

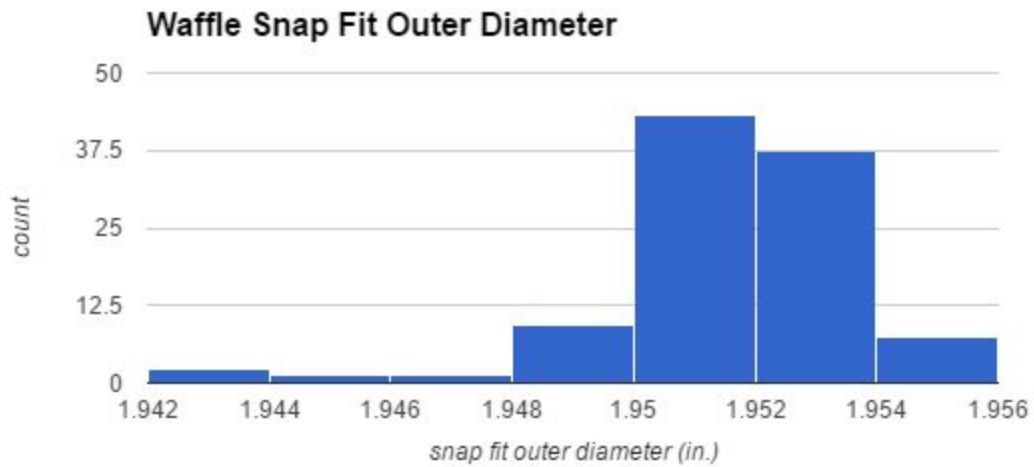
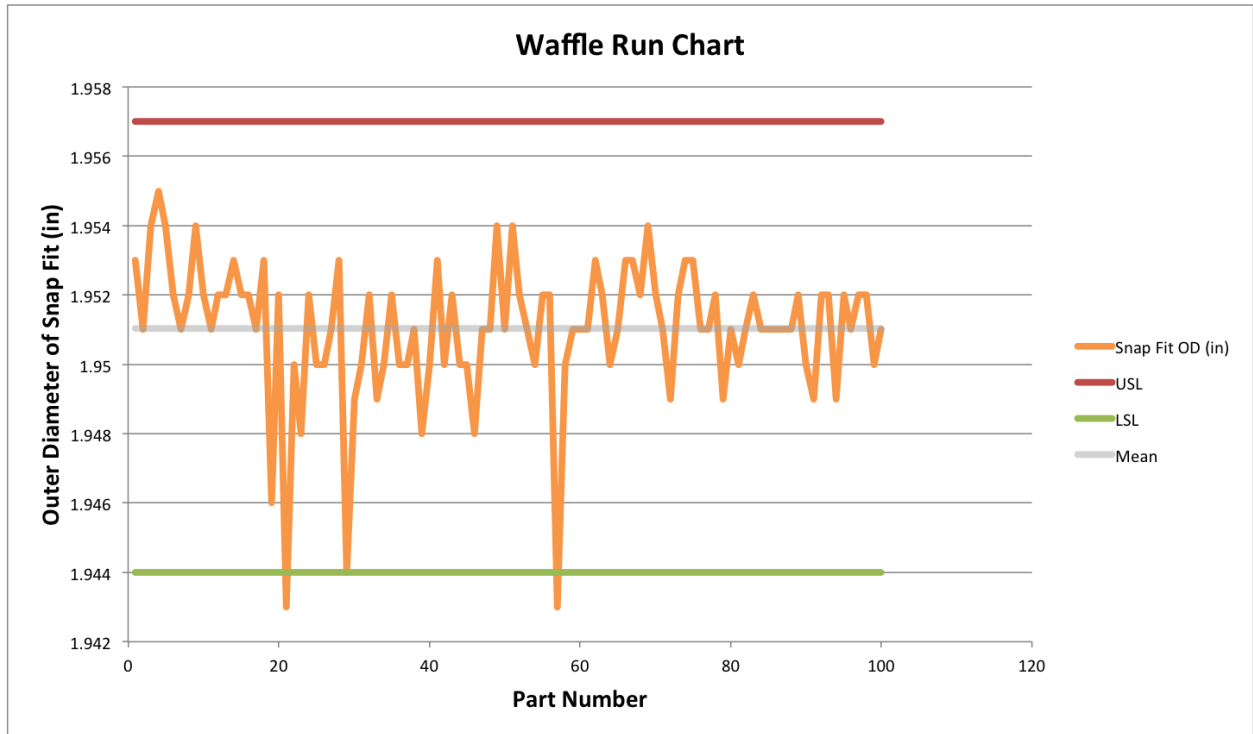
Yo-Yo Deliverable 4

