THE UNIVERSITY of WISCONSIN MADISON

BME 301: Secondary Airline Mobility Device

Secondary Airline Mobility Device

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Team -

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Overview

- Problem Statement
- Background
- Project Design Specifications
  - Prototype
  - Areas of Improvement
- Final Design
  - Semester Plan
- Future Work
- References and Acknowledgments

Problem Statement

- Airline travel is extremely difficult for disabled passengers
- Need to build a device to simplify the overall process and create healthier flying environment for disabled individuals

Background

Common aisle wheelchair

Airline Travel with Wheelchair

- Transfer from passenger's wheelchair to aisle wheelchair
- Transfer from aisle wheelchair to seat
- This is done in reverse when plane lands

Associated Risks

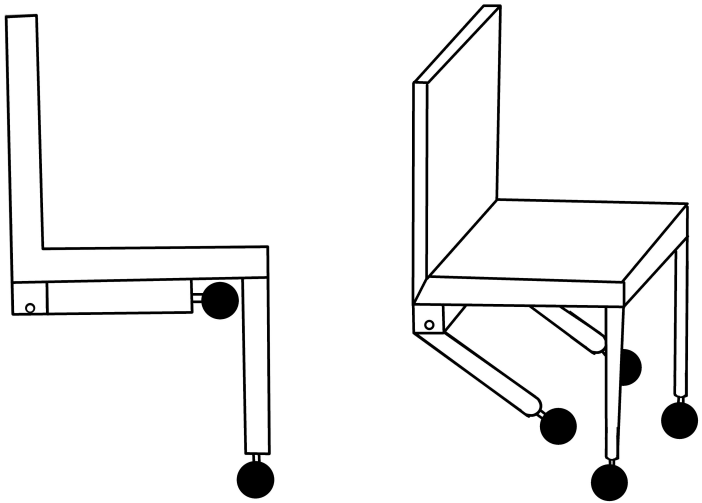
- Damage to passenger's wheelchair in cargo
- Risk of being dropped during any transfer

Product Design Specifications

Design Requirements:

- Minimize number of transfers during boarding process (four currently)
- Foldability/Stowability for when device is not in use
- Proper safety belts/harnesses
- Adhere to current FAA and U.S Access Board Guidelines for Aircraft Boarding Chairs

Prototype Final Design



- Benefits
  - Minimal risk of dropping
  - Simple fabrication and use
  - Easy to explain process
- Concerns
  - Weight bearing properties
  - Stowability

Prototype

Pros:

- Able to support 305 pound load
- Maneuverable
- Met current FAA restrictions

Cons:

- Heavy
- Weak at connections on frame
- Cumbersome locking mechanism
- Lacked safety features
- Not stowable in flight

Our prototype on Mr. Dorszynski's wheelchair

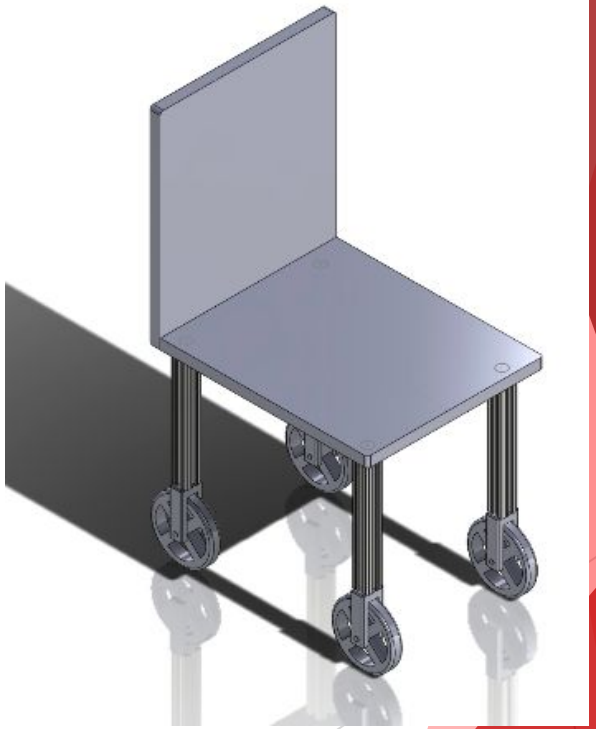
Areas of Improvement

- Improve stowability
- Incorporate locking hinges
- Strengthen frame
- Reduce unnecessary weight
- Add in seat belt
- Modify seat cushion material

[3] Image of MIG welding

Final Design

- Similar to SolidWorks image
- With added features
  - Will be added to SolidWorks for testing



Locking Mechanism

Hinges

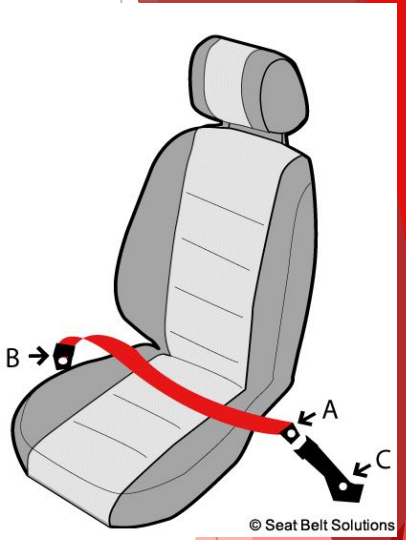
- Will lock in place at 90 degrees.
- Can fold to be flat for maximum stowability.
- Several different hinges are available
  - These can hold 330 pounds maximum
  - Weight distribution
    - Aids with carrying capacity

New Seat

- Will be made like a weight bench.
  - Stiffer Material
  - Slick Surface
- Optimum thickness is 8 cm.

Safety Features

- One lap belt
  - Prevents fall risk
- Footrests on the front legs
  - Prevents feet from contacting ground



Project Schedule

- Week 7: Finalize material choices and construct fabrication plan
- Week 8-9: Fabrication
- Week 11: Complete fabrication and begin testing
- Week 12: Testing
- Week 13: Finalize testing, begin work on final deliverables
- Week 14: Present final design

Future Work

- Obtain ambulance stretcher for leg analysis and mechanism incorporation into back legs
- Research potential for mass production, feasibility
- Mock run-through of use in airport setting

References and Acknowledgements

We would like to thank the following individuals their assistance thus far:

Dr. Ed Bersu

Dan Dorszynski

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Questions?