The Harleston Washing Machine
An Anthropometric Study

Assignment 3, ENP64
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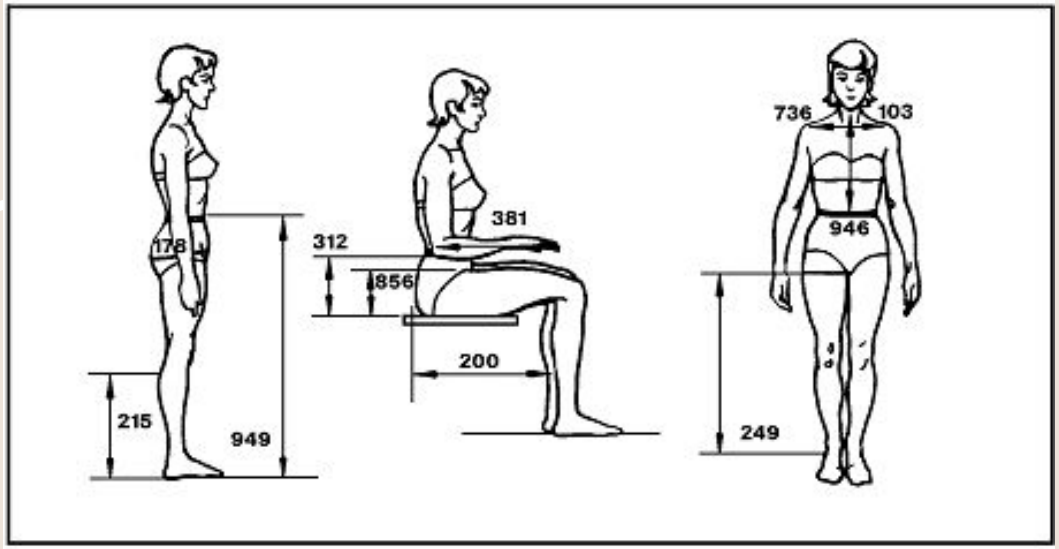
Anthropometry

Definition: The scientific study of the measurements and proportions of the human body.



Goals of this study

- Analyze the Harleston washing machines, which are used by hundreds of students on a weekly basis
- Determine anthropometric measurements of the machines
- Determine who the machines are fit for/not fit for
- Analyze three specific users and their experience with the machines
- Suggest potential improvements

Task One

Taking measurements and determining percentiles

Informal observations

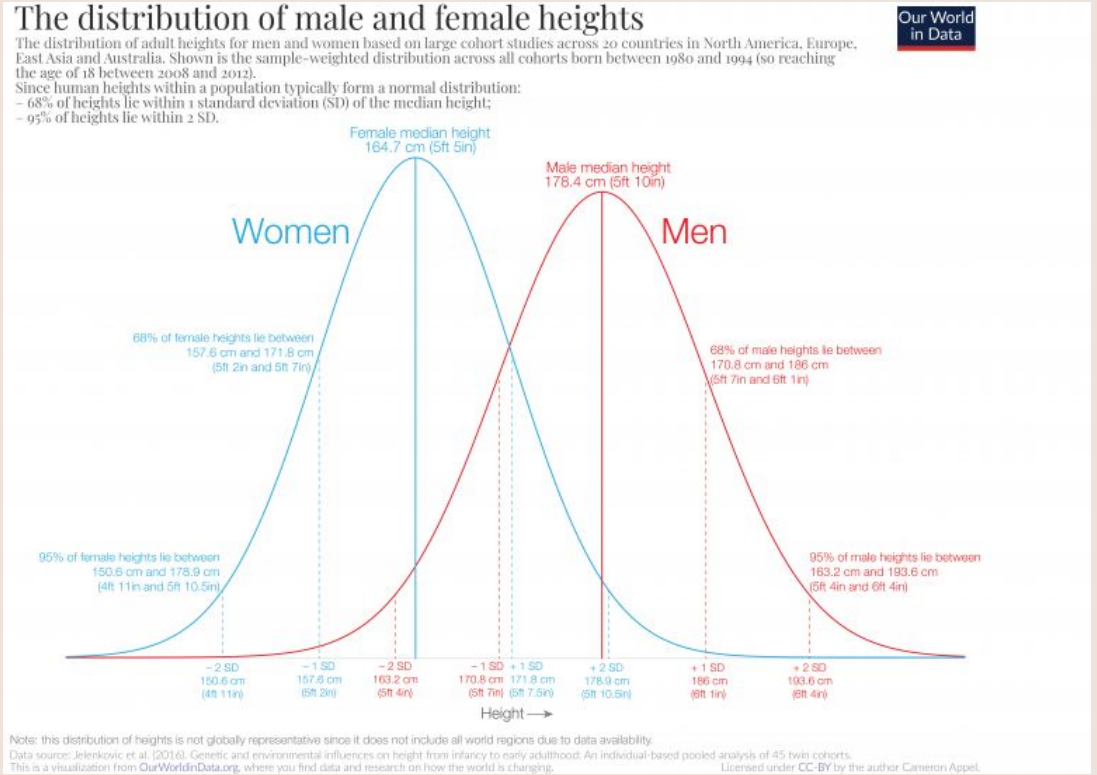
- Every member has the ability to use the building's laundry facilities
- 167 doubles, 51 singles, and 1 triple
  - There are approximately 388 students living in the building
- There are two laundry rooms, each containing 6 washers and 8 dryers (12 washers, 16 dryers total)
- It seems as though most users have to bend down in an uncomfortable way to reach the washing machines
- This study will analyze the anthropometry of specifically washing machines #1 and #12
- This study will only look at male and female-identifying students

