

**Travel Along Stairs  
by Individuals with Disabilities**

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# Required Equation

- Device = History + (R&D) + Social Policy + Funding + Gadget Tolerance + Building + Individual

# Stairs – E-Z Step

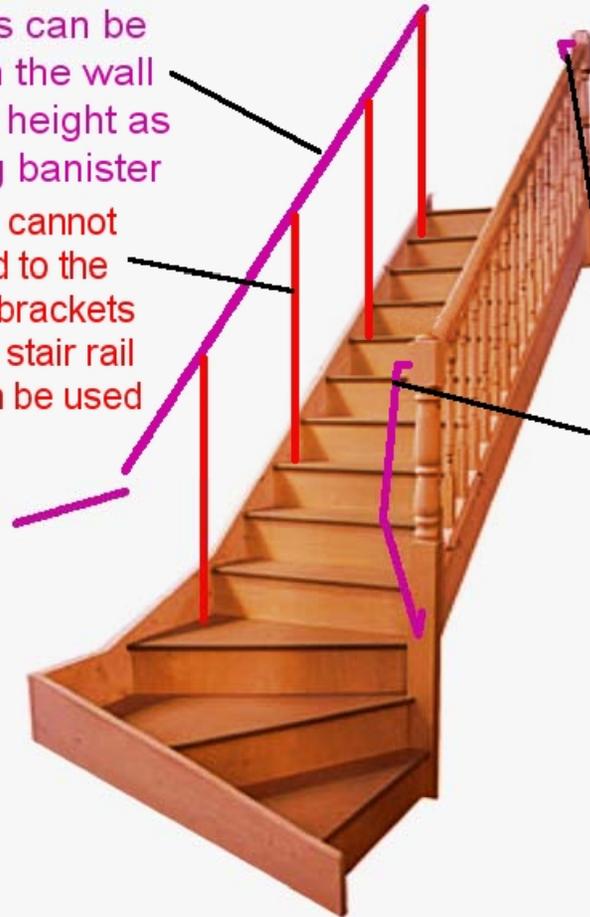


# Handrails

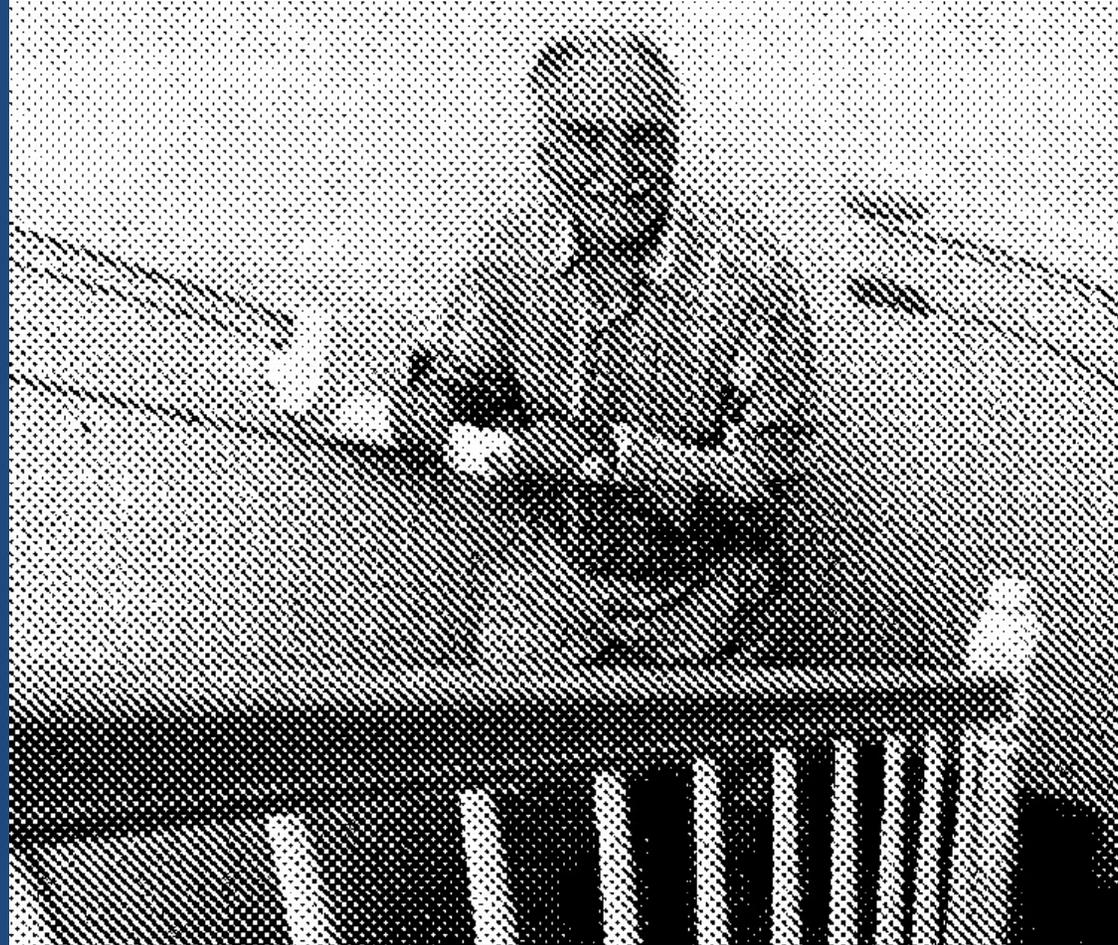
a stair rail/s can be installed on the wall at the same height as the existing banister

if stair rails cannot be attached to the wall with wall brackets then vertical stair rail supports can be used

