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# Mobile Convenience: A Design Concept to Comfort in Public Places and Gatherings

<sup>1</sup>Chakrabarti Debkumar, <sup>2</sup>Behera Debashish, <sup>2</sup>Purohit Pranit Kumar and  
<sup>2</sup>Murty Dev Prasad

<sup>1</sup> Department of Design, Indian Institute of Technology Guwahati, Guwahati 781039  
Assam, India, dc@iitg.ernet.in

<sup>2</sup> Industrial Design, NIT Rourkela

## ABSTRACT

Not being able to answer nature's call, due to inadequate psycho-physical facilities, leads to a series of serious uneasiness. City bus stands, fairs, tourist gathering spots, public functions etc. like places where large number of people assemble and stay for long where the convenience facilities do not conform to the need and privacy, is a serious matter of concern. There are several aspects concerning the need that also include human ethics. Here design ergonomics can look into for designing a comfortable and trustworthy system. It is also noticed that situations where people gather for longer period of time, in spite of facilities being provided normally beyond the periphery of the location of event, people cannot leave the place to visit the designated permanent or makeshift arrangements for various reasons. Many-a-times the design also do not appear usable and inviting.

A need towards looking into this issue from the design ergonomics point of view was felt during a session of internship assignments carried out by design students of NIT Rourkela at the Department of Design of IIT Guwahati recently. An attempt was made to investigate the issues and to conceive the possible design features and installations that would facilitate easy transportation, context specific identity and at the same time that would also not stand alone in appearance to disturb the gatherings' movements. Design ideation focuses both on male and female requirement issues, installations, cleanings along with ease of manufacturing and maintenance. Relevant behaviour of the user groups with context specific identity was also kept under consideration in the ideation process.

This paper demonstrates the salient design features of such facilities from the academic point of views using modular development approach.

**Key words:** Public convenience, design ergonomics, mobile and modular design ideation

## INTRODUCTION

In situations, people with little or no access to public toilets, especially for women and the elderly, in our present scenario causes serious problems in terms of varied levels of physiological, socio-psychological and environmental issues. It raises a concern for ergonomic design intervention to look into a system that goes along with various needs in Indian context specifically in fairs, locations for public functions like picnic and tourist gathering spots in a semi-structured location or otherwise any open place, public communication places like city bus stands, spots for travel stop-gaps, etc., where large number of people assemble and stay for considerable period of time. It is experienced that either there no such convenience facilities are available or

wherever is present they also do not conform to the need, privacy and human ethics. This paper looks into possibility of design intervention as an academic exercise on design innovation [1] in providing mobile convenience facility.

Various mobile toilet designs found in web search noticed not in use in India, when asked to some people while conducting a preliminary survey in Guwahati, they expressed that they do not have any idea about it but if such facilities are provided would be good. Unavailability of ample space for building toilets where they are required the most, specifically in locations where people concentration is extreme high for a specific time raises the need for mobile convenience system. This transparent a need to look into possibility of a mobile toilet system that can go along Indian requirement and easy to make, dismantle, relocation facility as necessity arises. From a pool of various available informations, an idea to build a toilet system that would reflect the sentiments of our people as well as go with the mood of the Indian masses would probably be well accepted. Thus among varied needs, to name few of them, i.e., Fig. 1 (a) and (d) Fairs and festivals, (b) Picnic spots and (c) City bus stand areas were considered as an internship assignment carried out at IIT Guwahati during Summer of 2013 by three Bachelor of Design students of National Institute of Technology Rourkela to look into the feasibility and there by exercising the design ideations [2].

## **AIM AND OBJECTIVES**

The study aimed at deciding the ergonomic design features towards building a compact, safe, easy accessible, clean and mobile toilet unit for areas where people gather more in number.

Objectives have been set to:

1. Study the specific convenience requirement in the three specific areas like (a) and (d) Fairs and festivals, (b) Picnic spots and (c) City areas specific to bus stops;
2. Find out the structural as well as identity functional elements for conceiving the design; and
3. Design ideation of exterior look of the convenience system that suit the above mentioned contexts.

## **METHOD**

An attempt was made to investigate the issues relevant to conceive the possible design features that facilitate easy transportation, provides context specific identity and at the same time it should not stand alone appearance to disturb the gatherings' free flow as experiences presented in Fig.1.

Quick survey on specific scenario was carried out in Guwahati and around. Direct observations and interview/ meeting with local people as well as experts in the design fields constituted the prime information collection methodology, and feedback rectification of the design conceived

was also done on the similar way showing them the intermediate concepts. The requirements thus have been chalked out, design specific elements have been identified, and based on the observations individual design approaches for three specific theme locations, Fig. 1, have been considered. This paper provides the summarised salient design features of such facility and the design concepts of which the final design and prototype development is currently underway.