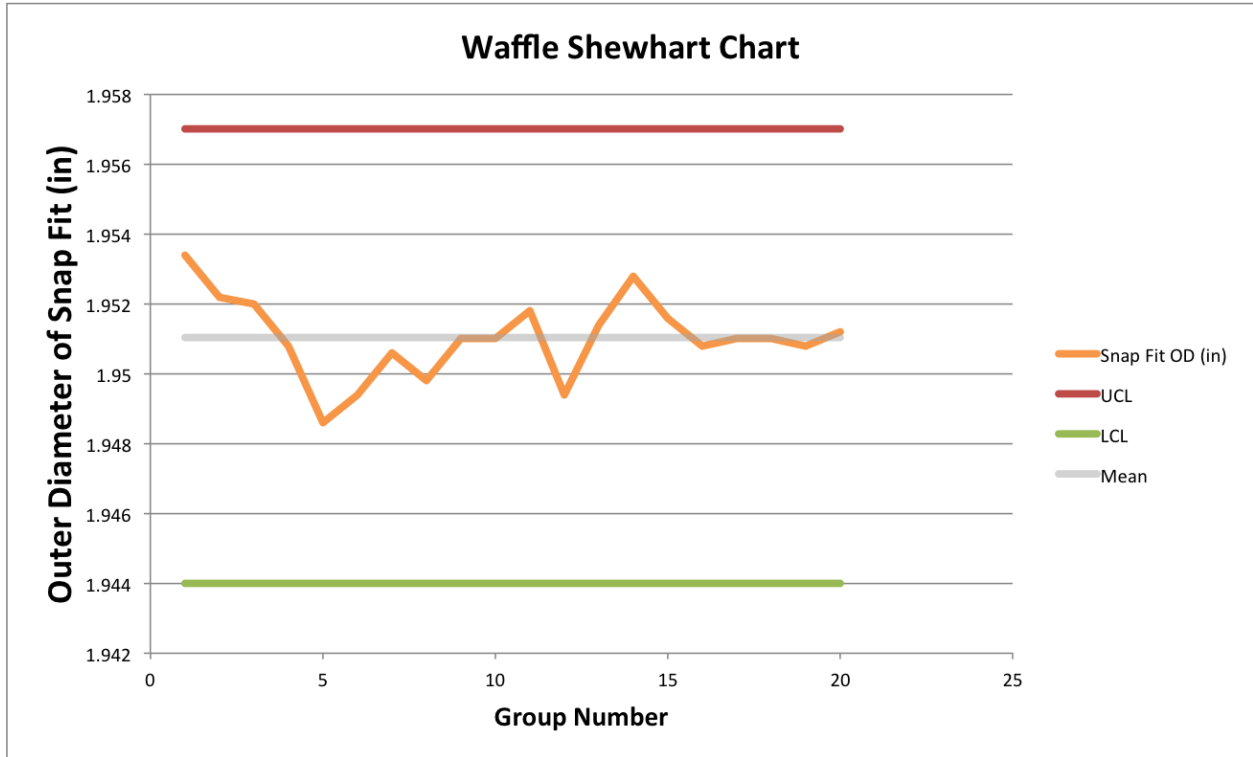
A Waffle Lot

Lab D1
R9-12

Anjali Krishnamachar
Grace Li
Kira Schott
Lutong Tracy Cheng
Wen Zeng

Waffle



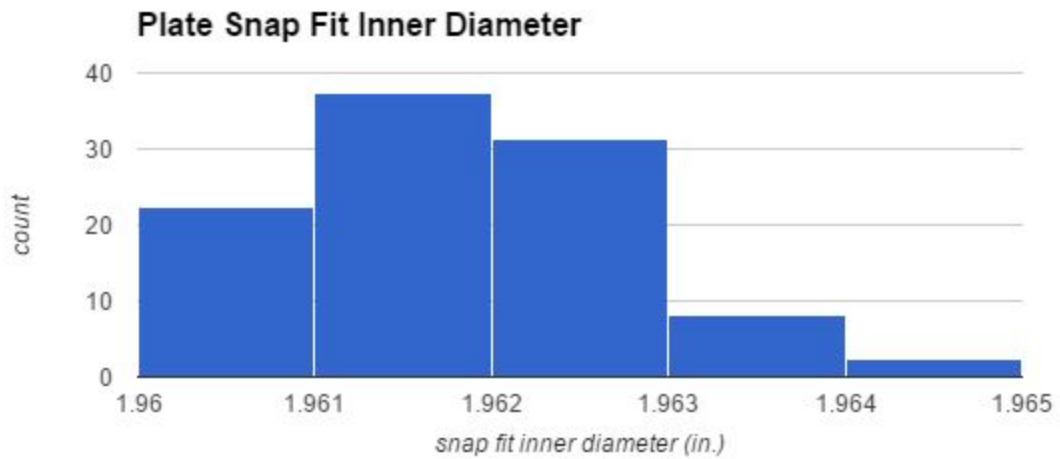


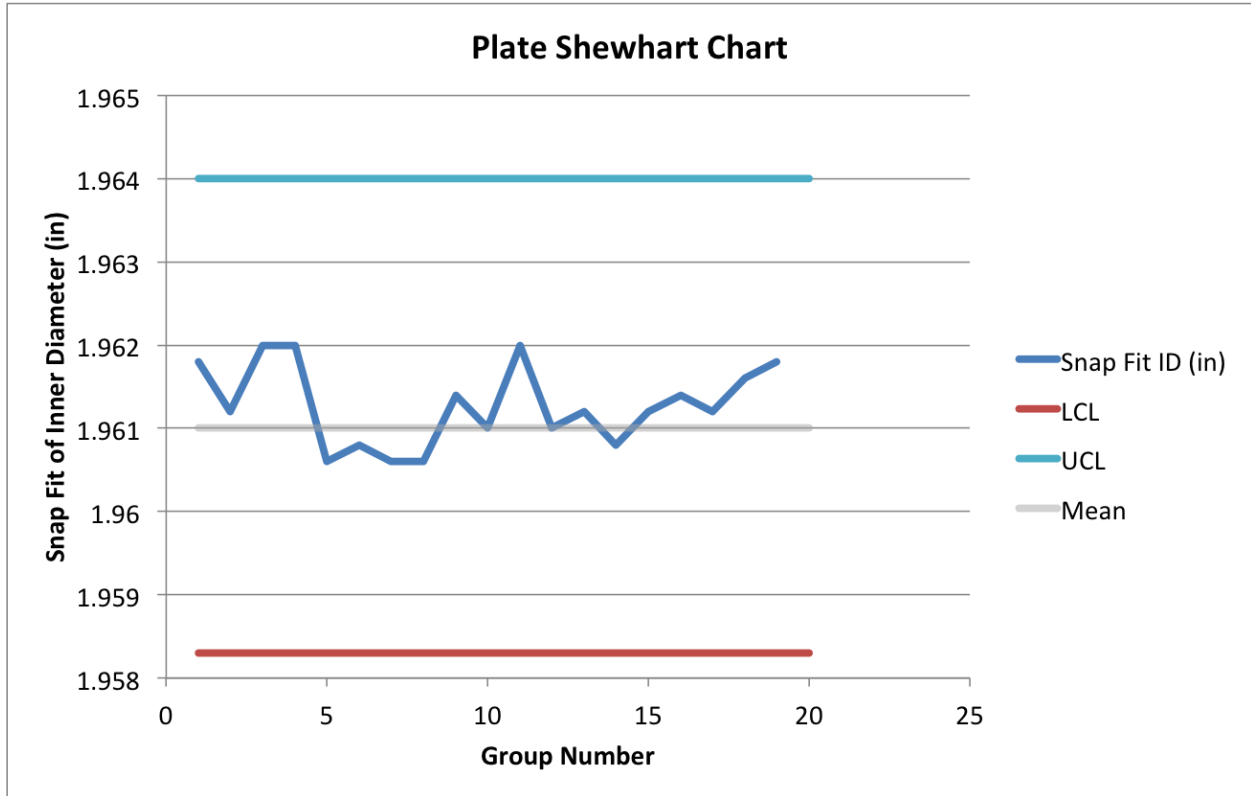
We chose a rational subgroup of 5 because this gave us a smooth moving average of performance. The step change induced by the parameter change cannot be detected. The parameter change of 100 psi in pressure was not enough to produce a significant change in dimensions.