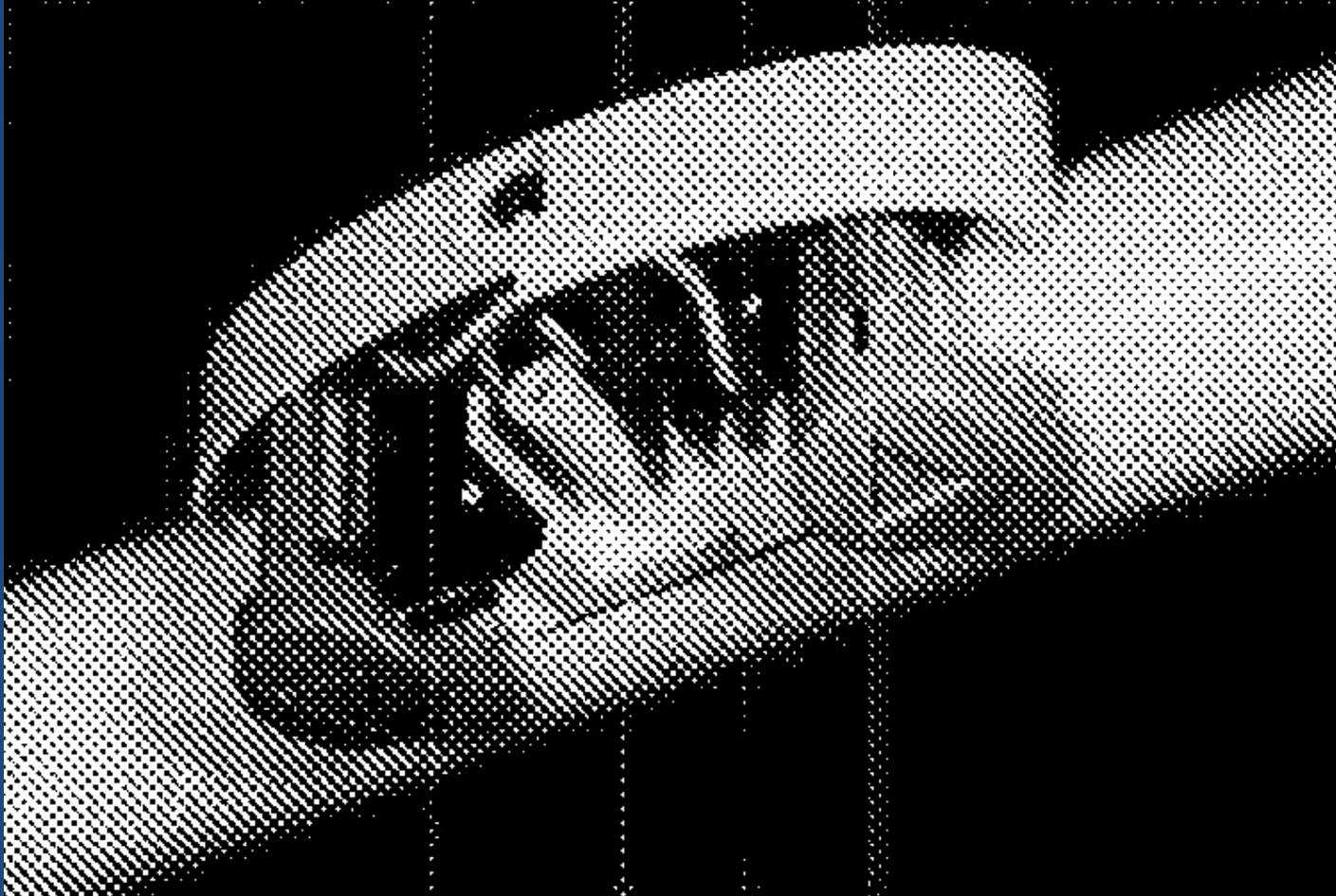
newel rails can be fitted to newel posts



