

# Walk On Wheels

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**Abstract**— Individual who use wheelchairs often use them for the purpose of transportation only and they struggle allot due to the fixed height of the chair. They cannot reach the different heights of computer table, door lock or any other things such as using a rack etc. We have designed a wheelchair in which the height is adjustable and a common known fact that those individuals have to depend on others for using toilets but in our model the easy accessibility of toilets is also ensured. The main advantage of our concept is the full process is a mechanical and no need of batteries circuits. Our major aim is to ensure better living and quality life of people living in rural and urban areas with a modified technology in a cost effective manner.

## I INTRODUCTION

Wheel chairs are used to transport a physically disabled person from one place to another informally they are considered as a part of that physically disabled individual. In India only half if the physically disabled person get the wheel chairs offered by government and others lack the knowledge how to be provided with the wheel chairs and those who have their wheel chair. As per Census 2011, there are over 27 million (2.7 Crore) people with disabilities out of which 5.4 million or 5.4 million (54, 36,826) have disability in movement in India. Given the poverty distribution in India, only a small fraction of these have access to Wheelchairs. According to the post published on Financial Express on 06 August 2012: "The market for wheelchairs in India is estimated to be 120,000 units worth USD 15 million, growing at rate of 10 per cent over last three year".

PS: we've already submitted an RTI request to Department of Empowerment of Persons with Disabilities (Ministry of Social Justice & Empowerment) for information if they have any kind of raw or approximate data about this. I'll keep this updated about any information I get about this. UPDATE: we've received the response to my RTI from CPIO. Besides public domain, there is not much information available with CPIO under census 2011 as well. My RTI request is now forwarded to Ministry of Home Affairs. I'll keep this updated about any information I get on this. So, for now, one can only estimate about this. Proportionally, about 1.5% to 3% of locomotive disabled people in India are wheelchair users i.e. around 80,000 - 1, 60,000, but there are nearly 50 lakh physically disabled peoples in India according to the data of the year 2011. This clearly represents the lack of

Although government provides sufficient fund for getting the needed particulars for the individual they lack the knowledge of buying wheel chair. And for those who use wheelchairs have only a very much less accessibility to their daily life progress

## II THE PROBLEMS FACED BY THE DISABLED

[2] Its not normally easy to survive a disabled person. They face a lot of problems in their daily life. Among them some of very silly or weird problems and some are bad which hurt the person's feelings. Older buildings with small doorways or corridors. Most parking lots are very difficult to manoeuvre through. Simple things like shopping, visiting friends or relatives become a really difficult and complex task very quickly. Uneven and rough terrains especially with sloping ground make moving manual wheelchairs almost impossible. Public transit. Getting on and off a bus that is equipped with wheelchair equipment can be tedious and time consuming and that is for the ones that do have the equipment. It will be impossible otherwise. Accessing different levels of the transit system especially if there are no elevators or if they are not working. You might easily Walk over the gap getting on a train or sub way but for a wheelchair user crossing that gap can be very tricky and there is always the fear of getting your wheels stuck!

Wheelchair users don't have a choice but to sit which can present the problems of muscle cramps and pressure sores. Either affliction can be a great source of discomfort. Since Commode Wheelchairs are below the normal or expected line of vision, motorist, pedestrians and other road users can present a danger if they don't see the wheelchair user quick enough to react. This almost blind spot has caused many accidents involving wheelchair on the street and sidewalks. The last and probably the biggest challenge is the attitude of society to wheelchair users. Those without physical disabilities might find it difficult to see through the eyes of a wheelchair user. Some typical reactions to wheelchair users include being talked down to, being totally ignored or thinking that the wheelchair user can do more for him or herself. Here are some of the typical daily challenges faced by wheelchair users:

1. Having filthy hands all the time by moving the wheels manually.
2. And never being able to see themselves in the mirror.
3. Realizing that public transport doesn't cater to disabled people at all.
4. And buses are not any easier. They are constantly waiting to find out whether the wheelchair ramp actually works.



5. And they are always faced with the decision of whether they should give up the space on the bus for a pram.
6. Having to confront people who wrongly park in disabled parking spaces.
7. And getting dirty looks whenever they pull into wheelchair parking spaces.
8. People staring at them when they're doing really boring things, like getting petrol.
9. Having to reassure people that they are OK all the damn time.
10. Dealing silly questions like "Do you have a job?"
11. Being constantly nervous that their wheelchair is going to tip over.
12. Trying to let people know that they are more than just spokes 'n' wheels.

