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AUTOMATIC WHEEL CHAIR CUM BED

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ABSTRACT — Increasing demand for efficiency in the healthcare sector, and a growing focus on patient needs, it is easy to neglect the needs of the caregiver. This project wheel chair with bed model lift helps the caregiver avoid heavy lifting situations that put their back at risk of injury, and allow the caregiver more energy at the end of the workday. This is a friendly assisting device for the physically challenged patients who cannot lift and shift from their bed independently. This device works on the simple mechanical control principles.The main objective of this project is to design, fabricate and test the device for lifting and transferring patients in an effective and comfortable way for the patient and the caregiver. This project shall enhance our knowledge in the structural design of mechanical links. The objective of this project is to control the vehicle through remote. This project is very useful for physically challenged people.

Keywords - Wheelchair, linear actuator, Automation, Design and development

I. INTRODUCTION

Wheelchair is a type of mechanical device that is used to improve the accessibility of persons who are mobility challenged. Wheelchair comes in variation where it is propelled by motor or by seated occupants turning rear wheel by hand. Often there are handles behind seat for someone else to do pushing. Based on this, wheelchairs can be classified as automatic wheelchairs or manual wheelchairs. The occupants spent a lot of time in sitting position since he cannot move and lie down himself in a bed. Transferring a person from this type of wheelchair to bed is also difficult. Even the sophisticated type of wheelchair available in the market today does not have the provision to lie down. This prompted us to think about a wheelchair which can be converted to a as a bed by the aid of power, so that the occupant himself can convert wheelchair into a bed and rest.

Therefore, as a student of Mechatronics engineering, this project interest and expose us to the field of mechanical, design engineering, electronics devices, programming languages. On the whole, in this project, to design the mechanical part of wheel chair system and to fabricate the mechanical part of the system is the step to learn mechanical engineering and to write a program to perform major tasks by using micro controllers is the step to learn electronics engineering.

II. WORKING

The equipment is fully operated through the mechanical setup. Motors with worm gear arrangement are provided at the either side of the stretcher model. The model can be folded at the particular time as our requirement. This equipment can be used for mainly two purpose one for stretcher and another one for wheel chair model. Basically the equipment is spitted in to three parts one is top plate bottom plate and center plate. These three are linked through the mechanical setup which is clearly shown in the above diagram. The motor with worm gear arrangement is placed on the two linkage areas. The stretcher can easily change to the wheel chair by just operating the motor with worm gear in this arrangement. The bottom two wheels of the model are coupled with motor which gives the motion to the wheel chair hence it can move from one place to another. Another main advantage of this project is it is operated through joy stick. . [3] proposed a principle in which another NN yield input control law was created for an under incited quad rotor UAV which uses the regular limitations of the under incited framework to create virtual control contributions to ensure the UAV tracks a craved direction. Utilizing the versatile back venturing method, every one of the six DOF are effectively followed utilizing just four control inputs while within the sight of un demonstrated flow and limited unsettling influences.

DESIGN CONSIDERATIONS

The main design considerations that while developing advanced wheelchair cum bed are,

- Easiness to handle
- Stability in both wheel chair and stretcher mode

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- Easiness to transfer patient from bed to wheelchair and from wheelchair to bed
- Conversion from wheelchair to stretcher mode and back
- Simple mechanism to convert wheelchair to stretcher and back to wheelchair automatically by the person who is using the wheel chair
- User friendly controls
- Safety

DIAGRAM

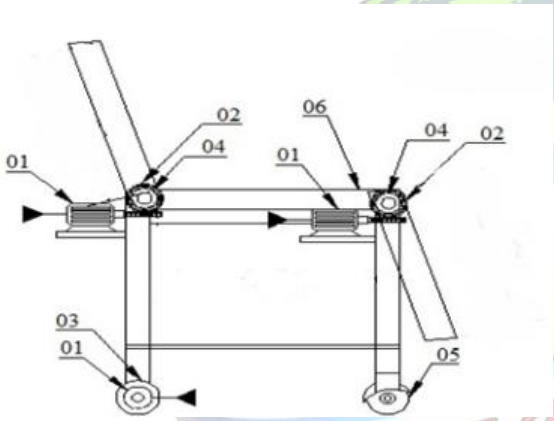


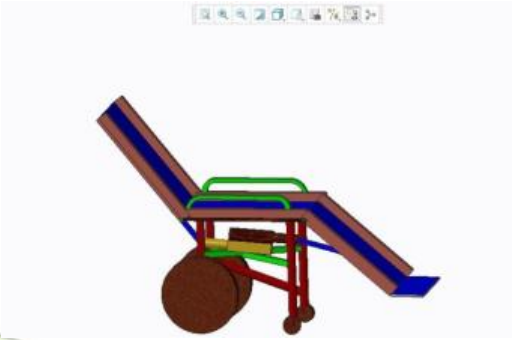
Figure 1**: Conceptual design**

LINEAR ACTUVATOR MOTOR

A linear actuator is an actuator that creates motion in a straight line, in contrast to the circular motion of a conventional electric motor. Hydraulic or pneumatic cylinders inherently produce linear motion. Many other mechanisms are used to generate linear motion from a rotating motor.

Fig2: linear Actuator

ASSEMBLY DIAGRAM



HOW TO OPERATE?

Step 1- Adjust the position of the control panel in a convenient position so that it can be operated both in wheelchair mode and bed mode.
Step 2-Switch on the power switch and see whether the power LED is on. If the power LED is not on then check weather emergency is on.
Step 3- If the emergency switch is on then switch off it. Now the power LED will be on, at the same time the charge level indicator will indicate the level of charge in the battery. Now the AWCB is ready to use.
Step 4- Use switches for the movement of the wheelchair, provided at the top of the control panel. Switches are also provided for forward or backward movement and to turn AWCB to right or left by the occupant.**Step 5**- For converting wheelchair to stretcher and back to wheelchair switches are provided at the front side of the control panel. Separate switches are provided to control the movement of footrest and backrest

III. CONCLUSIONS

In this paper we discuss the need for the wheelchair bed system in current world. We also studied the different mechanisms that can be implemented. This paper also slight upon the material selection and the importance of selecting proper materials. Although these chairs may prove to be costlier than standard chairs available in market, they improve patient's safety and comfort levels.

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