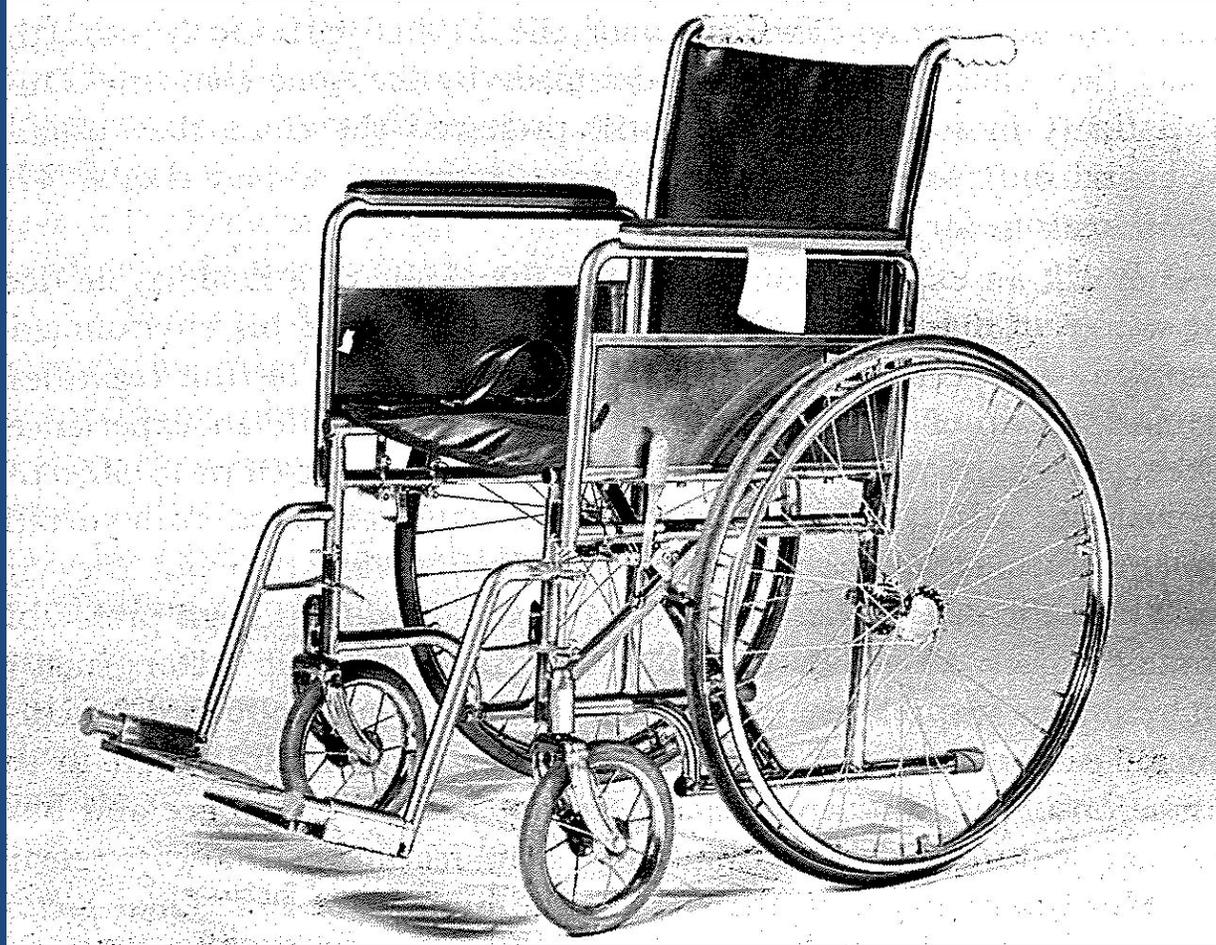
# Powered Grab Bar



# Powered Grab Bar



# Everest & Jennings



# Powered Wheelchairs



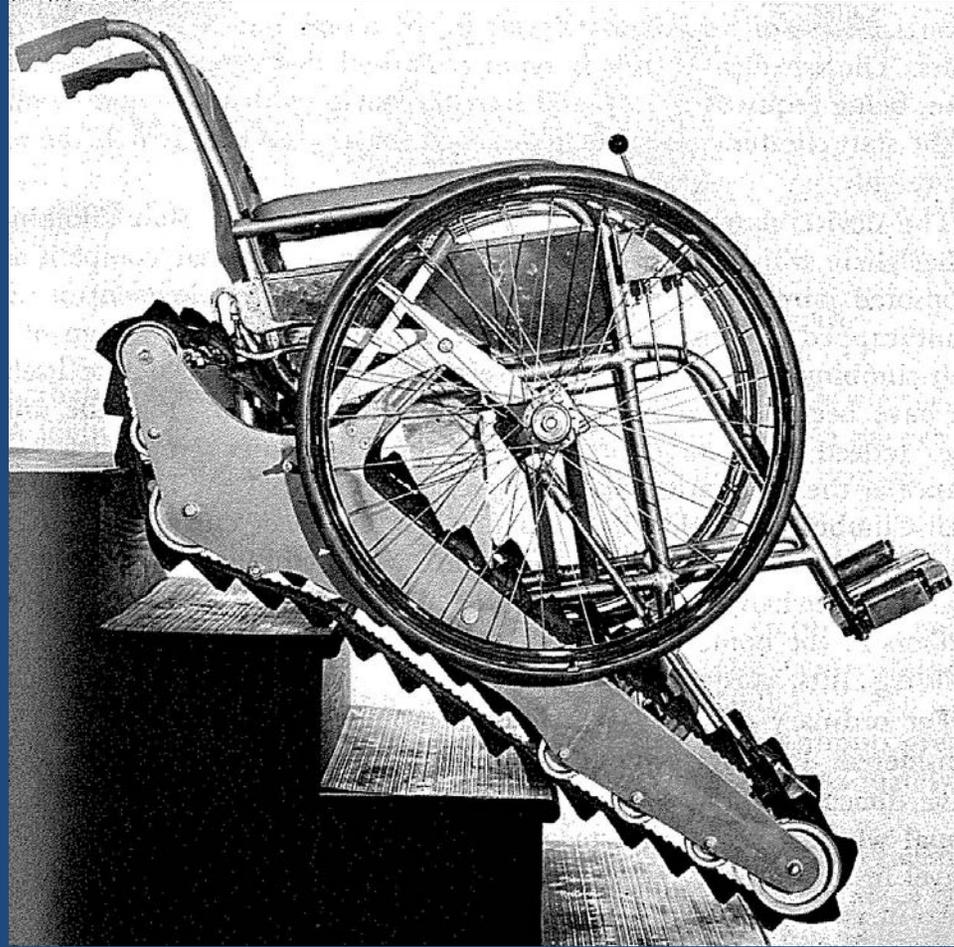