Laundry machine measurements

- Standard washing machine is 38 and ¾ inches tall
- Harleston washing machine is approximately 35 ⅓ inches tall
- Center of machine (on average, where users bend down to) is approximately 19 inches tall

Real-world measurements

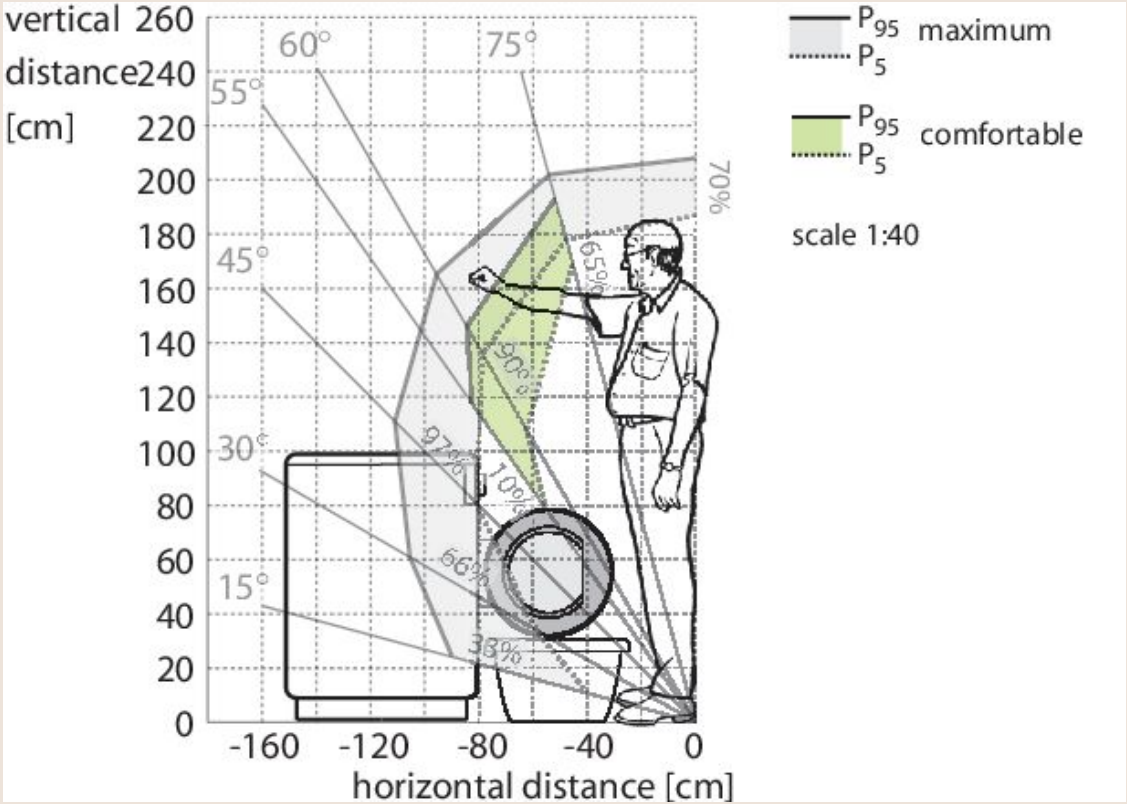
- Average female height: 5ft, 5 in
- Average male height: 5ft, 10 in
- Men have a wider spread (more variance) than women in height



Percentiles

Since the standard washing machine is 39 inches tall, anyone who is able to bend down (or at the height of the average laundry machine can access it.