**Why the wheelchairs are designed with accessibility features?**

In India, the usage of the wheel chair is in a very less number and the knowledge about the wheel chair is also very less. According to the above given data if Indian government provides sufficient wheelchairs with accessibility to the affected individuals their quality of life can be increased. Along with this the number of educated people who are physically disabled in movement ranges from 52.5% to 54.2%. The educated people or the students struggle a lot during their day to day activities due to the fixed height nonadjustable wheel chairs. The basic manual wheelchair has been around for decades and includes the base components of a seat, back, and leg/footrest on four wheels. The standard manual wheelchair is heavy and offers minimal adjustments for comfort.

It is a basic mobility device and the least expensive wheelchair. Lightweight high-strength wheelchairs can be adjusted to create a tilt in the wheelchair for improving posture. Adjustable ultra-light wheelchairs increase the ease of propulsion and lower the centre of gravity. They are the most expensive manual wheelchairs. For easy accessibility of toilets the introduction of a holed seat can be a solution by this the gifted can use the toilets without depending on others to help them and the main advantage is the health of the disabled both mental and physical will be ensured.

**Does our country has sufficient technology for the production of new wheelchairs?**

Yes, of course we have sufficient technology and materials to provide new wheelchairs for the gifted citizens. There are more than 20 wheel chair manufacturers in our country and tender can be released for the manufacturing and production of the new model wheel chairs. According to the statistics there are more than 20 manufacturing industries and 100 branches of the respected throughout the country. The initial production would be around 10 lakh wheelchairs and can be distributed throughout the country.

**III HYPOTHESIS**

**What is it like to be in a wheel chair? [By a user]**

It's bittersweet.  
Positives first, as always!  
I can do wheelies. (Do I need to explain?)  
I can run over people "by accident". I'm really sly, aren't I?  
I get to work out my upper body by pushing myself. Probably more than I used to, before I became wheelchair bound.  
I get to cut in line, because I'm in a wheelchair. Who gets to ride roller coasters first? ME! YES BITCHES, ME! I don't have to wait in line, so SUCK IT! (Seriously, I go-kart and ride roller coasters, even though I'm paralyzed).  
Emotionally, I have a lot of people who look up to me, because I'm so happy and positive even though I can't walk, who said it's the end?

**IV THE NEGATIVES**

[3] Particularly in India, people take me for granted. They think of me as "poor little Viral, she's on a wheelchair, she's going to be easy". What do I mean by easy? I mean to get in my pants, easy. I've had so many men try and flirt with me. Don't get me wrong, I'm a flirtatious person and I like flirting. After a little bit, they'd start talking about sex and all the dirty things they'd like to do to me. Why? Seriously, why? Do I look easy to you? Am I wearing a sign that says "Come have sex with me, I'm paralyzed and easy"? Emotionally, no guy ever wanted me, romantically or to fall in love with me. They thought that dating someone in a wheelchair is hard stuff.

Why on earth would someone date a girl or boy whose wheelchair bound? It's honestly not that hard. I got used a lot. This is related to my wheelchair, I suppose. Just because I can't walk, people would ignore me when making plans to go dancing or maybe even just go for coffee. The place probably isn't accessible or they think, what would a girl who can't walk do when we go clubbing or dancing? Honestly, I dance better than you, and I'm only moving my upper body. Some places in India aren't accessible. Do the politicians give a damn about accessibility for handicaps? No. There is a compartment in the local train for handicaps but there isn't a ramp or any sort for wheelchair bound people to get in, at least none that I know of.

In India, locals stare at handicaps. Are we a circus act? Is it wrong or taboo to see a gang of us at malls? But then again, there are a lot of nice people too. It goes both ways. People also don't think that I'm capable of doing anything, other than being a pretty face, mainly because I'm on a wheelchair. I've achieved more than them, while sitting in one chair for eight years. There are some surfaces that are hard to travel on. For instance, loosely packed dirt, snow, and sand. It's really hard for someone to push the wheelchair in the particular surface, let alone me. There are different types of wheelchairs that are available to help with such things.

Another thing that I initially didn't mention is urinary and bowel issues. Some people with neurological problems are



faced with difficulties to use the bathroom because they lack sensation or muscle strength to control such issues. I, myself, use a catheter for my bladder, so I don't have to worry about going to the bathroom in inaccessible places, especially in India. I guess this is a downside of being in a wheelchair, as well as having a neurological problem. Being wheelchair bound is definitely a challenge and something one has to deal with, it does not mean accepting the condition you're in. If I did that, I wouldn't be here typing this, or I wouldn't have been so positive and happy throughout these eight years. Accepting myself in a wheelchair is considered a failure to me, I view this wheelchair as a challenge for me to get out of it and do well for the people who deserve it. More than anything, I do believe that living life in a wheelchair is difficult but not impossible. A positive attitude and a smile through tough situations is needed and definitely encouraged. I believe that a handicapped or disabled person is NOT disabled or handicapped. Disabled or handicapped are sociopaths, psychopaths, murders, rapists, and/or people who lack sympathy, empathy, courage, love, sensitivity, and passion.