# E & J Traveler 18



# Lincoln Carriage



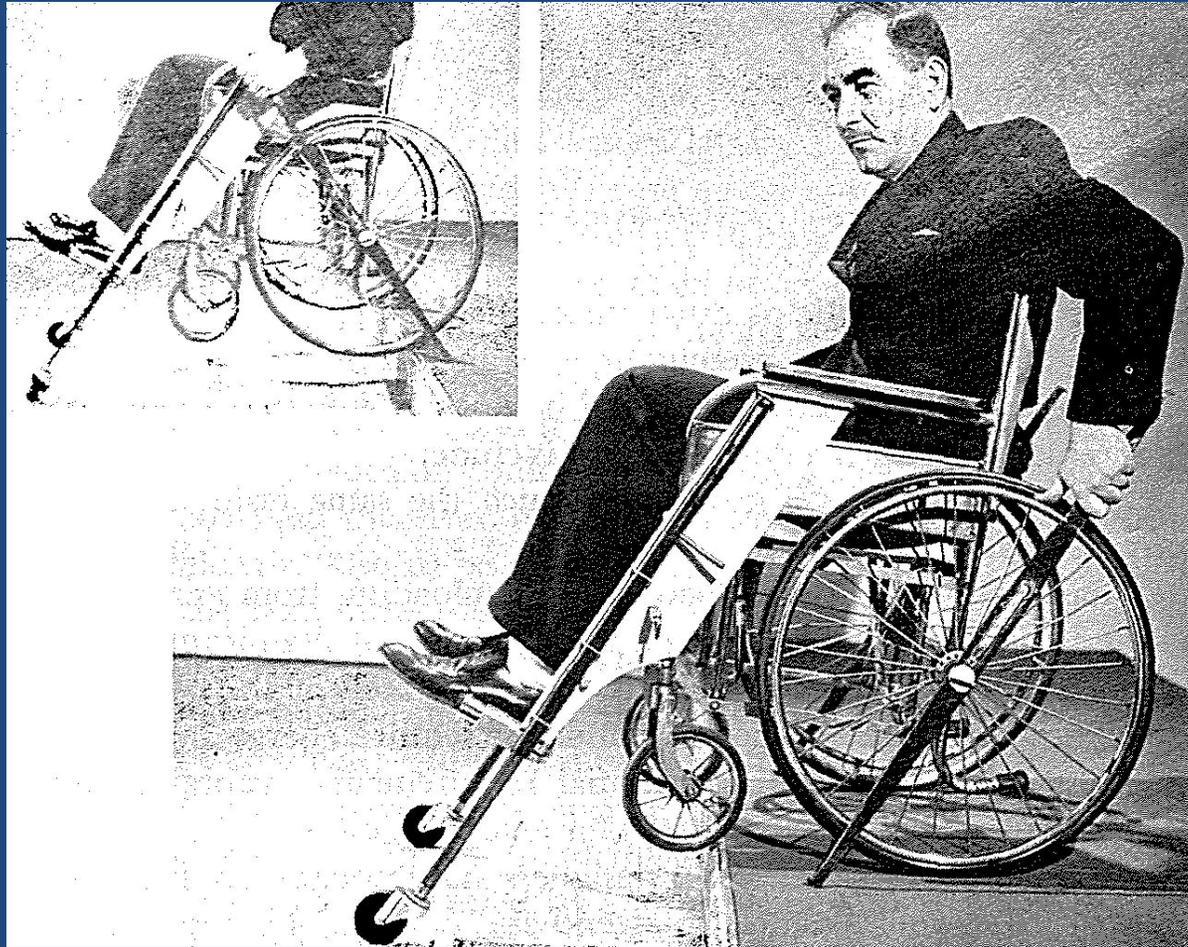
# Project Progress WC



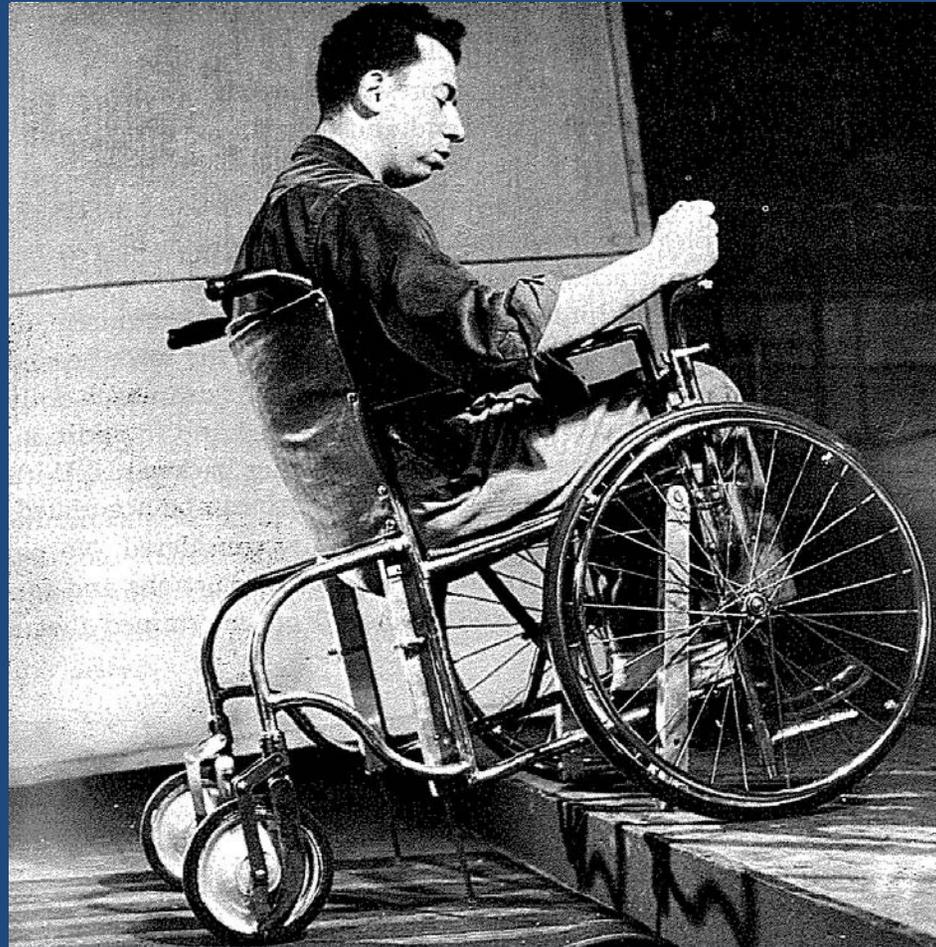
# Hale-Gardener WC



# Curbs & Dropoffs



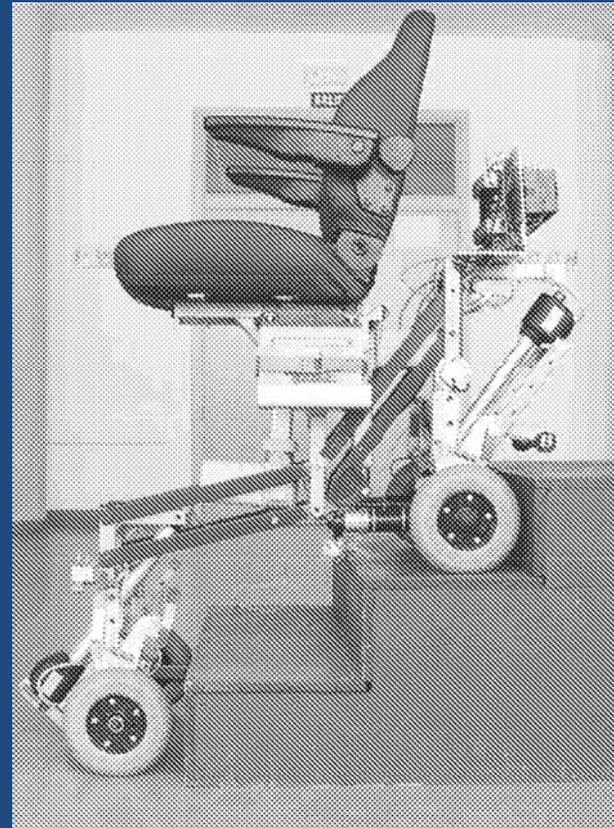
