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Evaluation of a composting toilet prototype for people in slum area in Indonesia

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Domestic coverage of WC: 87%
Direct discharge: 53%, Septic tank: 47%

People is satisfied in the toilet

The reality is: Most of excreta goes to the channel Installed septic tanks don't work.

Government and local government has less power to improve sanitation

Value chain sanitation system



How do we encourage the people to use our composting toilet? Acceptance of the toilet from the people

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Prototype of composting toilet 4

- •Feces-urine-water separation system
- Long toilet bowl
- •Compact composting reactor with ventilation
- •No heater for water controlling
- •Automatic system for mixing and closing shutter
- Design based on human engineering



Size: 50cm (w) x 60cm (d) x 60cm(h)

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Setting reactor





Objectives

✓ To find points and direction for modification

- ✓ To find current situation of Indonesian people around toilet
- ✓ To evaluate of feeling on new toilet

<<Items>>

- ◆Change of operation
 - Operation of lever
 - Cleaning every time
- Impressions on new toilet by Indonesian people
 - Feeling on toilet
 - Materials on toilet body
 - Feeling on seat
 - Feeling on change of reactor



Hearing survey





Results

- LIPI
- Respondents: 8 (staffs in LIPI)
- Female: 25%, male: 75%
- Toilet in house: squatting type



- Mosque in Sapporo
- Respondents: 12 (Living near there)
- Female: 33.3%, male66.7%
 - Toilet in their country: Squatting type 83.3% Sitting type 41.7%



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Results

- □ Situation in current toilet
- A) Cleaning tools
- Cleaning toilet bowl⇒Flat blush
- B) Detergents
- Contains HCI solution, alcohol
 ⇒metal materials will be corroded



C) Cleaning points



•Floor •Toilet bowl

- •Foot mark
- •Hole in toilet bowl

 ✓ Smooth shape for viewable parts
 ✓ Possibility of complicated shape for behind





Check points on dirtiness



Forced ventilation can control the problems of odor, mould, slime and wet floor.

We need to ask clean toilet bowl every time to avoid remain of feces and urine.

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10

Cleaning toilet



Cleaning frequency

Difficult for cleaning every time ⇒Change design of toilet bowl



Actions in the toilet

Actions in the current toilet





New operation

No problem

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Impression on new toilet





Good and acceptable ⇒ 90% BUT

- ✓ Unsatisfaction on size: <u>70%</u>
 •Too big to install in house
 •Too big seat
- ✓ Bad color of cover
 →Yellow: Dirty and garbage

Some wanted to squat on seat.

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Impressions on seat





•Some feels falling down, although the width is same as current



Conclusion

Summary

1. <u>Situations</u>

- ✓ Corrosive detergents
- ✓ No problem on materials
- ✓ Cleaning visible parts

2. Change in operation

- ✓ Some feels heavy for lever operation.
- ✓ Half don't want to clean every time.

3. <u>Impressions on new toilet</u>

- ✓ Big size
- ✓ Bad image on yellow color
- ✓ Feeling to fall down
- ✓ Small space for washing body
- ✓ No touch to compost
- ✓ No unplug electric cables

Suggestions for next model

- To consider the materials for corrosion issue
- ✓ To redesign the visible parts for easier cleaning
- ✓ To consider small body
- \checkmark To change image color
- ✓ To adjust height of seat and step

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- ✓ To induce sitting deep
- To modify connector



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