

A Study on the Improvement of Disaster Prevention Design-Based Toilet in Ger Area, Mongolia

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1. INTRODUCTION

50% of the entire population of Mongolia is residing in a capital city, Ulaanbaatar, and among them, 49.7% is living in Ger area. Ger area is gradually expanding by people who left farming villages to search for work due to rapid urbanization of Mongolia, and children, senior citizens, and women's health is particularly at risk due to the lack of heating, sewerage, and toilet and serious environmental contamination.



figure 1. Extension of Ger Area in Ulaanbaatar 1993-2012

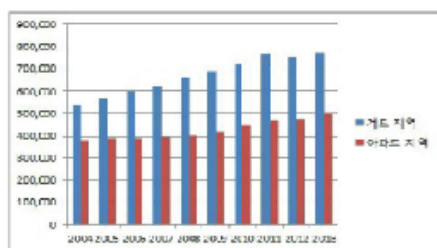


figure 2. Population growth of Ulaanbaatar in 2004-2013

2. ANALYSIS OF TOILETS IN GER AREA

2-1 Residential environment of Ger area

Soil pollution in Ger area is progressing seriously because garbage separation facility, water supply/sewage system, and septic tank are not installed in this region, and as a result of investigating the satisfaction level of housing facility on residents, it was identified that satisfaction level for sewerage and

toilet was lowest followed by the heating system.

2-2 Housing type of Ger area

Ger, a traditional house, and shacks are mixed together in Ger area, and majority of residents are living in Ger. Traditional housing of Mongolia is made out of timber framework and thick cotton tree manufactured with processed wool and roof and wall made out of similar materials. 4~8 walls are used in general, and the length of the wall is 1.5m. The arranged furnitures inside Ger are simple, light, and in modest size according to the lifestyle of nomads. The structure of Ger is arranged on the basis of a heater and toilet is located outside.

2-3 Present condition of toilets in Ger area



figure 3. Present condition of toilets in Ger area

Toilets in Ger area today(Pit Latrine-dug hole toilet) are built in a traditional method of building a small storeroom by digging a hole(approximately 2~3m) on the outside and making props with wood. When the toilet is filled with emissions, they change the location and make another one. Soil pollution is in serious condition due to the indiscreetly installed toilets in every house without septic tanks. Soil pollution leads to the drinking water contamination, causes various diseases, hinders development of children, and becomes the cause of suffering caused by

Table 1. Development of toilet design for distinct characteristics of Ger area

Type	Simplified mobile toilet	Wooden mobile toilet- Panasonic(Japan)	Gotta Go Toilet- Ventex Ceramics(Co)	Peepoo bag - Anders Wilhelmson
				
Case Study	Simplified mobile toilet does not require separate septic tank, simple to move, and easy to install, but is quite expensive and costs a lot to process.	A mobile toilet made especially for elders or mobility-impaired people which is designed to discard feces in a designated area by closing the lid and relocating after relieving oneself.	A mobile folding paper toilet developed to be used in camping, trip, and disaster area that eco-friendly bio vinyl gets completely decomposed into CO ₂ and water under the ground within 30 days .	A Peepoo bag designed for 2 billion people in the world without toilets that changes excrement into fertilizer after 2~4 weeks after defecating in a plastic bag made out of natural substances, tie up, and throw it away.

nasty smell.

2-4 Problems of toilets in Ger area

1. Toilets in Ger area are located outside the house and inconvenient to use.
2. They are cold in winter and have odor of decomposing matter and unsanitary in summer.
3. Toilet that dug hole without burying a septic tank becomes the main cause of polluting water deep inside the basement, and is making an adverse effect on the groundwater quality which is the water resource of Mongolians.

3. CONCLUSION

Design in the following matter based on the disaster prevention design.

1. Design with cultural characteristics and environment of Mongolians in mind.
Design in consideration of nomad's habit, structure of Ger, odor control, and prevention of soil pollution.
2. Design with consideration for characteristics of human body.
Design after understanding the physical structure of men and women according to urine and feces.
3. Design with economic feasibility in mind.
Design economical toilet to supply and support toilets.
4. Design toilets that considered sustainable environment.

Consider areas with narrow passage where it is difficult for vehicles to enter, cold and dry climate, and

inadequate social infrastructures(electricity, waterworks, sewerage) and design a sustainable toilet for recyclable emissions

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