

SAFE TRANSFERRING OF PATIENTS FROM ONE PLACE TO OTHER PLACE USING MULTIPURPOSE WHEELCHAIR

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ABSTRACT

The goal of this study is to develop affordable, multi-use wheel chairs that encourage mobility and improve quality of life for those who have trouble walking. In order to reduce pressure injuries, this invention forces users to directly remove patients out of beds. In addition to lowering the price of the product, we also want to reduce pressure injuries and falls. The ability to utilize a wheelchair for both indoor and outdoor use is another feature of this type. After the project is finished, we will have accomplished our goal of bringing wheelchairs. We created a wheelchair that is more versatile, safe, affordable, and of excellent quality. It allows for the safe movement of patients from one place to another place. The procedure that is used for transferring patients is very simple and unique

Keywords—Patient, Multipurpose, Wheel chair, versatile

INTRODUCTION

Those who struggle to walk due to disease or handicap use wheelchairs as a mode of transportation. It may be moved by rotating the wheels or the handles. Wheelchairs come in a wide variety of styles and designs today, including manual, powered, and transport wheelchairs. It is true that recent advances in science and technology have fundamentally altered how the average person lives today, but we also have to acknowledge that some groups of people have not benefited from these advancements. Others old people nevertheless have unpleasant lives, while some handicapped persons have restricted mobility. The engineers have taken many steps to help those people like designing a wheelchair. Recently, the elderly person and physically handicapped person who use a wheelchair are increasing. However, only two types of wheelchairs were come into wide use. They are normal hand operating wheelchair and electronic wheelchair operated by joystick. The former type needs muscular strength for the operation and the latter type needs the skill. Not only that, the handicapped without hand needs help of another people to move the wheelchair. Not only that, we also found that lifting and shifting of a disabled or a bedridden person has always been difficult, risky and problematic. This lifting and shifting is also dangerous and painful for that particular disabled person if an untrained person does it. Moreover, patients are also afraid of this procedure, as there is possibility in danger of slipping, falling and getting injured. Wheel chair consists of mechanical components basically such as the hand rims, arm rests, footrests, castors, seat and backup holster. However, the existing wheel chair has weakness such as not ergonomics enough to meet the users needed. Ergonomics can be defined as the application of knowledge of human factor to the design of systems (Taylor & Francis, 2008). The first wheelchair was made for Phillip II of Spain. Later on in 1655 a disabled watchmaker called Stephen Farfel built himself a three-wheeled chair to help himself get a bout on. In 1881 the 'push rim' was invented which meant no more dirty hands for wheelchair users; they could use the push rim to move the wheels and not get covered in mud. From here wheelchairs have developed more and more over the years including easy use, more options, light weight options, and adjustable seats and so on.

LITERATURE SURVEY

In a research paper "Design of multipurpose wheelchair for physically challenged and elder people", Mr. Mohan Kumar at al. Shows a new design of wheelchair which can be used for multipurpose. They made some observations on the physically disabled persons, ill peoples, hospitalized peoples, and all those peoples

who cannot walk on their own and they use a wheel chair to move from one place to another place. On the basis of their survey they made some modifications in the conventional wheel chair and add some new features in it. They found that those peoples are having difficulties in defecation so they add a commode in it. In that wheelchair the seat is flexible so that the user can use it for sleep if needed. A working table is also added in it which can be used for different purposes at different time. In this project these w added these facilities with some modification and make an E-wheel chair which is self-propelled.

“Development of Multi-Purpose Wheel chair” Mohd Elias Daud , Zulkarnain Hamid, Asri Md Desa 2015 Innovation& Commercialization of Medical Electronic Technology Conference (ICMET), 22-25-2015. Multi-Purpose Wheel chair (MPW) is an independent patient mobility for indoor and outdoor tasks, such as moving to and placing on bed, and self-lift assistance through electrical control. Currently, patients and attendees facing a problem to be shifting from a wheelchair to vehicles or bed. This research project started with literature review and market survey, and customer satisfaction through questionnaires. The survey was conducted in various places and different respondents. MPW can be operated by manual and 24 volt electric power control. It was designed in three main functions; a controlling up and down with electrical control, the positioning control for sitting state and lying state was considered for this project, and the alarm or emergency system is provided to inform the attendee that there is a need of his or her presence to the patient. The motivation of the MPW to reduce injury according to lack of patient handling and will meet a customer satisfaction.

PROBLEM DEFINITION

Nowadays the numbers of patients are increasing day by day due to our lifestyle. Hospitals are being crowded by the patients but they cannot provide better care for their patients due to lack of technologies or due to expensiveness of the available technology which cannot be afforded by the common peoples and hospital management. Among them paralyzed patient are more suffering. The main problem faced by the patients is during the time of shifting from bed to stretcher and vice versa. Pressure injuries and falls are the main problem faced by the paralyzed patient. The main aim of our project is to manufacture a multipurpose wheelchair with low cost that is affordable in our country without compromising any services which is done by the conventional method. Multipurpose wheelchair is medical aid equipment which enables transfer of patients from bed to stretcher and vice versa. There is no existing technology as such even though there is electrically controlled equipment which is expensive.

