

Prototype Testing:

Engineering Metric Being Tested: Time Spent Cleaning

Purpose:

The purpose of this protocol is to ensure that the toilet prototype is easy to clean, thus time spent cleaning should be minimal.

Goals:

Ideally, the toilet prototype takes no longer than five minutes to clean. Marginal cleaning time will be seven minutes.

Conclusions:

Overall, with our average cleanup time of 2 minutes and 57 seconds, our prototype meets our goal of keeping cleaning time to five minutes or less. There were two occurrences when cleanup times did not meet our goal, which were due to major spillage and learning curve of cleanup. Further improvements should include faster cleanup of major spillage occurrences.

Materials:

- Clorox wipes
- Paper towels
- Gloves
- Timer (can be on a cell phone)

Procedure:

1. Put gloves on before cleaning.
2. Have another person start the timer.
3. Clean the urine diverter, feces bucket, and toilet seat with Clorox wipes inside and out and let air dry for a minute.
4. Wipe down cleaned areas with paper towels.
5. Place all containers and toilet seat back to starting position.
6. Have another person end the timer.
7. Dispose of gloves in a trash bin and properly wash/sanitize hands after every cleanup.
8. Repeat in triplicate.

Results:

Clean Up Trial #	Cleaning Time from Start to Finish (in min)	Average Cleaning Time (min)
1	3 MINUTES 6 SECONDS	02 minutes, 57 seconds
2	3 MINUTES 9 SECONDS	
3	7 MINUTES 39 SECONDS	
4	2 MINUTES 30 SECONDS	
5	3 MINUTES 45 SECONDS	
6	3 MINUTES 52 SECONDS	
7	3 MINUTES 42 SECONDS	
8	2 MINUTES 4 SECONDS	
9	2 MINUTES 23 SECONDS	
10	5 MINUTES 32 SECONDS	
11	1 MINUTE 56 SECONDS	
12	2 MINUTES 7 SECONDS	
13	2 MINUTES 33 SECONDS	
14	2 MINUTES 3 SECONDS	
15	1 MINUTE 52 SECONDS	
16	4 MINUTES 33 SECONDS	
17	3 MINUTES 29 SECONDS	
18	2 MINUTES 0 SECONDS	
19	2 MINUTES 0 SECONDS	
20	2 MINUTES 36 SECONDS	
21	2 MINUTES 6 SECONDS	
22	2 MINUTES 22 SECONDS	
23	1 MINUTE 41 SECONDS	

24	1 MINUTE 51 SECONDS	
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Analysis:

Our average cleanup time was 02 minutes and 57 seconds. The range of times went from 1 minute and 41 seconds, all the way to 7 minutes and 39 seconds. When major spillage occurred, cleanup times increased. When there was little to no spillage, cleanup times were faster. There was a visible learning curve at the beginning in terms of clean up routine, as the earlier times tend to be longer than the later times recorded.

*Note: These cleaning methods are not followed in Haiti, but are necessary for Human Subjects Testing. Time of actual cleaning will vary.