→ About 100% of people can use it

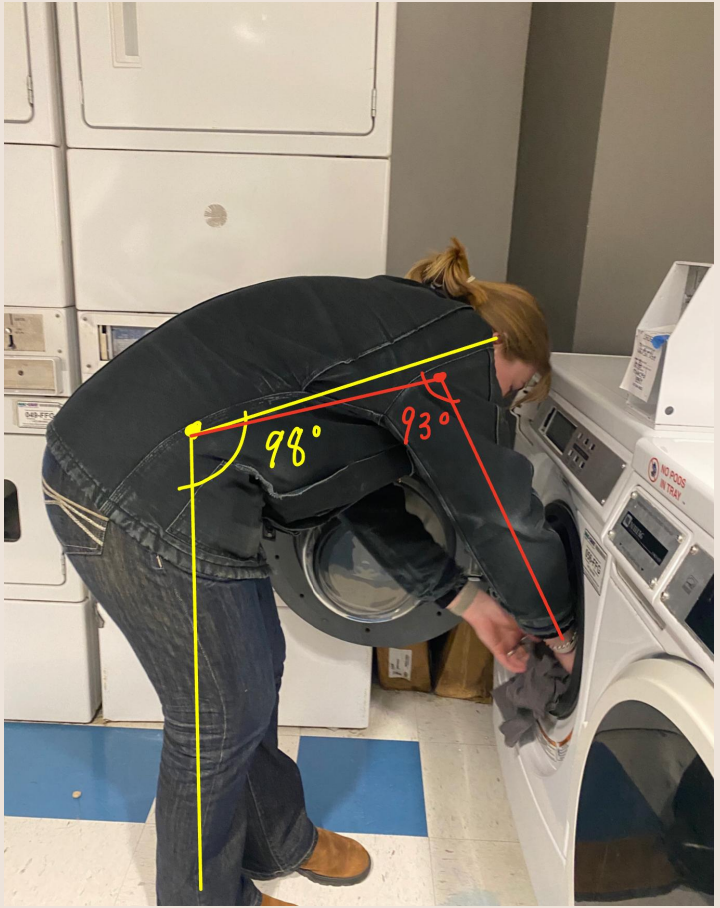


Task Two

Taking photographs of users and analyzing behavior

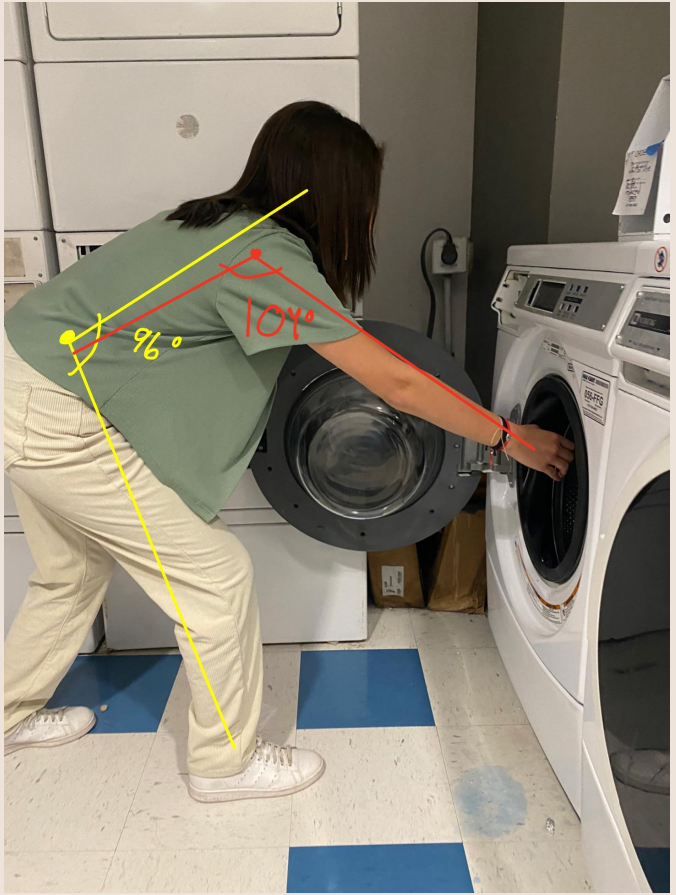
User 1

- Female
- 5’8
- Center of machine is around the user’s knees when standing
- When bending down (aka, using the device):
  - User bends their back at about a 98 angle
  - User’s arm is bending at a 93 angle