#### **What if the wheelchair fails?**

The proposed model is was adapted from the company called elevation and they are manufacturing this model since the year 2012. If failure occurs it would be only because of the usage of wrong material or wrong calculation etc. There are several causes for the failure of wheelchairs. Wheelchairs for Indian rural areas would be a challenge, the People from villages have poor roads non-sized homes and toilet facility has become a day dream for them. Thanks for the Indian government for initiating swach bearcat act nearly 70% of Indian rural area now have toilets and the special part is that there are toilets for disabled too for their ease of use.

#### **How can be the failures prevented?**

Following wheelchair safety tips are crucial if you want to get the most out of your independence and enjoy a lifestyle on the go. Correct usage, handling and upkeep of your mobility chair are vital to your safety and warding off accidental injury.[4]

#### **Wheelchair Safety Guidelines**

Always maintain your center-of-gravity while sitting down or moving around in your wheelchair. Use a positioning belt if one is available. Day-to-day actions will call for you to move in and out of your wheelchair, stretch for things, and bend forward. For wheelchair safety, rehearse carrying out these movements in someone's presence before trying them independently. Always use the wheel locks or brakes and keep a secure, well-balanced seat position when you reach, stretch, or bend forward.

Never bend over between your knees or move forward in your seat to pick up anything. Before trying to traverse ramps, slopes, inclines or declines, find out what you are capable of by first practicing with someone. Never try going up a steep slope alone. Prior to crossing a pathway, road

or sidewalk, search for unequal surfaces, spills, holes or obstructions prior to going forward NOT try going up a curb or tipping your wheelchair without the aid of an attendant. It is usually safer to go around a curb rather than try to go up it. Seek out a close by ramp, curb cut or elevator. With a power wheelchair, set the speed so that it does not exceed a speed that you can handle, especially when reversing. A few more quick safety tips for power wheelchairs – keep power OFF before transferring, using a ramp or lift. You don't want to accidentally bump the joy stick in that position.

#### **Wheelchair Transportation Safety Tips**

If you stay in your wheelchair while traveling in a vehicle, make sure that it has a "transport safe" tag. A transport safe label assures that the wheelchair has gone through numerous crash tests and can resist a 30mph impact. While in transit, wheelchair users must use a tie-down system to fasten the wheelchair to the floor of the vehicle. An occupant restraint system, which is different from a positioning belt, must be employed to lessen the risk of harm during a collision.

#### **V WHEELCHAIR MAINTENANCE**

[5] Maintain your wheelchair in good shape for optimal safety. Check the brakes often to ensure that they are not lax and are able to keep the chair in position on an incline.

If the wheel locks don't move easily on a manual wheelchair, lubricate them until they can easily lock and unlock. Check the front and back wheels of a manual wheelchair to make sure they turn without sticking and that the bearings are not making any noises. A simple test you can use to see if your wheelchair is properly aligned is to push it across a flat smooth floor. If it goes straight you are ok, if not your wheels are probably out of alignment or the bearings need replacing.

What are the other benefits of the new wheelchair model?

When you're In a Wheelchair: 5 Health Issues You Want to avoid

When you're in a wheelchair, it's important to look after your overall health. Getting around can be hard enough. You don't want to have to contend with any secondary health conditions. Here are five potential risks to your health that you should guard against.

**Weight gain:** Although many manual wheelchair users gain upper-body strength, other wheelchair users become more sedentary because of the nature of their injury. If you have a spinal cord injury, it's likely that the muscle mass below your injury has decreased, and the fat has increased. Your metabolism has slowed, and it's much easier to put on weight. Weight gain, however, can make it harder to move and increase joint pain and the likelihood of developing pressure sores. Talk with your health-care professional about an eating plan that will help you avoid weight gain.

**Diabetes:** If you put on weight — or become obese — your likelihood of developing diabetes rises dramatically. This is partly because the way your body processes insulin has changed.



Your injury might mask some of the symptoms, such as increased thirst and excessive urination. It's important to see your doctor regularly for blood-insulin testing, and if you do develop diabetes, follow your doctor's instructions to the letter.

**Bone and joint pain:** Manual wheelchair users are susceptible to shoulder pain, rotator-cuff injury and stress on their extremities. Muscle tightness can develop in front of the shoulders, and opposing muscles can become longer and weaker. Work with your physical therapist to avoid these problems.