Process capability

$$C_p = \text{Range}/6\sigma = .83$$

Plate



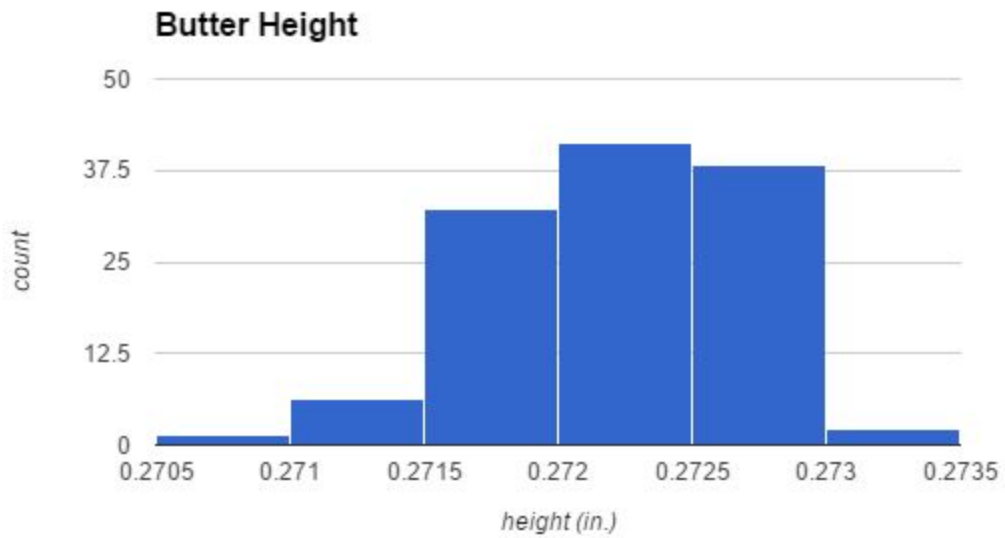
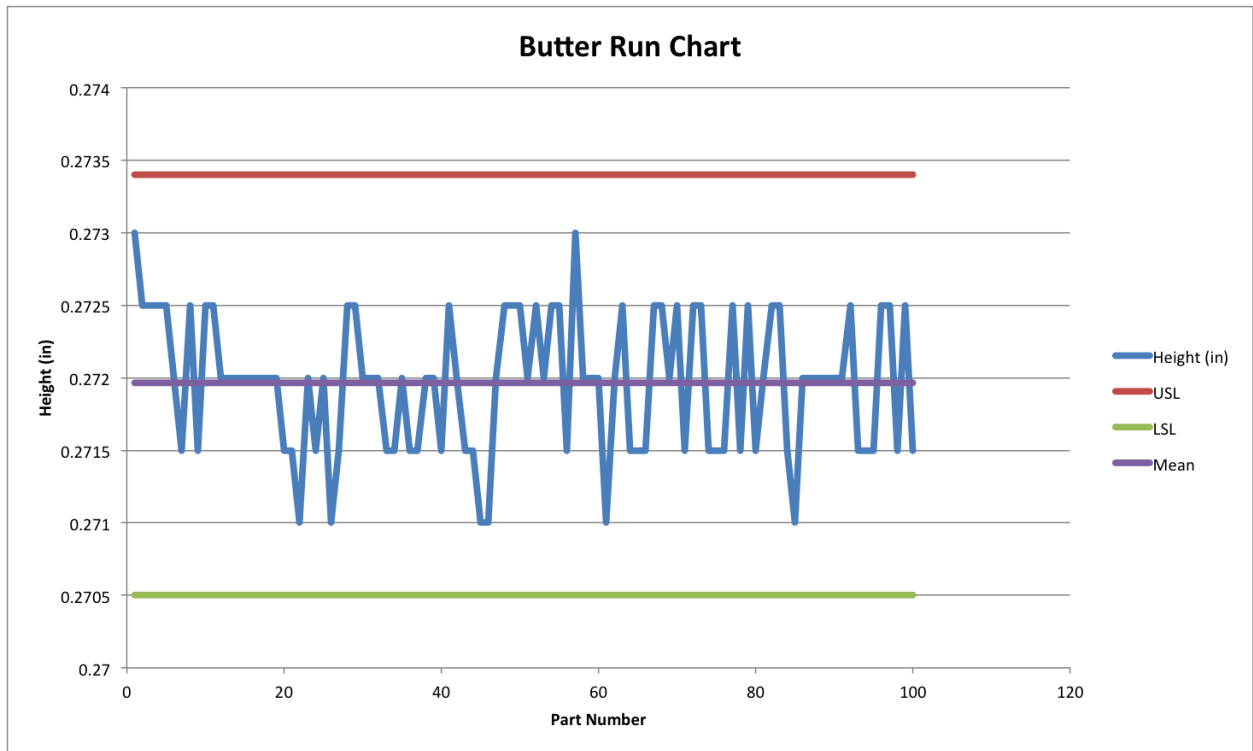


