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Prototype of Wheel chair attachable E hand bike

Production Engineering

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1. ABSTRACT

This paper involves simple design of wheelchair attached electric hand bike that can be attached to manual wheelchair for better mobility on road. The hand bike consists of electric bike motor, rechargeable battery, a controller electric throttle, and mechanical brakes. As the team made this bike or mechanism from waste. The concept is best from waste, and is affordable for middle class peoples. The hand bikes are designedto be safe, light weight and aesthetic look. This electric handbike can be easily detachable for wheelchair. This explains how an electric hand bike is made within limited budget for handicapped people.

Key word

Electric hand bike

Mobility for handicapped person

Attachment mechanism

Battery

Controller with motor

Handicapped tricycle

2. INTRODUCTION

For the disabled people who use manual wheel chair they often experience shoulder pain due to steering wheel chair with only the upper limb muscles for a long time. Some disable peoples need medical treatment and also have surgical treatment in serious case, to this potential muscles disorders several type of electrical hand bike have been recently introduced in which docking method is easy and it is possible to easily move by using electrical system after docking.

In case of relatively high speed on various terrain after easy installation using a connecter, the mechanical loads are continuously applied to the connecting parts between manual wheel chair and electric hand bike, And the resultant force accumulated at the connecting parts is determined to affect the structural stability of connecting parts. However related research on this area are still rear therefore this study aims to implement a three dimensional dynamically model that can simulate durability test through computational analysis, and to evaluate dynamic structure stability of parts between manual wheelchair and electric hand bike during durability experiment by verifying model through motion analysis.

3. LITERATURE REVIEW:

Sruthi Ramachandran et.al: batec Mobility, Firefly electric attachable hand bike Sherpa electric power bike this companies are produce E-hand bike for disable peoples. This companies are develops new technology to hand bike. The company's focus on Safety Performances Handling Maintains etc,factors The literature review studied on following Research papers: Motorized Hand Bike for a Manual Wheelchair:

The basic model of the hand bike is as shown in the Figure

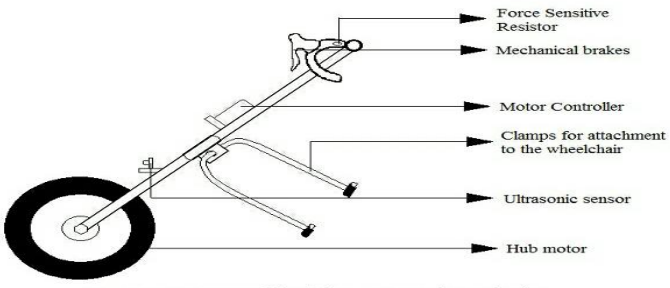

Figure 1: Basic model of the Motorized Hand Bike

Fig no-3.1

4. PROBLEM DEFINITION:

Problems statement: this work is easy to design on paper but difficult to do it in practical

2. Searching for used motor.

3. Checking the motorby professional

4.Finding new parts like controller & batteries.

5. Design a proper clamping mechanism.

7.When mechanism is attached the front 2 wheels of wheelchair is lift.

5. MANUFACTURING HAND BIKES USING RECYCLED BICYCLE PARTS:

Hand bikes made from recycled aluminum and steel bicycle parts were produced for physically disabled people with limited financial means, which encouraged accessibility, sport and social inclusion through self-mobility on roads. Therefore, this work aims to combine environmental and social responsibility.

- Objectives : The objectives of this work were to design, build, evaluate and donate hand bikes suitable for paraplegic people that are safe, maneuverable and low cost using mostly recycled aluminum and steel bicycle frames

6. OBJECTIVES

1. Simple initial goal to design composite wheelchair convert to wheelchair attachment electrical bike

2. Ability to convert a performance oriented tricycle for disable users without the need toget out the chair.

3. It is easy to turn into tricycle.

4. Engagement & disengagement is easy

7. METHODOLOGY:

1.The subject that we have chosen wheel chair attachment E hand bike. the team selected this because it is the need for disable peoples who cannot move from one place to another place at long distance and require and extra person to push the wheel chair.

2. Main reason behind making the project-When we watched the video we thought that we should bring this type of concept in our city for disable people. This project can be made at as possible as low cost so that the disables can afford it and the need of pushing the wheel chair may eliminate.

7.1Experimental Setup:

Actual Design

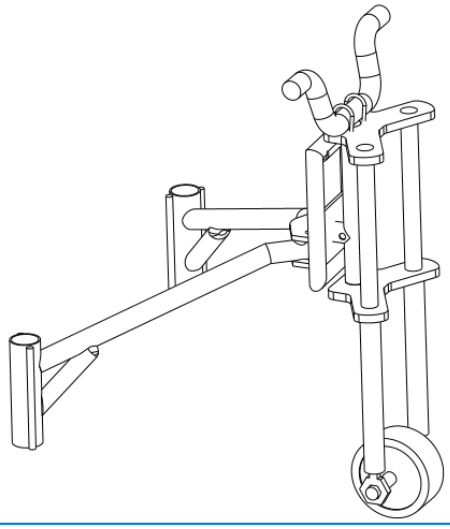

Fig no-7.1

Design Tool- The team used CATIA V5R21 and workbench is part designing and drafting.

Mechanism- simple mechanism such as door hinges are used for clamping with bar which is cut in center

Fig no-7.2

Fig shows Door hinge mechanism used to attach wheelchair & electric hand bike. The pipe cutting by the centre and welding the bar with hinges which open & closed by adjustable screw.

Fig no-7.3

Fig showsfront side of mechanism. This is attached to fork. It continually connecting with fork

Fig no-7.4

The fig show the both side of mechanism. It is made by CRC coil pipe. The front side attached to the fork &Back side attached to wheel chair.

7.2Fabrication Work Details-

Electric welding is been used for welding. Manglamwelding rods are used 3.5*350mm rod is used. A machine with 150 ampere is been used for welding.

Portable clamp for fork- Half plate for support with size of 2*3 to the fork.

Support to both the pipes is adjusted with 3*2 pipe and two holes to hold it and permanently welded.

Fork alignment- A fork and extra pipe is welded for fitting the fork properly with the pipe.

8. ANALYSIS:

As we are preparing the attachable hand bike for wheel chair we faced certain problem. As the foreign companies are manufacturing it to their standards they have the mass production in which they have proper machines with them to create mechanism for connecting the wheel chair with the hand bike. The team are creating it and manufacturing it to our standards with good quality of material. We have tried to match the standard with foreign countries and same how we have reached nearby their standard.

They firefly mobility bike consist 350W brushless electric motor with disc and V break. And removable light weight lithium battery. The firefly uses an automatic set of controller with grip throttle and livers. The ranges from 2000$.

One more company BATEC mobility has used aluminum material for mechanism body and motor of 200 rpm, 900W high torque brushless motor is used with easy fix and fit clamping system with safety. Electric display panel and usb port. Weight 15 kgs.

As compare to both of this companies we used electric brushless motor with 2.5 ampere with 250W motor with 12V and 7.5 ampere battery with is bet heavy in weight compare to the firefly company. For body works we use iron bar CRC-coil pipe because of high flexibility & high sustainability our .motor is 160rmp .

Main advantage is we have created it from waste material In this section we will analysis that how companies can price their product (hand bike) and how can we manage to make or develop it at affordable price.

9. CONCLUSION:

The motorized hand bike that can be attached to a manual wheelchair is presented in this paper. It aids the disabled people to easily ride on roads and reduces the strain on their shoulder. As the hand bike attached

manual wheelchair can be used outdoors as well as indoors, it eliminates the need for a separate mobility vehicle for each purpose.

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