ER14
CT2

Prototype Testing:

Engineering Metric Being Tested: Percent of Simulated Excrement Collected in the Bucket during a Horizontal Squirt Test

Purpose:
This protocol is designed to test the most extreme condition where human waste is expelled in an uncontrolled manner and splatters out of the anticipated fecal collection jug. This test will approximately quantify the percentage of the simulated excrement that is collected in the five gallon bucket.

Goals:
Ideally, 100% of the simulated waste would be collected by the five gallon bucket, and none would splatter onto the urine diverter and into the urine jug. However, the marginal target is 90% to accommodate most cases.

Conclusions:
The nature of this test was very controlled, unlike a real life scenario this protocol is modeled after. For each trial the liquid not contained by the bucket dripped down the back end of the bucket. The paper towels were used to absorb these spots to ensure that all liquid was accounted for in the measurement. Although the overall average of liquid not contained was very small, this testing measure does not give an accurate representation of how the system would respond in real life.

Materials:
- Complete toilet prototype with waste containers
- Simulation squirt bottle
- Blue food coloring
- Scale
- Paper towels

Procedure:
1. Dye the water with several drops of blue food coloring. This is to be able to easily identify where droplets of water will land in the system.
2. Weigh a single piece of paper towel (record) then place it inside feces bucket.
3. Fill the squirt bottle and weigh it to find the initial volume of water.
4. Aiming horizontally at the feces collection bucket, forcefully squirt the bottle aiming through the seat towards the posterior side of the 5 gallon bucket.
5. Empty bottle completely.
6. Take a photograph of any splatter outside the 5 gallon collection bucket and provide a brief description of the infected area in the table below.

7. Weigh the same paper towel if any water appears to have landed upon it (as evidenced by the new presence of coloring). Otherwise, mark as the same weight as it had before testing.
8. Repeat in triplicate.

Results:

Trial	Weight of Paper Towel Before (g)	Weight of Paper Towel After (g)	Difference
1	2	5	3
2	2	7	5
3	2	2	0
4	2	6	4
5	2	8	6
6	2	2	0
7	2	5	3
8	2	3	1
9	2	4	2
10	2	5	3

Analysis:
An average splatter mass of 2.7 grams was calculated across the 10 trials. Although this mass is small, the protocol does not accurately model a real life scenario. The position of the bottle for each trial was highly controlled, as was the force of the liquid. This protocol does not give representative results of how the system would respond in the described scenario.