

HOZHONI CLEANING CREW DEVICE

Hasan Aldhefeery, Fahad Alaenezi, Hussain Alwateeb, Amber Juare, Calvin Schnorbus

Department of Mechanical Engineering, Northern Arizona University

Abstract

A wheelchair is designed to be undemanding, comfortable and easily modified in order to cater to individual users, some challenges exist when a user is engaging in certain activities, like those at The Hozhoni Foundation (THF). THF provides residential care and services that enhance the quality of life, self-sufficiency, dignity and self-respect of the individuals they serve. The main concern for THF is to create a system that allows wheelchair users to efficiently carry and organize the necessary cleaning supplies [1]. This device must be adaptable for various types and styles of wheelchairs while maintaining a lightweight and detachable system from the operator. It is also important that users who do not use wheelchairs benefit from this device. The goal of the team is to create a system that can be easily manufactured by someone with limited construction resources and can accommodate as many users as possible.

Background

The cleaning crew at THF find trouble transporting cleaning equipment around the facility. The main concern for THF is to create a system that allows wheelchair users to efficiently carry and organize the necessary supplies. The users also include individuals with mental disabilities and persons who cannot lift heavy loads.

Project goals

This device must ensure:

- Adaptability amongst any user - Affordability for all facilitators
- Limited weight stress on user - Durability for long term service
- Portability in service & storage - Safety while in operation
- Ease of assembly with a simplistic design

Engineering Design

Final Design

The box attaches to the black belt through velcro (Figure1).



Figure 1: Portable box

Engineering Requirements

Table 1:Engineering Requirements

Table 1: Engineering Requirements			
Engineering Requirement	Target	Actual	Pass/Fail
Weight of device	7 lbs	4.85lb	Pass
Size(width)	5-10 in	6.18in	Pass
Size (Length)	15 in	16.125in	Pass
Cost (Final Device)	\$200	\$80.85	Pass
Storage Size	0.25-0.5ft ³	0.28ft ³	Pass
Lifespan	5 years	N/A	N/A
Weight Capacity	15 lbs	<15lb	Pass

Conclusion

The lap organizer satisfies all customer requirements and engineering requirements. These requirements although adjusted through the design process by consumer, the client and users are gratified with the benefits this assistive device brings.

Final Design

The final design includes:

- Aluminum belt encased in synthetic polymer material; lap belt detaches with velcro strips
- Panels easily secured by method of dovetail joints
- Waterproof paint was used to paint the box
- Future alternative methods would increase comfort of device

References

[1] Hozhoni Foundation. (2001). Mission statement. [Online].

Acknowledgement

Project Sponsor: The Hozhoni Foundation

Faculty Advisor: Dr. Sarah Oman

Sponsor Mentor: Dr.Sarah Oman

Instructor: David Trevas