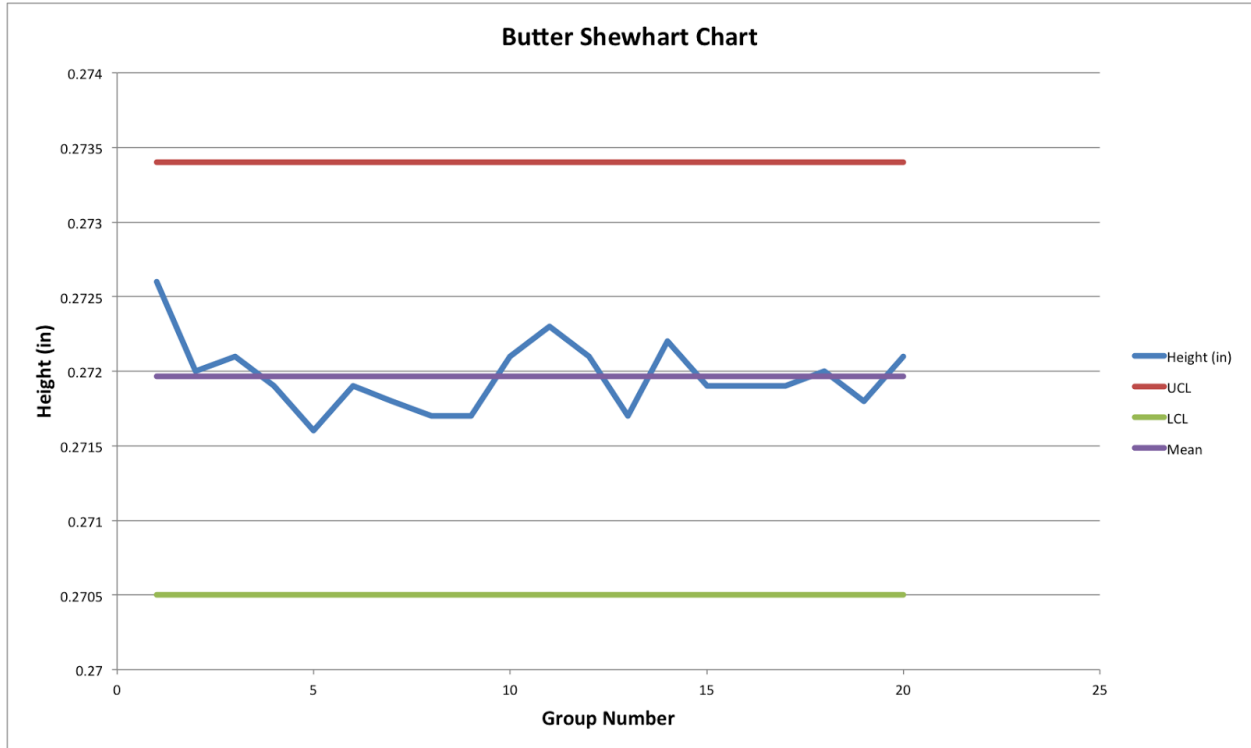
We chose a rational subgroup of 5 because this gave us a smooth moving average of performance. The step change induced by the parameter change cannot be detected. The parameter change was not enough to produce a significant change in dimensions.

