Accessible Weight Scale for Seated Users

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Overview

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- Currently Available Products
- Accessible Weight Scale for Seated Users
  - Elevated Toilet Compartment
  - Posture Support
  - Handheld Console
  - Operation Procedure
- Budget
- Conclusion
- Q & A
Background Information

- Project is funded by RERC-AMI National Student Design Competition
- Clients have limited leg, hand and arm strength; poor eyesight and memory
- Objective
  - Design accessible weight scale that is:
    - Convenient
    - Easy-to-use
    - Easy-to-sanitize
    - Inexpensive
    - Accurate
## Currently Available Products

<table>
<thead>
<tr>
<th>Product</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting Scale (MODEL 6461)</td>
<td>• Inexpensive ($200)</td>
<td>• Capacity 250 lbs</td>
</tr>
<tr>
<td></td>
<td>• Portable</td>
<td>• Accuracy 1 lb</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Display not visible to user</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No foot support</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Does not store readings</td>
</tr>
<tr>
<td>Healthometer Model 595KL Digital Chair Scale</td>
<td>• Capacity 600 lbs</td>
<td>• Expensive ($1,169)</td>
</tr>
<tr>
<td></td>
<td>• Accuracy 0.2 lbs</td>
<td>• Bulky</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Display not visible to user</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Does not store readings</td>
</tr>
<tr>
<td>Detecto Model 6876 Euro Chair Scale w/ Flip-Seat</td>
<td>• Capacity 600 lbs</td>
<td>• Expensive ($1,749)</td>
</tr>
<tr>
<td></td>
<td>• Accuracy 0.2 lbs</td>
<td>• Bulky</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Display not visible to user</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Does not store past readings</td>
</tr>
</tbody>
</table>
Accessible Weight Scale for Seated Users

- Integrated into an elevated toilet seat
- Store previous readings
- Take a reading in under 10 seconds
- Total capacity: 500+ pounds
- Accuracy: 1/5 pound
- Display outputs and prompts visually and audibly
- Easy-to-use
Accessible Weight Scale for Seated Users

- Main components
  - Elevated toilet compartment
  - Toilet seat
  - Handles
  - Adjustable/removable foot support
  - Handheld console
Elevated Toilet Compartment

- Elevates toilet seat 5”
- Made of 2 aluminum alloy plates and solid aluminum rods
- Bemis 500PRO Round Wood Toilet Seat
- Contains slots for foot support
- Houses electrical components
- Communicates wirelessly w/Handheld console
Elevated Toilet Compartment

- 4 Clamp mechanisms hold compartment on toilet
- 3 Load cells held by mounting mechanism

S290 Platform Load Cell

Load Cell mounting mechanism
Posture Support

Monroe: Pull Handles
Material: Fiberglass Reinforced Technopolymer
Handheld Console

- Acts as user interface
- All buttons labeled in English and Braille
- All outputs and prompts given by LCD and Speaker
- Two Velcro strips for easy mounting
- Accessible battery compartment
<table>
<thead>
<tr>
<th>Part</th>
<th>Vendor</th>
<th># of Units</th>
<th>Total Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>S290 Load Cells</td>
<td>Strain Measurement Devices</td>
<td>3</td>
<td>$570 (190 x 3)</td>
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<tr>
<td>OKW Enclosure Casing</td>
<td>Allied Electronics</td>
<td>1</td>
<td>$11.74</td>
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<tr>
<td>ICC/Intervox Speaker</td>
<td>Allied Electronics</td>
<td>1</td>
<td>$2.61</td>
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<tr>
<td>Lumex LCD</td>
<td>Allied Electronics</td>
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<td>$20.52</td>
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<tr>
<td>IDEC Pushbutton (red, square)</td>
<td>Allied Electronics</td>
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<td>$15.47</td>
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<tr>
<td>IDEC Pushbutton (round, green)</td>
<td>Allied Electronics</td>
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<td>$13.25</td>
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<tr>
<td>Starpoint Triangular Up/Down Pushbuttons</td>
<td>Advanced Electronic Systems, Inc.</td>
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<td>$40 (20 x 2)</td>
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<td>PIC18F6722</td>
<td>Allied Electronics</td>
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<tr>
<td>RC8650F1C Chipset</td>
<td>RC Systems</td>
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<tr>
<td>Linx Tech. LR 418Mhz Transmitter</td>
<td>Digi-Key</td>
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<tr>
<td>Linx Tech. LR 418Mhz Receiver</td>
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<tr>
<td>Linx Tech. CW 418Mhz Antenna</td>
<td>Digi-Key</td>
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<td>$7.88</td>
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<tr>
<td>ON Semiconductor LM317LZG</td>
<td>Allied Electronics</td>
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<td>$0.76 (0.38 x 2)</td>
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<tr>
<td>Aluminum Alloy Plates</td>
<td>Yarde Metals</td>
<td>1</td>
<td>$245.10</td>
</tr>
<tr>
<td>Bemis 500PRO Round Wood Toilet Seat</td>
<td>Paul Supply</td>
<td>1</td>
<td>$11.24</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td></td>
<td></td>
<td><strong>$1008.52</strong></td>
</tr>
</tbody>
</table>
Conclusion

- Many people in need of accessible weight scale
  - Obesity and old age lead to increased number of wheelchair bound
  - Diabetes leading cause of amputation
- Current products inconvenient
  - Bulky
  - Expensive
  - Additional assistance required
- Our device allows for more independence
  - Easy to use
  - Stores previous readings
We would like to acknowledge the following people, to thank them for their support and assistance with our project:

- RERC-AMI National Student Design Competition, Provided Funding
- Dr. John Enderle, Client Contact and Advisor
- Dave Price, Advisor
- Dave Kaputa
- Rich and Serge
Sources

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Questions and Answers