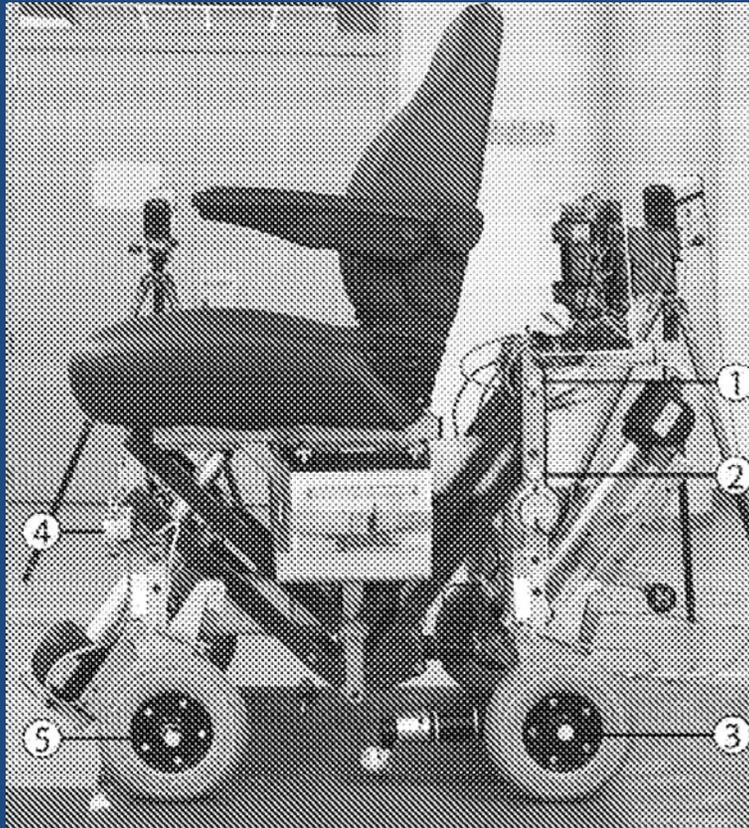
# Curbs & Dropoffs



# Curbs & Dropoffs



# Rodriguez, 2007



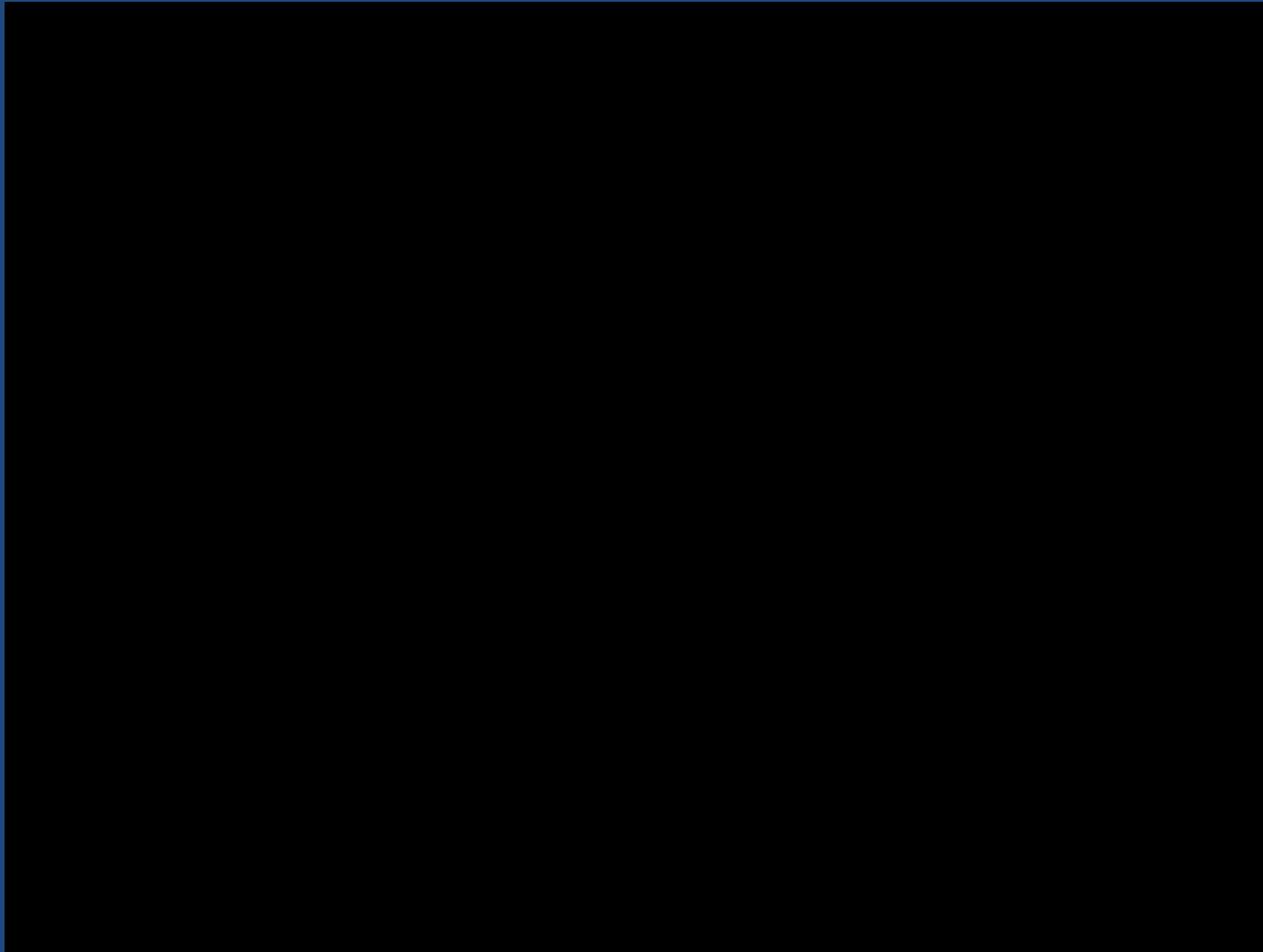
# The “range”



