

## CHAIRLESS CHAIR

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**Abstract:** - The 'chair less chair exoskeleton system' is a hydraulic-based exoskeleton support that is essentially a 'chair' that functions as an exoskeleton and allows users to walk or move at a set speed while working. It's a mechanical ergonomics device based on the structure and function of the human body, with segments and joints that correspond to those of the person with whom it's externally connected. This support assists users in relaxing their leg muscles by directing their weight to a changeable damper linked to the frame, which then transfers the weight to the ground. This exoskeleton device is designed to work in conjunction with the human lower extremities and to operate in sync with the human realises. It is made up of two similar 'supports,' one on each leg of the wearer. To engage the damper that supports the body weight, simply bend the knees to a comfortable stance. The entire weight of this exoskeleton chair is low, so the wearer is not overburdened. The lower body support provided by the exoskeleton is only for comfort.

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### I INTRODUCTION

The globe is becoming increasingly confined. With the advancement of technology, it has become critical to ensure that the most commonly used gadgets are likewise compact and tiny in size, making something like a "Exoskeleton based hydraulic support," a "Wearable Chair," or a "Chairless Chair" a need. People whose current job needs them to stand for long periods of time would benefit from this exoskeleton-based assistance. The pain in the thighs and back will be relieved by this new and improved "chair." It's especially useful for senior assembly line workers and military personnel who don't always have the option of pulling a chair to rest on the go!

### II PROJECT METHODOLOGY

The present case study or project aims to design and develop a lower body exoskeleton. Usually in production line, the workers are standing while doing their work. This cause them a several fatigues on their back. So, our group has design and developed a chair-less chair which the workers can sit freely whenever they feel tired and still can do their work while sitting. This lower body of exoskeleton is not being well known yet and majority from the existing chair-less chair is made of mild steel which is very heavy. Therefore, we decided to use Iron. Besides that, it also can be securely welded. We also use strap in order to tighten between our legs to the simp-chair (exoskeleton). Other than that, other equipment that we use to make this simp-chair are rivet, shaft, nut, bolt, whereas, for machine we are using drilling machine, grinding machine and arc welding machine.

### III MATERIAL USED

SR. NO	PARTICULAR	QUANTITY
1	SHOCK ABSORBER	2
2	CYLINDER ROD	2
3	CURVED SUPPORT	2
4	BELT	1
5	NUT	2
6	GALVANIZED SHEET	4

#### 1. SHOCK ABSORBER: -

A shock can be a hydraulic or hydraulic device that absorbs and dampens shock waves. This is accomplished by converting the shock's K.E. into a kind of energy (usually heat) that is subsequently dispersed. The majority of shock absorbers are dashpots (a damper that resists motion via viscous friction). Hydraulic shock is commonly used for couching.

#### 2. METAL ROD: -

Metal rods are metals and alloys that are shaped like round bars or rods, rectangular or flat bars, square bars, hexagons, or other bar stock designs. These forms are also available in billet form, with a cross-section that is based on the shape of rod or bar material. Reinforcing bars are a form of metal rod that is used to provide strength and support to concrete and masonry buildings from within. Coil stock and hollow tube stock are two different types of metal rods. To alter the height of our project, we linked rods together.

### 3. CURVED SUPPORT:-

Curved support is the part used for overall support and to give stability for our body weight. It also gives stability to project.

### 4.SIEMENS SHOCK ABSORBER [WASHING MACHINE]:-

This component maintain distance between leg and chair less chair exoskeleton mechanism.

### 5.GALVANIZED SHEET;-

The underlying iron or steel is protected by galvanising in the following ways: When the zinc coating is intact, it prevents corrosive chemicals from accessing the steel or iron beneath. Application of chromates over zinc is also considered as an industrial trend, as zinc protects iron by corroding first for better results.



### IV ADVANTAGES

The main advantage of this chair less is that it is portable. It can be carried anywhere easily by keeping in a bag. The user can even walk to some distance chair less chair attached to their legs. So that the user doesn't need to detach the exoskeleton every time he moves from one place to another. In addition, our prototype offer user to comfort themselves with three levels of degree depending on their comfort level. This can help user to do their work with high serenity compared to chair with constant degree because some work not require the user to be seated but if its prototype had both benefits and disadvantages. As can be seen, the advantage of this chair less chair is it still can be carrying anywhere although user might find it difficult to move with the chair attached on their leg. But



our concern when design this chair is to reduce muscle cramp due to standing for a long time so, we expected the user will only move in short distance. Next, it is proven to be suitable with any range of height because the dimension that were used has consider the average height of Asian people.

1. It is automatic.
2. It is power less
3. Provides maximum comfort.
4. It will light in weight
5. Compact in size and portable

### V CONCLUSION

The chairless chair has been developed and assembled successfully. The goal of this project was to build a small model to demonstrate how the system works, and it was accomplished effectively. In this project, a lower extremity exoskeleton mechanism is created to support human walking, sitting, and standing motions in a synchronous manner, as well as to carry a considerable percentage of the user's external load. Once this is accomplished, exoskeletons may become more feasible and begin to appear in ordinary life after some improvements.

The goal of this project is to create an external skeletal system for the lower body that will support sitting and partial standing postures. Future work will concentrate on making the design lighter and employing high-grade materials to achieve better strength while reducing the size and weight. The design must be implemented and tested in a real-world setting, and the effectiveness in everyday circumstances must be assessed.

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