**Fig 1:** Mobile convenience requirement in the three specific areas were studied; (a) Fair like (e.g., Rathayatra of Jagannath Puri) that people stay on the locations for longer and difficult to move to the periphery where make shift toilets are created, (b) Such picnic gathering, mostly no facility available (c) Such busy bus stops, people are always in movement and rush, and (d) Festivals where male-female and varied age population gather but remain on movement require specific considerations for context specific mobile convenience system conforming specific identity.

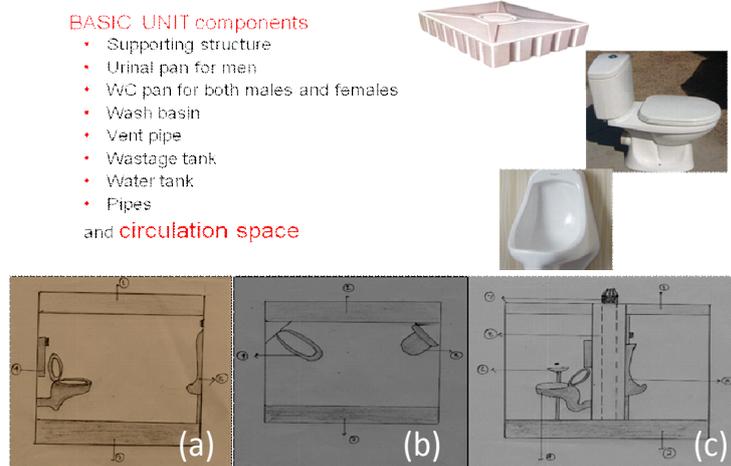
## **DESIGN INTERVENTIONS**

### ***Support justifications***

Following issues and queries visualise the design brief for design concept/ideation:

1. What issues are required to consider.
2. How its identity can be noticed being inside a crowded or a place of waiting.
3. Male and female utility specificity to be considered.
4. Privacy vs. answering the need.
5. Structural issues and the components.
6. Making, if the whole unit would follow complete or semi-dismantle structure.
7. Attention to safety and hygiene.
8. Smart arrangement of water supply and waste disposal.
9. Manufacturing easiness and maintenance issues.

10. Usage of high-grade raw material for longevity and smartness vs. local material and manufacturing and maintenance
11. Easy to use, owing to their remarkable features such as lightweight, sturdy construction and systematic drainage system.
12. Cleanliness and other conveniences users may need.
13. If the unit would be semi-stationary or fully mobile, give the context specific justification.
14. Easy to bring from one place to another.
15. Aesthetic finishing and construction.
16. Free to use vs, pay and use, collection and supervision.
17. European W/C or Indian flat squatting on floor based style of ceramic / stainless steel, urinals with stylish soap dispensers, wash basins, tissue holders and many other types of equipment.
18. Inclusiveness in design vs. exclusive requirement of specific nature of disability.
19. Material selection that includes structural issues, i.e., to avoid rusting, etc.
20. No smell, due to air gas pipe.
21. Natural light with supplement of artificial illumination and cost effectiveness systems to power supply.
22. Water storage fiber tank of 1000 liters is mounted on top of the cabin or if any specific requirement and water smart distribution system.
23. What would be the platform (floor) height and area; there is a ramp with handrails and specific facilities to enter in.
24. Utility area and various toiletry items and their placement location, inside the chamber or outside.



**Fig 2:** Mobile convenience basic unit components and possible layout arrangements for male-female combined or separate; (a) separate compartment with WC and male urinal pan, for

male-female use (one person at a time), (b) one WC and one Indian style on floor, and (c) separate use WC and men urinal independent chamber back to back within one unit may be considered for context specific design ideation.

