

Design and Fabrication of a light weight portable carrier

Shivam Sudarshan Verma^a

Vivek Srivastava^b

Vikas Chauhan^b

Avinash Chauhan^b

Ranjeet Rai^b

Assistant Professor^a and Research Scholar^b

School of Mechanical Engineering

Lovely Professional University

Phagwara, Punjab

ABSTRACT

This project aims at developing a carrier for easy transportation of heavy loads. The need for such a system arises from day-to-day requirements in our society. Devices such as portable carriers are used to relieve the stress when lifting the materials and also, we have minimized to carry the carrier which is foldable and can be carried easily also without any extra effort.

Smart carts aren't smart without reason! The adjective has been well thought of before being put as a prefix for something that is basic utility. These are very easy to move around. A clever-piece of furniture, smart rolling carts can be shifted from one room to another without any kind of trouble. Rolling carts can also be taken along to shopping malls for carrying around the new purchases. They can contain all the weight, as well as transport it from one place to another place.

1. INTRODUCTION

In order to lift heavy loads in industries a small transport device is used called portable carrier. When used properly, carrier can protect people from injuries and other health problems that can result from moving heavy loads and eliminate the problem of carry trolley because it can be carry on back as a bag or in hand simply.

In presence of different types of carrier in market, we have a problem of carrying it. It is a typical task to carry our carriers. So, this work minimizes the problem of carrying it and develop a new concept of Smart Portable carrier. It minimizes this kind of problem because by this concept we have built a special carrier which is portable and having arrangement to minimize and maximize the size according to our needs. During carrying materials we can maximize its size and after it we compress it in small size and put it on our back or easily carry in our hand like a bag.

This project possesses these all types of special characteristics which allow it to make useful

- In industries for carrying different materials like in small scale industries. To carry the boxes and

packets of different materials

- In commercial uses like in houses to carry cylinders, grain sack.
- To carry sports kit of sport men/women or different types of similar task can be easily done very frequently in our day to day life.

2. DESIGN & FABRICATION

Carrier body material

The carrier body (or frame) is a system that is used to support other components of a system. The material which was used is Aluminum. It is because of the fact that that aluminum has low density which results in low weight of the system. It is also a widely used metal in the world. It can provide better strength, superior malleability, lower exposure to the corrosion, etc. Moreover, it also very easy to recycle.

Mild Steel material is used to assemble the frame at lower end near shelf and wheels and also provide the strengthen the body of portable carrier and make ease to carry load without any damage. we use it due to favorable properties. Cheap and malleable mild steel is having low tensile strength. Although it has a promising hardness but it can also be increased through carburizing.

For the aluminum material and static load condition, we assume factor of safety is 1.5

Applied load = 40 kg

Factor of safety = failure load/working load

Hence,

Failure load = $1.5 \times 40 \text{ kg} = 60 \text{ kg}$

It is clear that upto 60 kg of load can be easily sustain by it and upto this load our design is safe and beyond this it may be break.

$$F \times X = W \times Y \quad F = W \times Y / X$$



Figure 1 Final product opened



Figure 2 Final product closed

3. CONCLUSION

According to need of modern society and industrial demands to carry material with less effort and easily portable carrier, this project can fulfill wish of all to carry the materials and then easily carry the carrier used for carrying purpose. Due to light weight, easily foldable like properties make it very suitable for use in industrial work, commercial work and we can say anywhere us at which we need a carrier to easily carry our things.

The major advantage is its less cost which make it easily accessible for almost every people who want it and make their task of carrying materials or objects along with carriers.

REFERENCES

- [1] Sam D. Herbert, Andrew Drenner, and Nikolaos Papanikolopoulos, "Loper: A Quadruped-Hybrid Stair Climbing Robot", *University of Minnesota, MN 55455 2008, IEEE International Conference on Robotics and Automation Pasadena, CA, USA, pp.19-23, 2008.*
- [2] Mourikis, A.I., Trawny, N., Roumeliotis, S.I., Helmick, D.M., and Matthies, L., 2007, "Autonomous StairClimbing for Tracked Vehicles," *International Journal of Computer Vision & International Journal of Robotics Research - Joint Special Issue on Vision and Robotics, 26(7), pp.737-758.*
- [3] Hsueh-Er, C., "Stair climbing vehicle", 2008, Patent No. US2008164665 (A1), Jan 24.
- [4] A.F. Hoermann. "Feasibility analysis of a design for a stair-climbing wheelchair". *Department of Mechanical Engineering, Massachusetts Institute of Technology, June 1997.*
- [5] Lawn, Murray J., and Takakazu Ishimatsu. "Modeling of a stair-climbing wheelchair mechanism with high single-step capability." *IEEE Transactions on Neural Systems and Rehabilitation Engineering, 2003 pp. 323-332.*

- [6] S. Hirose, K. Yoneda; "Toward Development of Practical Quadruped Walking Vehicles," *Journal of Robotics and Mechatronics Vol. 6*, pp.498-504, 1993.
- [7] P. Wellman, W. Krovi, V. Kuma, W. Harwin, "Design of a Wheelchair with Legs for People with Motor Disabilities," in *IEEE Trans. Rehab. Eng.*, vol. 3, pp. 343-353, 1995.
- [8] M. Lawn, T. Sakai, M. Kuroiwa, T. Ishimatsu, "Development and practical application of a stairclimbing wheelchair in Nagasaki," *Journal of HWRS-ERC, Int. Journal of Human-friendly Welfare Robotic Systems*, pp. 33-39, 2001.
- [9] R. Misawa, Japan Patent 8-286753, Oct. 29, 1996.
- [10] R. Misawa, US Patent 6,158,536, Dec. 12, 2000.

