

Hozhoni Garden Device

NORTHERN
ARIZONA
UNIVERSITY®



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Team 13

Introduction

TO: Uphold the values and mission statement of our client

BY: Developing a device for people with disabilities to use in a garden setting.



Fig 1: Hozhoni Foundation logo

Project Problem

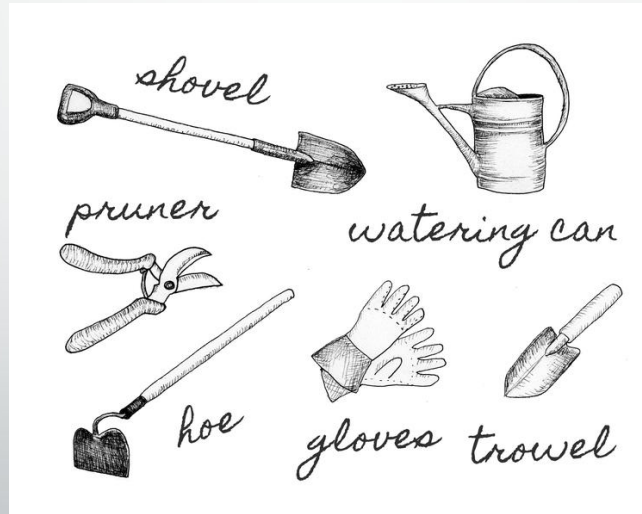
Current Problems:

The Current devices at The Hozhoni Foundation are basic and not comfortable for the people with disabilities

Team Mission:

Create a Garden Device:

1. Comfortable
2. Easy to use
3. Safe



Project Requirements

Open-endedness of problem statement meant team spent extra time creating list of requirements.

- **User safety**
- **User Comfort**
- **Low manufacturing cost**
- **Accomplish at least 1 common gardening task**

Each requirement was then quantified into more traditional engineering terms

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Project Specifications

Table 1: Engineering Requirements

Engineering requirement	Target	Rationale
Minimum edge thickness	= > 0.25 Inches	To allow for effective grabbing of larger objects
Design's weight	< = 25lbs	To allow for ease of lifting and moving it around
Reach	5 feet	To maximize on the reaching out distance between the user and items
Maximum noise	< = 60 decibels	To avoid disturbance while in use
Cost of manufacturing	< = \$400	To allow for affordability and reduced maintenance costs
Maximum dimensions for the design	2ft by 3	For effective storage
Least possible force	< = 5lbs	To allow for ease of use
Assembly time	< = 5mins	To reduce complication and waste of time

Design Solution

Goal : Create a final Design that satisfies the mentioned needs

Final Device :

Two components :

1. Main Device
2. Stand



Fig 2 : Main Device



Fig. 3 : Stand

Design Solution

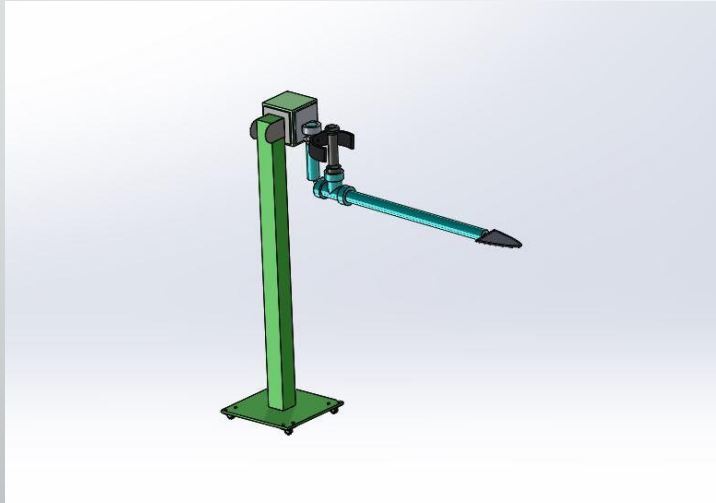


Fig 4 : Final Design Created by
SolidWorks



Fig 5: Main Device attached on Stand

Ahmad Alkhezzi

Additional Alternative Designs

As an extra effort the team decided to build “easy to make” devices that can be used by the people that are at the Hozhoni Foundation



Fig 6: Long-Reach Rake



Fig 7: Long-Reach Digger

Manufacturing

Manufacturing Procedure:

- Most of the project is made of wood.
- Moveable stand.
- More free angle.
- Arm support and pads.
- Painting.