VI.DESIGNOFWHEELCHAIR

In the design of the multipurpose wheelchair for load applied and material considered as major parameters. The photograph of multipurpose wheelchair with screw mechanism is shown in fig1



Fig1 wheel chair

The basic design of the device has evolved from the concept of a convertible wheelchair. Then the convertible feature was included to the design at a conceptual level and tremendous amount of brainstorming

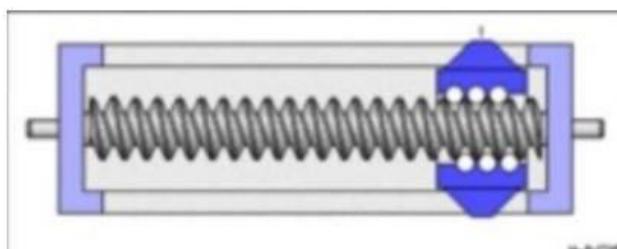
was done. Since the fundamental aim of is to provide comfort to the patient as well as his/her care giver ,powered conversion of the device between chair and stretcher was given focus. In the second phase, the power source was to be selected. In this wheelchair we can use screw with nut. By using screw mechanism we can lift the chair. This screw is attached the two scissor lift the screw rotates rotational and motion converts linear motion with help of scissor lift.

TABLE1
Specification of wheelchair

1	Weight capacity	100kg
2	Weight	40kg
3	Seat width	600mm
4	Seat height	520mm
5	Overall height	1400mm
6	Overall width	600mm
7	Overall depth	520mm

Screw Mechanism:

Screw nut mechanism is the working principle of the multipurpose wheelchair. A screw nut mechanism is mechanism which converts rotational motion to linear motion combining a screw and a nut where the screw Thread is in direct contact with the nut thread. In the case of roller screws, the rollers rather than the nut are indirect contact with the screw thread offering greater efficiency. There are three types of manufacturing



Process for a screw, either rolled, ground or machined using a whirling process. Power Jacks employs all Methods in the manufacture of our lead screws. Lead screws are used in a very broad range of applications, sold as individual products or incorporated Medical, Defense and Transport applications are particularly popular lead screws. In this mechanism patient are lifted by rotating the thread rod with the help of handle.

Scissor lift:

In this wheel chair we can use scissor lift because lifting. Scissor lifts works based on screw mechanism. The screw is rotates anti clock wise then move up words the scissor lift by using bearings. The screw will rotates clock wise scissor lift move down words the most common industrial lift is the scissor lift table. This may seem like a complicated piece of equipment, but in actuality scissor lift tables are really very simple in design. Platform is the top of the lift table where lifted product sits. It can be supplied in a variety of sizes. Base is the bottom of the structure that rests on the floor. It contains the track the scissor legs travel in. scissor legs are the vertical members that allow the platform to change elevation

WORKING OF MULTIPURPOSE WHEEL CHAIR:

Screw nut mechanism is the working principle of the multipurpose wheelchair. A screw nut mechanism is mechanism which convert rotational motion to linear motion combining a screw and a nut where the screw thread is in direct contact with the unthread. In the case of roller screws, the rollers rather than the nut are in direct contact with the screw thread offering greater efficiency. There are three types of manufacturing process for a screw, either rolled, ground or machined using a whirling process. Power Jacks employs all methods in the manufacture of our lead screws. Lead screws are used in a very broad range of applications, sold as individual products or incorporated into screw jacks and electro-mechanical actuators. As with screw

jacks, Industrial Automation, Medical, Defense and Transport applications are particularly popular lead screws. In this mechanism patient are lifted by rotating the thread rod with the help of handle.



Fig2Teastingtheproject

ADVANTAGES, DISADVANTAGES AND APPLICATIONS

Advantages of wheelchair:

Heavyweight scan be accommodated.

Low cost, easily affordable

Width of the wheelchair is high.

Increase in comfort level of the patient.

Prevents further damage to patients and the helper while transferring him/her from chair to bed or vise-versa.

No special training required to operate them

Disadvantages of wheelchair:

The wheelchair is heavy.

Non foldable, requires more space

Heavier in weight as it is made of mild steel body

Less durable as it comes in contact with environmental disorders

Application:

Hospitals and public places

Institutions and office

Industries

Home

METHODOLOGY:

We can see there are variety of wheelchairs available in market for serving disabled people, with a wide range of specifications and applications. For fulfilling this objective we designed some of the parts of wheelchair. Those parts will improve the quality and applications of present wheelchair. This project multipurpose wheel chair In order to enhance the working and comfort level the modifications in wheelchair has been done in this project. In this wheelchair several changes has been done in the seat size and the design from multipurpose wheelchair. In this the size of seat is made of 52 cm *60 cm (length*width). This is done to provide sufficient space because we added some more features in it and all are made according to human comfort. The wheel chair can be used to lift a person and flexible it as bed in case of emergency. If the patient needs to shift to a bed in case of some medical reasons, then one can convert it to a bed by just doing some adjustments. Stud screw helps the scissor unit to move it upwards and down wards. We can use this chair indoors and outdoors. It considers safety in posture change if the patient needs to relax

CONCLUSION:

For caregivers, moving patients from a bed to a wheelchair is a taxing task. We are addressing them in a way that could endanger someone's life since obese paralysed patients are a possibility. According to estimates, a significant majority of caregiver injuries happen when moving patients. Even though there are quite sophisticated tools available, most patients cannot afford them. Therefore, we have developed a cost-effective, three-in-one sophisticated wheelchair with a screw and nut mechanism that is simple to assemble and maintain. When compared to the electrical and manual wheelchairs offered on the international market, the total cost of the versatile wheelchair is quite low. Using the wheelchair will facilitate patients to a far better way. One care taker can easily carry out the patient with no time and reduced complexity. Though our project is less expensive, it does not compromise with the service provided by the conventional equipment. This equipment can be used in the hospitals, old age homes as well as in houses. The upper frame of wheelchair can be raised to a distance of more than 40cm with help of scissor lift. The linear upward motion is achieved through screw nut mechanism. For this input rotational motion is given through the one handle provided at the top. It has additional daily life usages like commode chair etc. There are several modifications that can be done on the wheelchair one of which is the using a screw thread of higher pitch which could help reduce number of rotation given on the handle as input. Hence the product have yet still more modification to be done which significantly helps the patients.

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