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A Review on Chairless Chair

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ABSTRACT -a chairless chair is exoskeleton leg that look nothing like a chair and it allows the user to rest on it wherever and whenever the user wants. People who are working in industries or standing in assembly line for long hours develop stress and fatigues. Due to this there occurs physical problems such as back pain, lower body pain, limbs, head and shoulder. As a result of this his efficiency is reduced and the production rate is decreased. Its intended use is in the manufacturing sector. With the chairless chair the user can walk with the fitting and can move anywhere. The main aim is to reduce the workers fatigues and work related accident while increasing productivity and efficiency. Space management is an important factor for any industry and unnecessary chair and resting place can be avoided by the use of this chairless chair and the saved space can be used for other purposes.

KEYWORDS- exoskeleton, chairless chair, Ergonomics, pressurised damper

1. INTRODUCTION

This concept was first created by Zurich-based start-up noonee and was developed at NCCR robotics lab at engineering university. This concept of Chairless chair is very innovative as it allows the user to sit wherever he wants and at the same time it does not occupies any extra space in the workplace. The Chairless chair is mainly designed for industrial workers for which prime objective is to increase workers health and increasing production. This Chairless chair does not takes much space and which results in saving workspace. The device is very simple and easy to carry. A belt secures it to the leg and it has strap that wraps the thighs. The damper supports the bodyweight which is directed towards shoes. The main aim of this Chairless chair is to provide a relax environment to the user.

There are mainly three steps involved in developing a product into reality. They are design, fabrication and analysis by satisfying these criteria exoskeleton have designed, manufactured, analyzed, with modeling software Like Solidworks, 3-Axis Computer Numerical Control (CNC) - Vertical Milling Centre (VCM) for fabrication, Ansys professional for analysis. The exoskeleton is fabricated using low cost, high strength, light in weight aluminum alloy (T6) 6082. A locking mechanism is used to regular interval of angles for every 30 degree to 180 degree and it's also designed with slots by adjustable mechanism. Also to damp the load a pressurized pneumatically actuated damper is fitted.

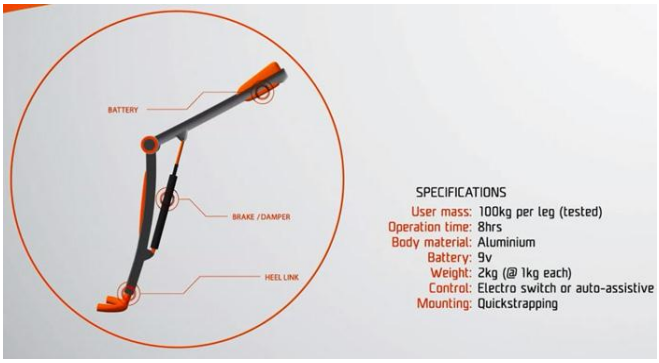


Fig 1: noonee Chairless chair version 1.0

Fig 2: noonee Chairless chair version 2.

2. SIGNIFICANCE OF DESIGN

Chairless chair are used for walking, standing and doing work and confident enough that you will not fall.

1. Lightweight aluminium alloy T6- 6082
2. Piston and damper mechanism for smooth sliding
3. Ergonomics
4. Belt and buckle
5. Exoskeleton frame

6. Hexagonal nuts and bolts

3. DESIGN METHODOLOGY

The exoskeleton leg was designed in SolidWorks software. Here all parts are sketched, modelled and assembled with the motion study and mechanism.

A. Top links

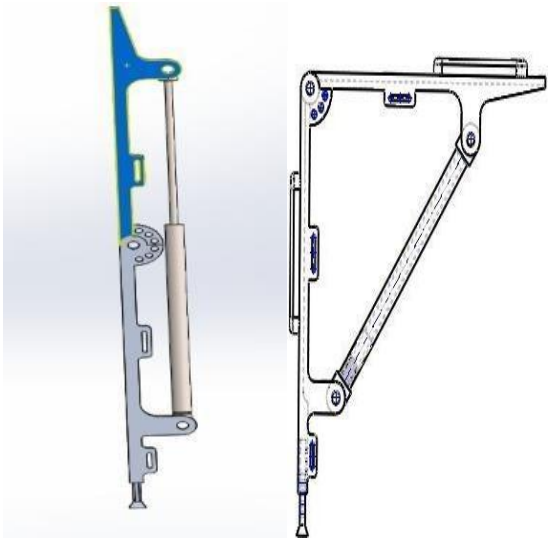
B. bottom link

C. damper top

D. damper bottom

E. hexagonal nut and bolt

4. ASSEMBLY OF EXOSKELETON



5. MATERIAL SELECTION

For the exoskeleton leg we selected a lighter, stronger and flexible material. Here we have selected aluminum alloy 6082. This alloy gives good characteristic, machinability, brazeability and corrosion resistance.

6. ADVANTAGES

1. Reduces physical strain
2. Provide comfortable work environment
3. Create a condition to increase efficiency and productivity
4. Adapt to different shape and size of safety shoes

CONCLUSION

The exoskeleton does not consumes any power for its operation. This device is eco-friendly as it does not pollute the environment. This Chairless is light in weight, mobile & reliable, easy to carry and does not require any extra space. The future work will concentrate more on making it lighter in weight and more compact.

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