Mobarak Alqenaei



Fig 5: Main Device attached on Stand

Manufacturing

Manufacturing Procedure:

- Easy to build and made.
- Light weight.
- Comfortable Handle.
- Arm support.
- Safety.



Fig 6: Long-Reach Rake

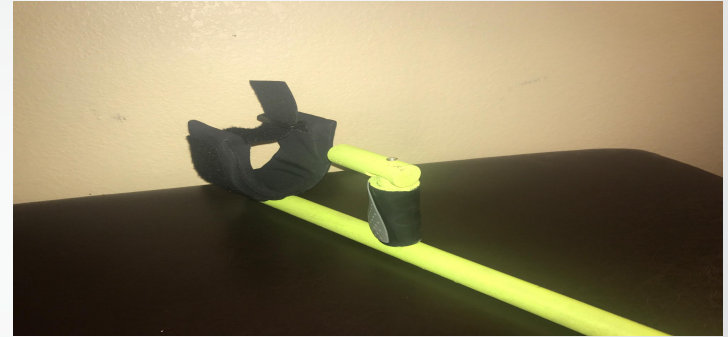


Fig 8: Arm-Support



Fig 7: Long-Reach Digger

Final Product Testing

Testing Procedure:

- Area measurements.
- Choosing different costumers.
- Testing and taking notes.



Fig 9 : Garden 1

Height: 25.5 in

Length: 59 in



Fig 10: Garden 2

Max Height: 23.5 in

Midpoint : 55 in

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Final Product Testing



Fig's 11,12,13 : Final Product Testing

Testing Proof



Budget

The given budget is \$1500.

Product	Cost
Alpha prototype (Cardboard)	\$5
Beta Prototype (PVC)	\$30
Primary Devices	\$225
Total	\$260



Bill Of Materials (items that we used)

Product	Quantity	Cost	Provider
Fiberboard	1	\$10.48	Home Depot
1.38in*1.38in Wood Cube	1	\$5.46	Home Depot
2 in*2in*35in redwood Square end	1	\$4.67	HomeCo
2 in. Soft Rubber Swivel Plate Caster	4	\$17.92	Home Depot
5/16in*4in Power lag Screw	1	\$0.59	Home Depot
1-1/4 in Flat head screw (5 pieces)	4	\$6.72	Home Depot
1in PVC T shape	2	\$6.43	Home Depot
Crutcheze Pads	1	\$29.99	Amazon
Crutcheze Replacement Parts	1	\$10.70	Amazon
Garden Tools	3	\$17.39	HomeCo
Gorilla Glue	1	\$6.77	Home Depot
3/4in * 35in wood shaft.	2	\$17.56	HomeCo
1/2 in * 35 in wood shaft	2	\$14.42	HomeCo
2-1/2in Soft Rubber Swivel Plate Caster	2	\$13.74	Home Depot
18in*18in1816in cardboard box	1	\$2.16	Home Depot
1/8in*4in STD Screwdriver	1	\$4.49	Home Depot
6in Duct Clamp	1	\$3.87	Home Depot
4in PVC Drain Coupling	1	\$5.36	Home Depot
1in PVC Lock * 1in MDP Adapter	1	\$2.87	Home Depot
3/4in PVC Running trap	1	\$2.79	Home Depot
1-1/4*2 in PVC pipe	1	\$1.74	Home Depot
1-1/4*1 in PVC Bushing	1	\$3.61	Home Depot
Painter's Touch Paint	2	\$9.74	Home Depot
Total		\$208.47	

Saad Alajmi

Conclusion

- Team Goal.
- Project Requirements.
- Problems that we faced.



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Questions?