Process capability

$$C_p = \text{Range}/6\sigma = .862$$

Butter



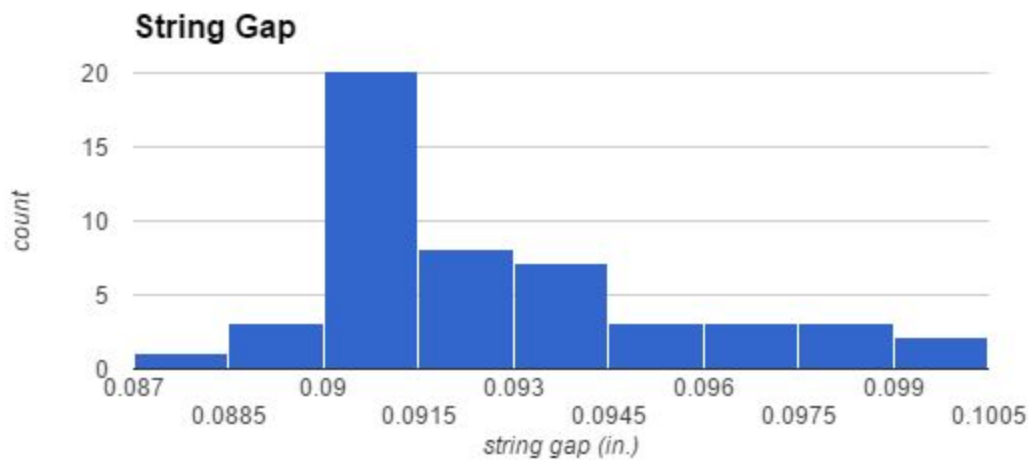


We chose a rational subgroup of 5 because this gave us a smooth moving average of performance. The step change induced by the parameter change cannot be detected. The temperature drop wasn't large enough to induce a change in the butter height.

Process capability

$$C_p = \text{Range}/6\sigma = .73$$

Histogram of the string gap width with the upper and lower design specification limits



Cost Estimate

Labor cost estimates:

Waffle injection molding- 1.5 hours

Plate injection molding- 2 hours

Butter thermoforming and cutting- 2.5 hours

Assembly- 1.5 hours (4 people)

We're assuming minimum wage is \$7.25/hr.

Material cost estimates:

Polystyrene is 4 cents/lb. Polypropylene is 80 cents/lb.

Assumed machining time is \$60/hour, taking into account power and facility usage.

Note: Mold machining time and material not included in this cost estimate.

Cost Estimate for 100 Yo-yos

Part	Waffle	Plate	Butter	Assembly
Labor Cost	\$10.88	\$14.50	\$18.13	\$43.50
Material Cost	\$3.20	\$2.00	\$0.04	\$0
Machine Cost	\$90	\$120	\$150	\$0
Total	\$104.08	\$136.50	\$168.17	\$43.50

Overall total cost estimate for 100: \$452.25

Cost Estimate for 100,000 Yo-yos

Part	Waffle	Plate	Butter	Assembly
Labor Cost	\$10880	\$14500	\$18130	\$43500
Material Cost	\$3200	\$2000	\$40	\$0
Machine Cost	\$90000	\$120000	\$150000	\$0
Total	\$104080	\$136500	\$168170	\$43500

Overall total cost estimate for 100,000: \$452250

Estimated production cost vs. volume

