

Portable Recliner



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Outline



- Problem Statement
- Client Background Information
- Design Specifications and Existing Products
- Recliner Components
- Design Alternatives and Matrix
- Future Work

Problem Statement



Often, handicapped people require a mechanized recliner to sleep in, but devices available are **too heavy and cumbersome** to be used when traveling. The device created needs to be **light** enough and **small** enough to be transported in the **trunk of a car**, while being **comfortable enough to sleep in** and **strong enough to be sat in** for a long duration of time. The device must also be able to be **controlled to lower down into prone position** and to be able to **lift the user to a standing position.**

Client Background



- Client sleeps in reclining chair
- Needs assistance to sit, stand
- Would like to be able to travel and maintain quality of life

Design Specifications



- Able to allow individual 1.75 m to sit or lay comfortably
- Able to support 136 kg
- Is comfortable; can be slept in:
 - Able to recline to prone
 - Should contain a footrest
- Collapsible; fit in the trunk of a car(<0.4 cubic meters)
- Able to lift the individual sitting in it to a standing position

Existing Products



- Home-use mechanical recliner
- Collapsible hospital sleepers
- Portable cushion lift systems



(1)



(2)



(3)

Recliner Components



- Reclining Mechanism
 - Pneumatic and torsional spring
- Standing Mechanism
 - Current product with pneumatic lift
- Leg type
 - Detachable
- Cushion
 - Removable
- Footrest
 - Torsional spring



(4)



(5)

Design Option #1: Slider



- **Pros:**

- Suits client needs
- Well suited for sleeping

- **Cons:**

- Difficult to use/assemble
- Portability concerns
- Durable and sturdy in any position



Design Option #2: Beach Chair

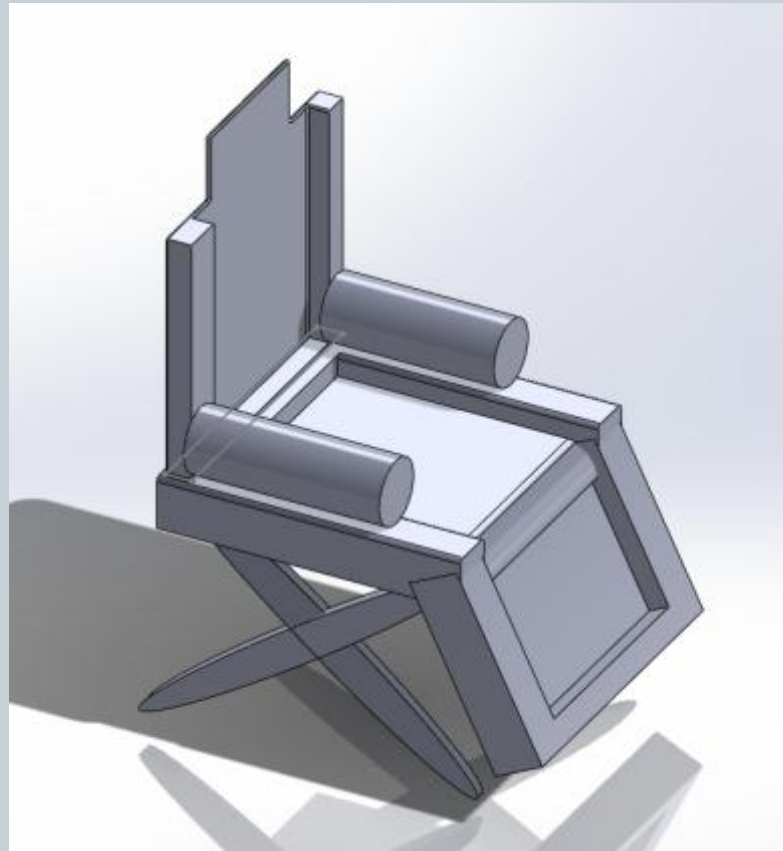


- **Pros:**

- Lightweight
- Compact
- More portable

- **Cons:**

- Less stable
- Less durable
- Safety concerns with pinching and springs releasing