# iBot Wheelchair



# iBot Stairclimbing



# iBot Wheelchair

Applications?

Economics?

Distribution?

Repair?





# Galileo Viper



# Galileo Viper

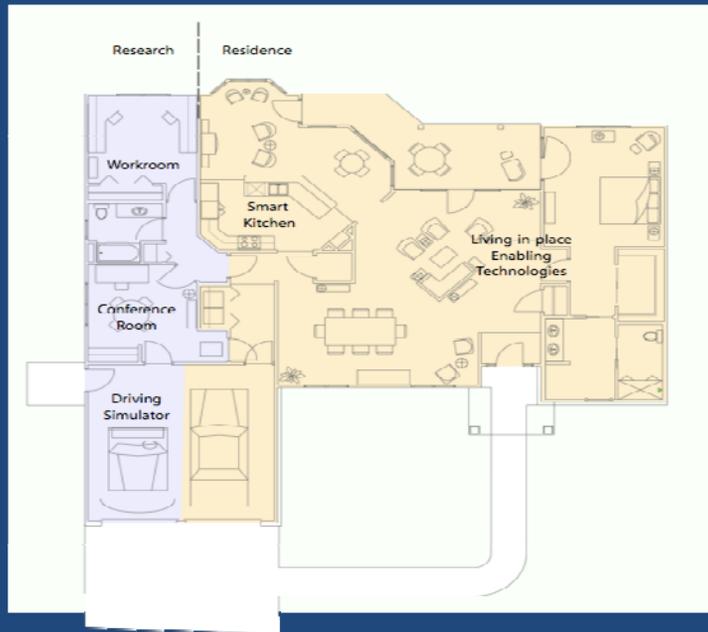


# Home Evacuation



GatorTech Smart House

# Gator Tech Smart House



- Built 2004
- Retirement community on UF campus



CONCEPT PLAN 11/03

M.T.S.

# Secure, powered entrance



# Smart blinds



# Smart floor



# Smart bed



# User-Operated Stair-Climbing Wheelchairs

- ISO 7176-Part 24  
(2005)



# User-Operated Stair-Climbing Wheelchairs

- ISO 7176-Part 24  
(2005)



# Wheelchair Carriers

- ISO 7176-Part 28 (2009)
- Ergonomics introduced
- Reach ranges for individual



# Inclined Stairway Chairlifts

- ASME A18.1-2008
- Min Capacity-  
Anywhere
  - 115kg (250lb)
- Max Speed
  - 0.20m/s (40ft/min)



# Inclined Stairway Chairlifts

- CSA B355
  - Min Capacity  
110kg (243lb)
  - No maximum, but  
increase as  
appropriate
- Max Speed  
0.15m/s (30ft/min)



# Inclined Stairway Chairlifts

- ISO 9386-2 (2000)
- Min Capacity-Public
  - 225kg (496lb)
- Min Capacity-Private
  - 115kg (254lb)
- Max Capacity
  - 350kg (772lb)
- Maximum speed
  - 0.15m/s (30ft/min)



# Inclined Platform Lifts

- ASME A18.1-2008
- Min Capacity-  
Public
  - 200kg (450lb)
- Max Capacity-  
Public
  - 340kg (750lb)
- Max Speed
  - 0.15m/s (30ft/min)



# Inclined Platform Lifts

- ASME A18.1-2008
- Min Capacity-Private
  - 200kg (450lb)
- Max Capacity-Private
  - 320kg (700lb)
- Max Speed
  - 0.15m/s (30ft/min)



# Inclined Platform Lifts

- CSA-B355
- Min Capacity
  - 180kg (397lb)
- Max Capacity
  - None
- Max Speed
  - 0.15m/s (30ft/min)



# Inclined Platform Lifts

- ISO 9386-2 (2000)
- Min Capacity-Public
  - 225kg (496lb)
- Min Capacity-Private
  - 150kg (330lb)
- Max Capacity
  - 350kg (772lb)
- Maximum speed
  - 0.15m/s (30ft/min)



# Evacuation Chairs

- RESNA
- Rehabilitation Engineering & Assistive Technology Society of North America