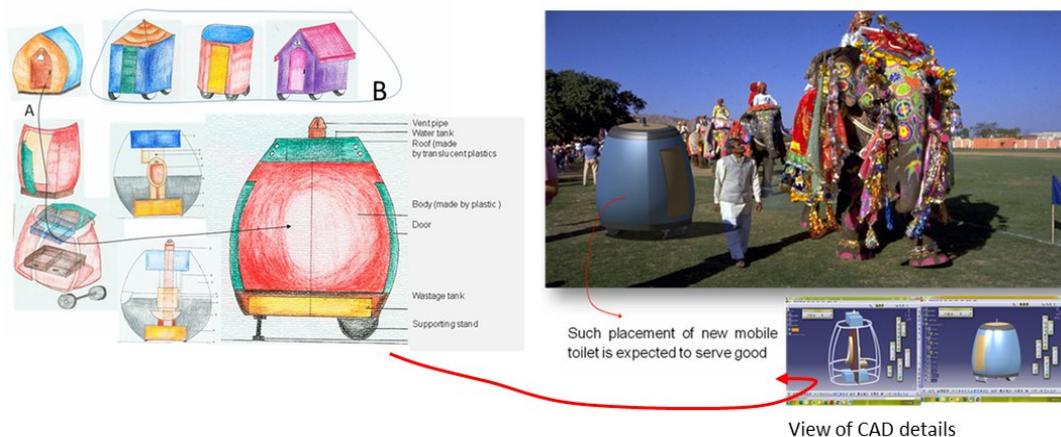
25. Ensuring cleanliness and developing a system for individual unit as well as mass cleaning/ servicing of vehicles and disinfection.
26. The toilets will have ozone sterilizers, a hand sanitizer and there will be periodical use of pesticides in the mobile toilet.
27. Jets vacuum sanitary systems provide a modern, compact and water-saving solution to this challenge, built into portable facilities for temporary toilet installation.
28. Overall ergonomic [3] and usability issues of convenient use.

The above are some of the issues that come out as consolidated enquiry about the system's requirements from the likely to be user groups. These help in ideating the design concepts' interior and exterior. The Basic components that constitute the mobile toilet units that could be assembled in specific manner in the respective design concepts are presented in Fig.2.

### Design ideation: Concepts

#### Fairs and festivals

Religious festivals and fairs play an important role in our life and many big festivals are being celebrated where lakhs of people gather around to be a part of the celebration. Festivals like Rathyatra, Kumbha mela, Gangasagar mela, Puskar mela and many such festivals, large number of people come together and gather at particular religious places; in other time the same spot remains empty.



**Fig 3:** Left side: initial concepts resembling basic structure of religious prevalence where the marked (A) has taken to the final for further exploration and (B) other forms. Right side: concept may be used in festive locations; similar approaches may also be developed for varied context.

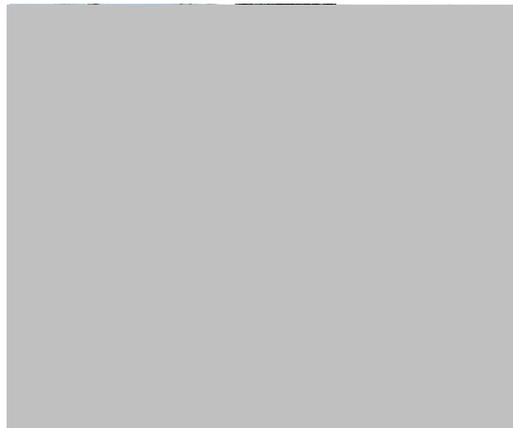
It is seen that during those festive times people face a lot of problems to access toilet facilities in case of urgency. Usually government makes some provisions for temporary toilets in the outskirts of these areas but still those are not found to be so helpful for the people because the people hesitate to move far away from their place and also face problem because of the crowd. Henceforth people urinate in the side by areas polluting the festive environment and disturbing the aesthetics due to the unavailability of public toilets in the nearby areas. Particularly female and elderly [4] face a lot of problem due to the same reason; privacy and ethics become major concern while attempting such public facility.

A portable toilet that should give a festive look and would fit to the scenario, keeping in mind the religious sentiments of the people would be a good idea. The toilet must be compact and clean as well. Fig.3 (left side) expresses some concepts where the marked (A) has taken to the final, while (B) expresses other possible forms; and the form and overall look should be in such a way that, Fig.3 (right side) it matches with the festive character. Such development may be considered in different contexts of festivals and fairs, and be evaluated its effectiveness.

#### **City locations like bus stops**

Basically job holders and other daily commuters go out of home in the morning and return back during the evening time. As a normal practice, before leaving home, people complete their daily routine at home itself, but at the time of returning, people in general, may find an emergency to use toilets before reaching home. Today's cities are not provided with enough toilet facilities at the peak time in the areas where it is required the most such as bus stops and the other similar nature crowded areas.

Fig 4 provides such a concept. The form should go along with the character of bus stop. The units (single or few attached one after another) may be transported to the location by transporter engine to the spot and after use may be transported back for servicing. The design is conceived as a portable and compact toilet individual unit that would serve the need of the city people during the peak time in bus stops, and it is expected to serve as safe, hygienic and clean.



