

Design, development and modelling of forklift

[Psychology](#), [Child Development](#)



Abstract

We describe the development of robotic forklift intended to operate alongside human personnel, handling palletized materials within existing, busy, semi-structured outdoor storage facilities. The main objective of this project is to fabricate a Mechanical forklift for material handling in industries. In this paper a robotic vehicle is fabricated which runs to carry material from one place to another by using Radio Frequency Technology. Nowadays in industries, forklift used with hydraulic system. To use forklift, it requires one spot guide to guide a forklift driver because of less visibility. This paper discusses how to integrate Radio frequency identification (RFID) technology into a forklift truck to make it wireless to increase visibility and human safety.

Introduction

A forklift is a vehicle similar to a small truck that has two metal forks on the front used to lift cargo. The forklift operator drives the forklift forward until the forks push under the cargo, and can then lift the cargo several feet in the air by operating the forks.[1]Forklift is totally run on electric motors which are control by a remote operator by means of remote will connected with RFID which fix radio frequency transmit and receives to forklift circuits. [1, 6, 7]With electrical motor it gives the motion to the forklift vehicle like forward, back, left turn, right turn and pallet controlling up down motion, which are controlled with remote and which will be transmitting signals to receiver and receiver will convert signals to operation. It"s helpful to operator will be situated at only one position and it will operate the forklift from one position

and he we monitoring on the neighbor environment due to that he will avoid the accident and operate with vision cameras.

Field to Use

Electric forklift have got numerous applications. They are used for transmission of materials from one place to another. Forklifts and fork trucks are used to engage, lift, and transfer palletized loads in warehousing, manufacturing, materials handling, and construction applications.

Literature Survey

From the reference of the actual forklift named Landoll we had scaled the actual dimensions to prototype model. The mechanical structure of this prototype model is constructed with metal plates, this structure looks like a rectangular frame& the vertical moving mechanism that contains metalforks is assembled over the structure at front side. Since it operates through a remote, it doesn't contain any steering mechanism. The remote technology transfers the data by RFID. All four motors are driven through a single „ H“ bridge DC motor drive package. All the four wheels are directly coupled to the motor shafts independently. The DC Motors are having reduction mechanism, there by speed is reduced and torque is increased.

Working

The mechanical system is considered as motion converter, this can be created by implementing electro-mechanical techniques. The concept is to transform the motion from one form to some other required form by using suitable mechanical & electrical devices. In this research work the technique of transform the rotational motion in to linear motion is implemented. For

this purpose five DC motors are used to create motion in the mechanism that functions as forklift. These motors are constructed with reduction gear mechanism & it is built in with the motor internally. As the machine is designed as prototype module, lowest rating motors are used to drive the mechanism.[8, 9]The name H-bridge sometimes called a “ full bridge” is so named because it has four switching elements at the “ corners” of the H and the motor forms the cross bar. If the bridge is sufficiently powerful it will absorb that load and your batteries will simply drain quickly.

Components

Chain Drive. Chain drive helps to drive the system in both side (one at a time) using electric motor.

Driving chain. Two Sprockets with Diameter 25. 07mm and 49. 77mm is used which have 12 and 24 teeth on it. Chain of length 480mm and 80 links is convenient.

Lifting chain. Two Sprockets with Diameter 25. 07mm and 49. 77mm is used which have 12 and 24 teeth on it. Chain of length 660mm and 110 links is convenient.

Fork. The dimension of fork is 125x18x5 mm. The material selected Mild steel. The max load carrying capacity is 50N.

Shaft. The dimension of the shaft is 5mm diameter and 220 mm length. The material selected is Mild steel. It is an interconnection between primary and secondary chain drive.

Geared Motor. It drives the primary chain drive at 24rpm. The torque is about 5 kg-cm and the power input is 12V DC. E.

Tensioner. It is used to maintain the tension in secondary chaindrive.

The material selected to prepare the prototype model is Mild Steel due to its properties like malleability as it can be hammered and pressed into any shape, ductility as it can be bent easily and versatile and in the last is most common, cheap, strong and stiff. [2]For the electrical point of view, we had used an AT89C2051 microcontroller; the output of this controller is fed to the RF transmitter. This transmitter is designed to generate a very high frequency of 433 MHz & it is used as carrier frequency.

Conclusion

By considering fork as a cantilever beam withThe main advantage of using this technology is to increaseuniform distributed loadUDLthe safety of operator by operating the forklift from certain distance. This increases the efficiency of the productivity, because human errors due to the poor visibility can be minimized.

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