Improving Forklift Maneuverability

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Warehouse storage is a greater than $20 Billion US industry is expected to grow even further due to the rapid expansion in online shopping. The efficient utilization of limited storage space is one of the key factors to sustain this industry. Product stored in warehouses co-exists with forklift traffic and the efficient interaction, to share limited floor space, plays an important role in moving and organizing these products. If a forklift's maneuverability is inefficient, the warehouse storage capacity is sacrificed due to wider aisles between shelves. This project aimed to address forklift maneuverability through a modified drive system which included the following steps: • Development of design criteria for maneuverability improvement • Construction of base models of concept forklift drive systems for initial measurement and prototype selection • Design and construction of a prototype drive system • Documentation of project findings. The findings showed that both the tank drive and Mecanum wheel drive system had the ability to perform turning around its own geometric center, which is typically a constraint for conventional forklift drive systems. The Mecanum drive system however had uniquely an additional capability to change the vehicle's position without changing orientation. This capability resulted in the choice for prototype development. The prototype required a control program for four independently controllable motors attached to the Mecanum wheels allowing the vehicle full maneuverability in any direction. The project concluded that the Mecanum wheel drive system is the best candidate among drive systems tested with respect to operational and spatial efficiency.

Awards Won: