which consist of C-Shape and Wider C-Shape, with two configurations forward facing and inverse. For each grouser set, one of the grousers was attached with 2 load cell sensors used to measure force. The grousers were tested across a total of 3 runs to identify its total average traction force acting on the grouser during the wheel's movement. The results show increased maximum positive and negative forces when the grouser width is increased, which resulted in less net traction force. The inverse configuration also showed better results than forward facing. This shows that for assistive mechanism, increasing the width of the grouser may not increase the effectiveness of the grouser in generating traction force.

Keywords Assistive-grouser · Grouser shape · Traction force

1 Introduction

Today, mobile robots have emerged as a popular research area because they enable human evolution through exposure to a variety of environments, facilitating local and global research as well as space travel. Wheeled rovers are one of the examples of wheeled mobile robots that are used in space exploration on the Moon and Mars.

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