**Pressure sores:** Loss of muscle tone and diminished circulation can cause pressure sores to develop. Examine your skin regularly to spot any developing sores, and treat them quickly and daily until they are gone.

**Cardiovascular disease:** Wheelchair users who are overweight are at an increased risk of developing heart problems. Again, a healthy eating plan is essential.

In our new model the individual can improve their health by the elevation process done. The elevation process helps them to elevate and stretch their limbs and have a world out too. This will also mentally affect their health as they get a positive thinking that they need no external help by their friends or any other for doing daily works. They can take the juice bottle kept inside the refrigerator in a height and they can reach the switches, can lock the doors and can do many other things.

## VI METHODOLOGY AND CONCLUSION:

We are adopting the concept of the pneumatic gas cylinders used in office chair and the mechanism is same as the mechanism of the office chair. The office chair consist of a gas pneumatic cylinder which expands when the lever fitted at the bottom is pulled and the chair is elevated. The same is done in the wheel chair.

The 'pneumatic' is given to any office chair that is height adjustable using a lever underneath the seat. They are found in many workplaces because having an adjustable height is considered to be an ergonomic feature. Have you ever wondered, however, how the chair is able to move up and down in such a fluid motion at just the touch of a lever? There are a number of components that make up a pneumatic chair. These include: the base (which usually consists of three, four or five wheels), a gas cylinder (which stores the compressed air and is fitted with a telescopic cover), a seat (which is fitted with a plate that holds the adjustable lever), and the padded back support. Essentially, a pneumatic office chair is built around a single acting cylinder (a spring that has been filled with air). The air chamber in this cylinder is connected to a piston that, when activated by someone pushing the lever, moves into the chamber. This action further compresses the air inside the chamber, resulting in a lifting motion that allows the seat to rise. When the piston Moved further out of the

chamber, it expands the air inside and allows the seat to lower.



The next time you need to adjust the height of your pneumatic office chairs, pay close attention at the way in which it is able to lift you up and down. If the chair is struggling to lift you to your desired height or is grinding as it slowly lowers, it may need some special attention to oil it back into optimal working condition.

The same way we are going to elevate the wheelchair also but in this we are going to use 2 pneumatic cylinder each at the diagonal of seat and the foot roster. The two cylinders are connected with the single lever which will be used for the elevation operations and for the back holder we are going to attach a parallel pneumatic cylinder which is fixed below the seat. Here we use a y shaped girder instead of square girder as shown in the figure. The centre of gravity does not change for the varying elevation. The angle of setup is 30 degree and it in this angle the centre of gravity does not change and the balance issues won't arise.

Most important of all is the length of the cylinder we are going to use it depends upon the diagonal length of the lower part of the wheel chair. The weight bearing capacity of the wheel chair with pneumatic cylinder is as same as the normal one as we use the office chair in a way such that the whole weight of the body acts on the extended pneumatic cylinder and it has the capacity to bear the load applied on it. The load bearing capacity varies from cylinder to cylinder and it depends upon the size and diameter of the cylinder we are going to use. Talking about the dimensions of a wheel chair they vary from brand to brand and model to model so the dimensions can't be specified as they are. About the production cost the normal cost of the normal wheel chairs are generally Rs.2500 to Rs.3500 and their online rate is from Rs.3000. The modifications of the normal wheel chair will estimate a cost of Rs.800 to Rs.900

## VII ACCESSIBLE TOILETS:

It's a known fact that without someone's help the disabled cannot use toilets which is a very big issue. This will can also be considered as a major problem because one cannot depend on others for even going for toilets and if one does with his own effort they have to struggle a lot for accessing it. In our model we have added some simple features with which they can access the toilets without the help of others. In our model we

have added a hole in the middle back of the seat of the wheelchair which can be used during the use of toilets and it can be covered using a leather sheet or cushions. As seen in the picture the eccentric hole is made and it won't affect the design of the wheel chair as it is in the backside of the base and pneumatic cylinders should be fitted in the corner slab as if they don't interfere in the middle portion. The cylinders can be placed very next to the wheels by this they won't interfere in the process or the design this system is very cheap and costs only about 250 to 300 rupees.



### VIII CONCLUSION

The Ultimate aim of this project is to make the life of the disabled easy and accessible. They're mental peace and physical health will be nourished by our project. This will help them in bringing their day to day life challenges into day to day activities. The total cost of the wheel chair will estimate from Rs.3000 to Rs.4500 and this will ensure the well living of the gifted and especially in India the citizens will be very much helpful by this model. This project is to prove that everyone one are equal and each has their rights to get his benefits completely.

### REFERENCE

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