

The Accessible Weight Scale for Seated Users

Multiple Handicaps

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INTRODUCTION

The accessible weight scale for seated users is a project funded by the Rehabilitation Engineering Research Center on Accessible Medical Instrumentation's (RERC-AMI) National Student Design Competition. The weight scale has been designed for users with mobility disabilities who cannot use a standing weight scale and need to monitor their weight on a regular basis. The accessible weight scale will accurately measure the user's weight and store previous weight measurements for the user.

The scale will be incorporated into an elevated toilet seat for maximum convenience for the user. The elevated toilet seat will have handles and adjustable foot support to aid the user in getting on and off of the toilet scale. The scale will also include a simple, easy-to-use user interface that can be mounted anywhere in the bathroom or held by the user while the device is in use. Weight measurements and previous readings will be displayed on a large Liquid Crystal Display (LCD) screen and given as an audio output from a speaker for users with limited vision. Also all of the buttons will be labeled in both English and Braille. The user interface will communicate with the rest of the scale wirelessly so that there are no exposed wires. A picture of the overall device is included below.

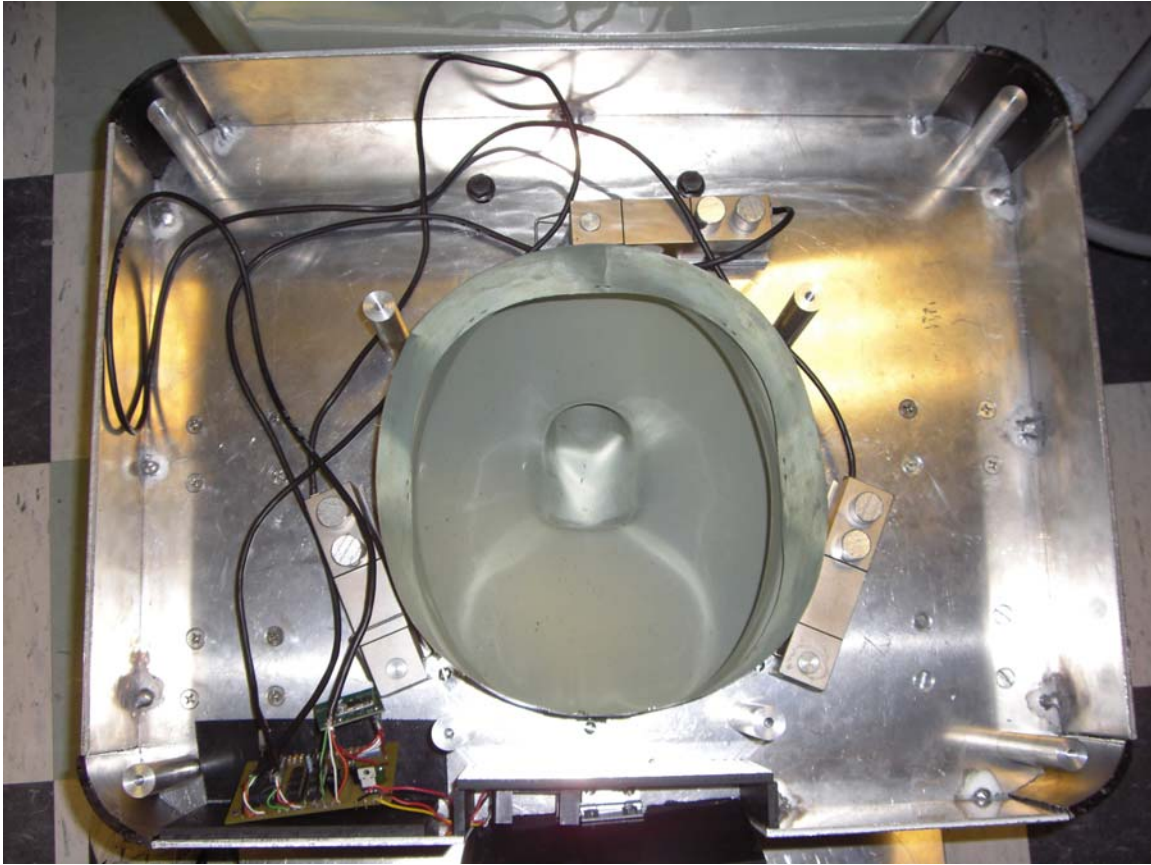


Picture 1: Elevated compartment for seated users

TECHNICAL DESCRIPTION

The prototype of the Accessible Weight Scale for Seated Users was made out of aluminum alloy plates. The actual device would be made out of injection molded plastic. The elevated toilet compartment is 24" wide, 18" deep and it elevates the toilet seat a total of 5". The scale also has foot support to help the user to keep their feet elevated while a measurement is being taken.

The scale uses three 350a beam load cells fastened to the bottom panel of the elevated toilet compartment to measure the weight of the user. The weight of the user is supported by 8 columns. The eight columns were made of 3/4" diameter Aluminum rods. Each of the rods was cut to a height of 3 3/4". The columns are threaded on both the top and bottom. The columns take 1/4-20x3/4 screws. Flat head screws were used so that the screws did not extend beyond the surface of the top and bottom panels. 4" diameter PVC piping was used to round the corners and hard plastic was used to fashion the battery access panel.



Picture 2: Elevated compartment

The elevated toilet compartment takes the user's weight measurement and sends it wirelessly using the eb505 Bluetooth wireless modules. The weight measurement is received and outputted through the Liquid Crystal Display (LCD) and SP03 text to speech device.



Picture 3: Hand held console

To simplify the user interface there are only three buttons that the user needs to use; the 'yes' button, the 'no' button, and the 'setup' button. The user is prompted with a question and simply answers yes or no. In normal mode the user is only asked if they would like to save the data from a measurement that is automatically taken when the user gets on the device. The 'setup' button allows the user to enter a separate part of the program which asks the user if they would 1) like to take a new measurement, 2) view saved data, 3) export data wirelessly to a nearby computer, 4) tare the scale for more accurate readings, and 5) if they would like to turn the scale off. The scale turns on automatically and turns off after a 5 minute interval in which no button was pressed.

The overall cost of parts / materials for this device was approximately \$13,000.