Design Option #3: Lazyboy

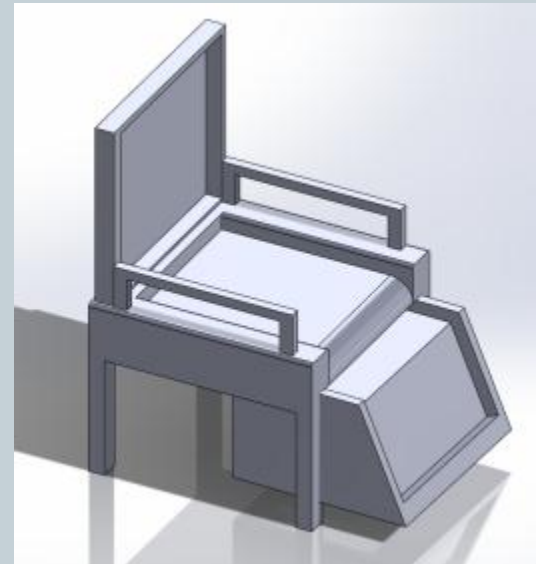


- **Pros:**

- Easy to use
- Durable and stable
- Well suited for sitting for long periods of time

- **Cons:**

- Difficult to construct
- Concerns about pneumatic system for laying
- Weight and compactness concerns



Design Matrix

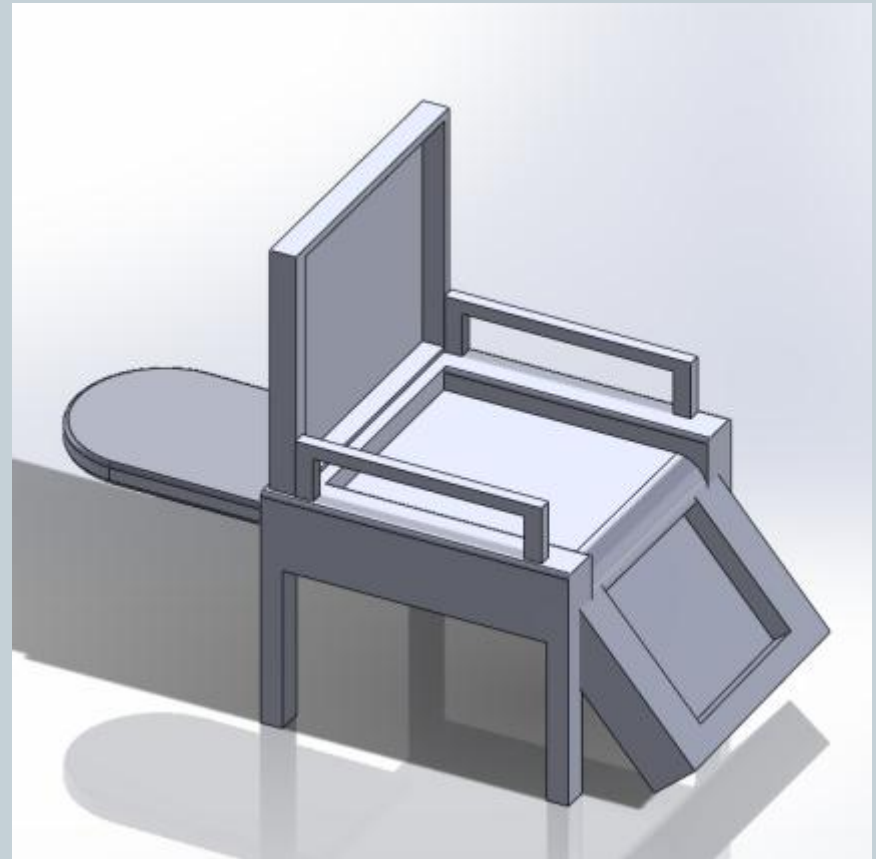


		Slider		Lazy Boy		Beach Chair	
	Weight	Grade	W.Grade	Grade	W. Grade	Grade	W. Grade
Comfort	0.2	6	1.2	7	1.4	6	1.2
Ease of Use	0.15	5	0.75	6	0.9	7	1.05
Compact	0.1	7	0.7	5	0.5	7	0.7
Client Satisfaction	0.15	8	1.2	5	0.75	3	0.45
Weight	0.1	7	0.7	4	0.4	7	0.7
Feasibility of Construction	0.1	7	0.7	6	0.6	7	0.7
Assembly	0.1	4	0.4	6	0.6	7	0.7
Durability	0.05	6	0.3	7	0.35	3	0.15
Cost	0.05	5	0.25	5	0.25	5	0.25
Total	1		6.2		5.75		5.9

Final Design



- Reclining back with pneumatic
- Footrest with torsional spring
- Recliner stability platform
 - Extra footrests
- Collapsible legs
- Removable cushions



Future Work



- Determine materials needed and order them
- Accurate, fully modeled, and animated Solidworks
- To scale physical models
- Fabricate design
 - Machine shop-bolts and connecting bars
 - Possibly welding
 - Torsion springs
- Product testing
 - Weight
 - Durability
 - Ease of use/ability to compact

Acknowledgements



- Dr. John Puccinelli
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- Meriter Home Health

References

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Questions?