**Fig 4:** Background and concept to fit in bus stop context. (A) clockwise from left-top common bus stop followed straight line structure, top-right is a sample of curvatures are in use, right-

bottom is a situation of bus stand, and left bottom is a concept of new look bus stop; (B) form rendering of a new concept of mobile toilet; (C) open door view of the concept; and (D) the mobile toilet unit (door closed) and bus stop- the scenario that may be experienced.

### **Urban and outskirts picnic spots**

Picnic has curved its own position in the Indian culture and draw participation of all age groups and strata of life. Whatsoever be the our daily life, no matter how hectic our schedule may be, we still find out time to spend some quality time with our near and dear ones at some place of serenity away from the hustle and bustle of city life. But one important and basic need that has never been given attention is the toilet and sanitary facilities of the picnic spots. Generally, picnic spots being in the out skirts of the cities, even if toilet facilities are provided in some specific picnic spots, it generally escapes the radar area of the municipal corporation and is thus not properly managed. Fixed structures always are also not inviting because the spot does not have picnic every day and other time it should not make an eye sore appearance in the open scenic beauty.

Thus in order to facilitate the general masses with proper sanitation facilities with clean, hygienic, safe and most importantly the privacy is required to be maintained and at the same time it should be also aesthetically pleasing. Hence this picnic scenarios is taken as third consideration for designing a toilet system that can be transported to and fro between service station to the spot as and whenever required basis. Fig 5 is such an ideation exercises initial attempts and Fig 6 expresses the visualization when it is placed in a location.



**Fig 5:** Utility and form generation exercises. (A) and (B) act as inspiration, where (C), (D), (E), (F) and (G) are the form explorations; (H) is the functional layout of different components and (I) is CAD exploration.



**Fig 6:** On location visualization of the concept. (A) and (B) in open picnic spot and on a road side location (showing without door views), and (C) the concept's overall exterior look with door closed.

### **Toilet Management and Regular Maintenance**

These toilets should be basically maintained by the municipality. The design and specifications need to be made with lifetime management in mind. Materials and fixtures should be resource efficient, durable, vandal resistant and easy to clean. Locks, signage and access paths should be provided.

Risks and misuse can involve threats to a user, staff, property, environment or reputation. A risk management plan for toilet maintenance should be developed covering the following risks: (a) public toilets can often create an environment for anti-social, illegal behaviour, (b) poor maintenance and cleaning, (c) physical threat/ violence towards cleaning staff, (d) Vandalism, (e) Slippery surfaces and (f) Septic tank loading, etc. A security arrangement requires to be site specific. Cleaning should relate to the frequency of use. The toilet facilities should be audited regularly to assess wear of equipment (including information about general maintenance, graffiti, security and other issues) at specific time gaps to ensure the toilets are being well maintained, rather than wait for equipment failure report. A contact phone number for maintenance (and relevant) issues may be placed on a sign outside the toilet facility to report problems or issues directly to the municipality who will relay the information to the contractor.

### **CONCLUSION**

This is a hypothetical project of a theme of a mobile toilet with specific reference to use in large gathering. Mobility of the whole device is being on wheels and will have specific waste disposal facility when the device is taken back to the waste disposal area. The whole device is an independent envelop for two persons use which houses all relevant facilities for refreshing and can be used only for urination as well as defecating facilities either two units of male urinals, for two females commodes or one male urinal and one commode for female use. This can be used by single person as well as by two persons at a time with individual privacy. Context specific identity elements can be used for creating specific ambience and provide privacy and convenience facility, and can be relocated as and when ever and where ever it requires.

Basic issues covered in this exercise of design ideation are:

- To give an Indian look/ accent to the toilets, so that it could be widely accepted.
- Towards devising a toilet system that would serve the people in a multipurpose way. Though it was taken into account just three places of interest but the design ideas proposed here in are such that these can be used at other places too, owing to its compactness and mobility.
- The toilets can be used for sharing information with the masses such as: (A) In fairs and festivals this structures can be used to display emergency phone numbers, route chart and timing of events and also can be used as a land mark or identification point. (B) In the bus stands or bus stops it can be used to display the bus timing, bus fares etc. (C) In the picnic spots this structure can be used to display the route chart, direction map and the specific spots to visit in that area.
- Also these toilet structures can be used to use for advertisement by different companies and institutions.
- A number of portable toilets can be attached to one another by the supporting stands and can be finally connected to a truck or a tractor and can be more easily from one place to another.
- The compact structure of the toilets enables it to be placed at any place needed without occupying much of the area.

Based on the above ideation exercise and design ergonomics criteria the final design and prototype development is currently in progress.

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