# Evacuation Chairs

- RESNA
- Assistive  
Technology  
Standards Board
- (ATSB)



# Evacuation Chairs

- RESNA Standards Committee on Emergency Stair Travel Devices used by Individuals with Disabilities

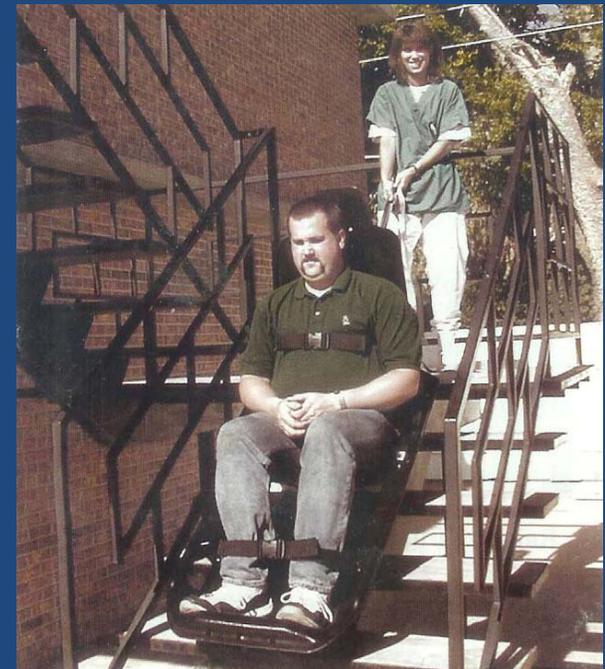


# Evacuation Chairs

- RESNA ESTD
- June 24, 2009



# Evacuation Chair Types



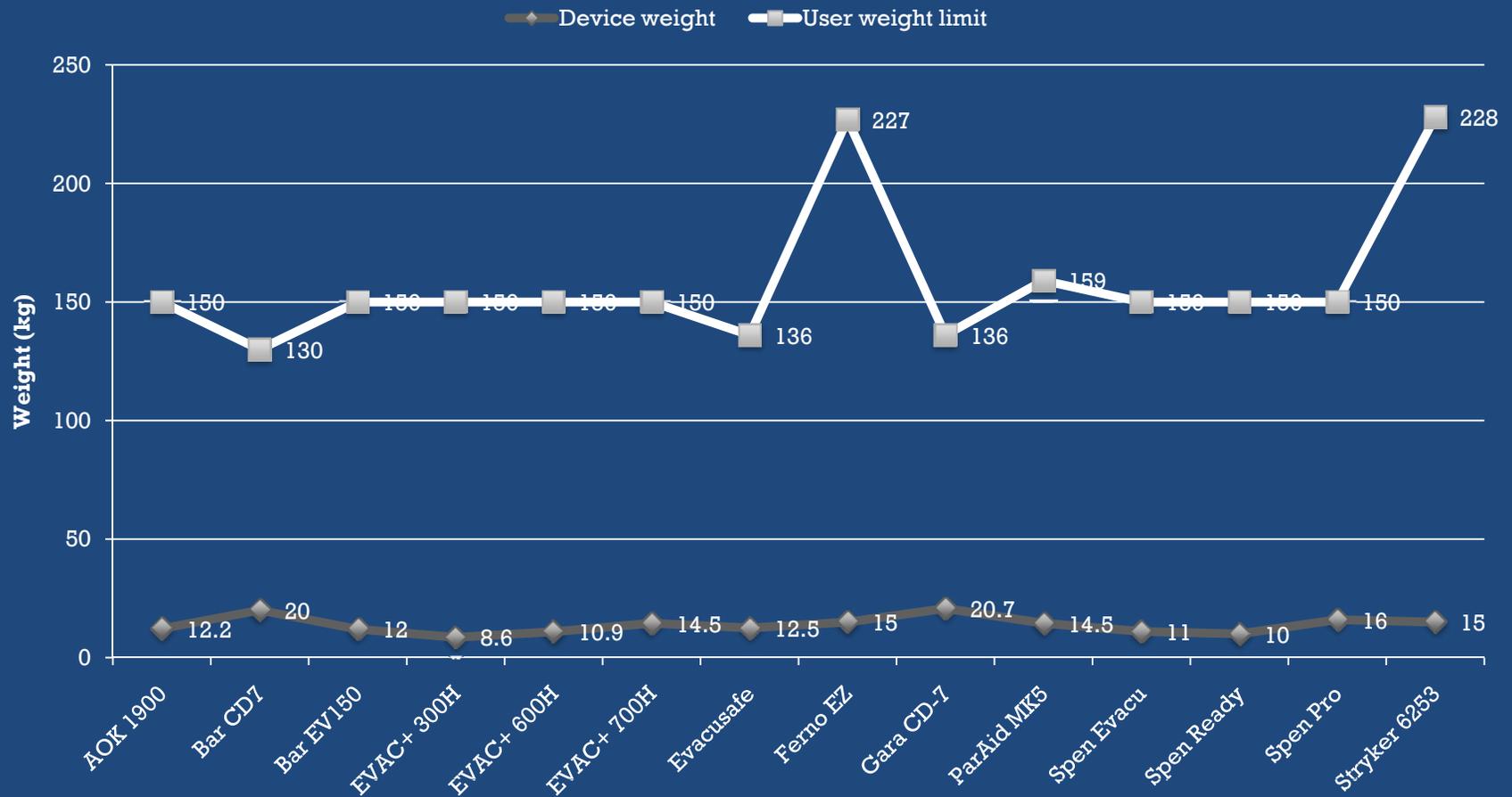
# SDD Track / Belt Design

- 14 of 34 devices
- Speed control
  - Speed governor
  - Friction belt
  - None
- User support limited to belts