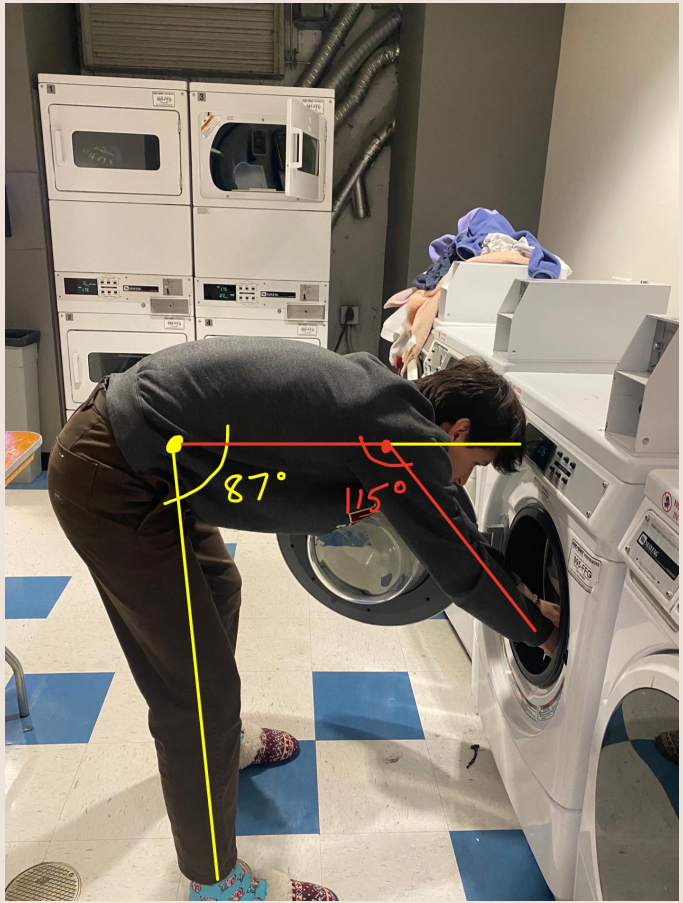
User 2

- Female
- 5’2
- Center of machine is around the user’s thighs when standing
- When bending down (aka, using the device):
  - User bends their back at about a 96 angle
  - User’s arm is bending at a 104 angle



User 3

- Male
- 6’0
- Center of machine is around the user’s shins when standing
- When bending down (aka, using the device):
  - User bends their back at about a 87 angle
  - User’s arm is bending at a 115 angle

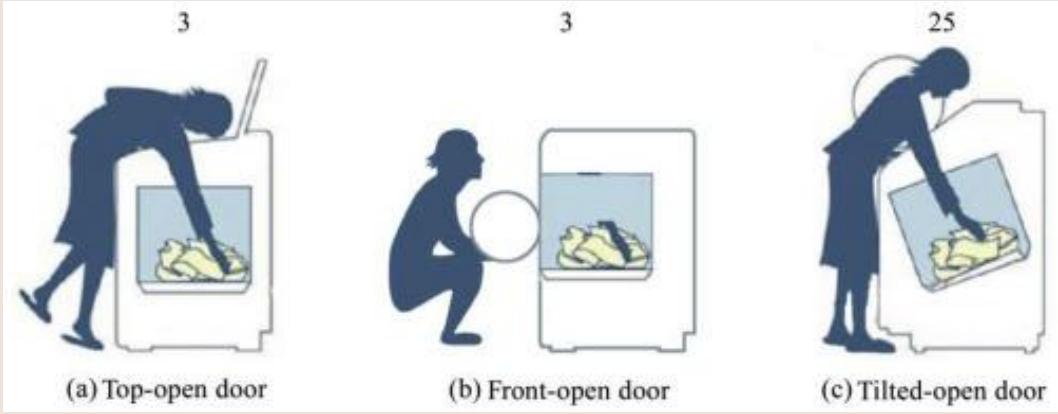


Task Three

Suggesting new changes

New Change	Why it would work, based on anthropometric evidence
Put machines on some type of platform that makes the center of machine reach around the height of the center of an average user	Easiest reach is 90 degrees, meaning the center of the machine should be around the height of the average user’s arm
Create a mechanism that can change the height of the machine (hydraulic platform)	Anthropometric measurements come at a wide range, and manufacturers must design for even extreme use cases to maximize the usability of their product
Create a mechanism that makes taking clothes out of the washer easier so that users spend less time at the machine	The longer one stays in a certain position, the more tired out their muscles become, aka muscle fatigue
Connect the dryer and washer together so that the dryer automatically begins when the washer stops, limiting the amount of time spent doing this activity	Same as above

This Tilted Washing Machine Wants To Save Your Back on Laundry Day



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