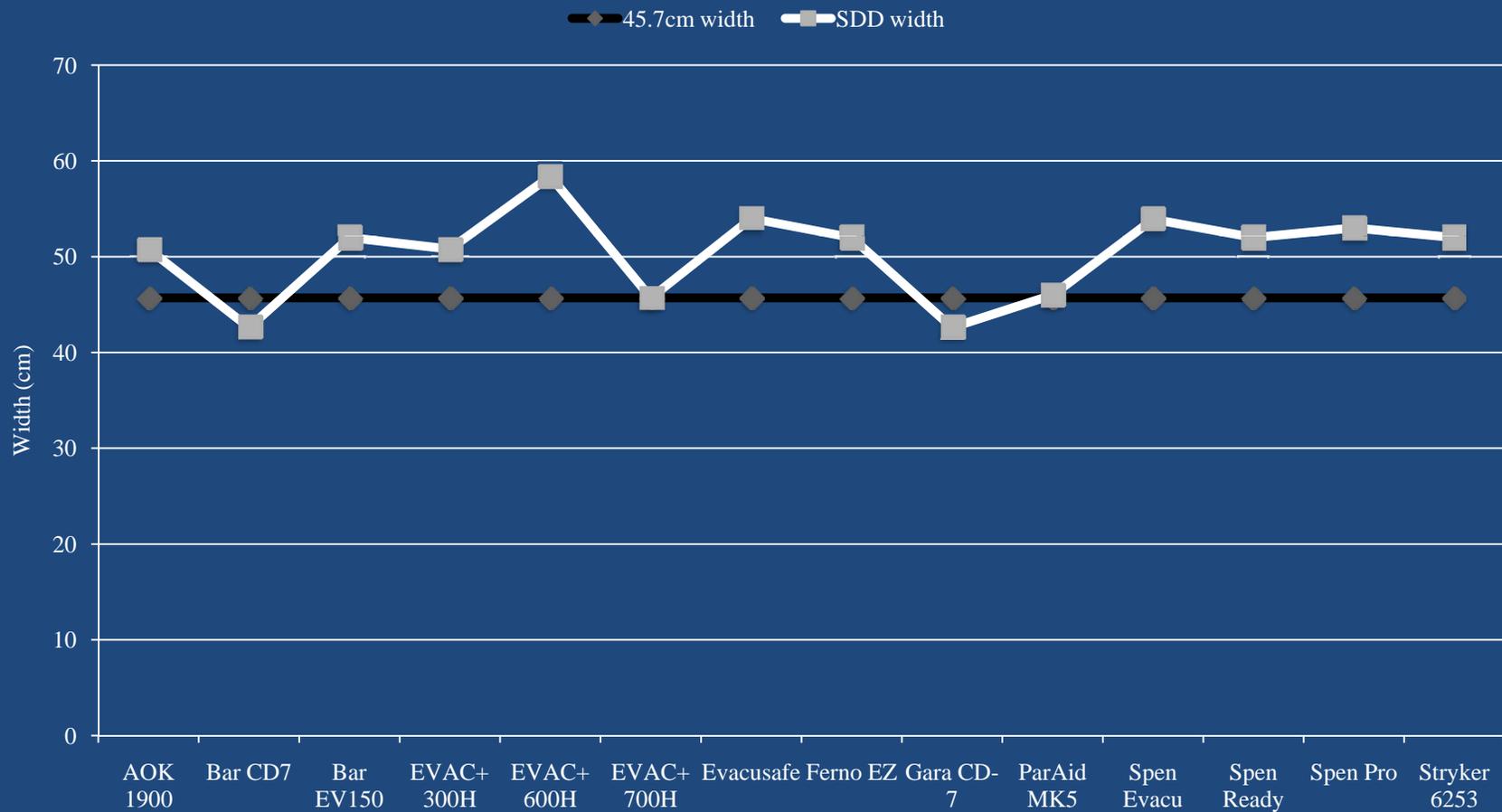


# SDD T/B-type

## Device Weight and User Capacity



# SDD T/B-type Overall Width



# RESNA ESTD

- Scope
  - Emergency use only
  - Stair “travel”
    - Not just “descent”
  - Use exclusive to consumers

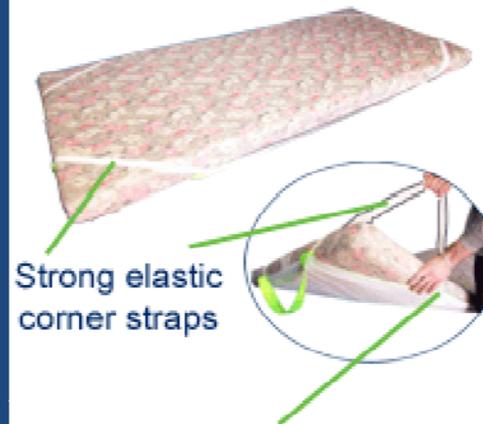
# RESNA ESTD

- Design types included
  - Track / belt
  - Carry
  - Other (e.g., Sled)
  - Environment as criteria?

# RESNA ESTD

Different devices  
for different  
environments?

**Patient Rescue Sheet**  
For emergency evacuation  
of non-ambulant patients.



Strong elastic  
corner straps

If a fire should occur, the  
webbing straps are  
removed from their pockets.



Starting to slide Patient  
Rescue Sheet off bed

# RESNA ESTD

- Consumer perspective
  - Support surfaces
  - Requirements during transfer
  - Straps
  - Additional supports
    - Trunk supports
    - Head supports

# RESNA ESTD

- Assistant perspective
  - Life Safety personnel
  - Novice users
- Features
  - Deployment
  - Set-up
  - Transfer assistance
  - Use along stairway

# RESNA ESTD

- Device performance
  - Weight capacity
  - Speed of travel limitation
  - Durability
    - Loaded condition
      - ISO mannequin
      - Rescue Randy
  - Flammability

# Thanks

