

Flexible Design for Health & Safety Architecture as a Problem Solver—SAUNTER TOILETS

Kannan G. Gopalakrishnan¹ and Nishanth K²

¹Sr. Architect, EDRC – RBU, L&T Construction, Chennai

²Architect Trainee, EDRC - RBU, L&T Construction, Chennai

E-mail: ¹kanna@lntecc.com, ²nishanthkathula@lntecc.com

Abstract—Would you believe that unhygienic, unclean, improper access to sanitation is causing a **Jalianwala Bagh** massacre every day in our country?

Yes, Hundreds of people die every day because they don't have a proper place to go. A city like Chennai has only 714 public toilets for a population of 46.81 lakhs, and that too a lot of them are inaccessible, unclean, subserviced, unlit and unhygienic. 22% of these toilets cater **only** to men; 55% do not have lights; 80% toilets **charge** a fee to access them and 68% of these toilets are locked at night, thereby encouraging open defecation.

66% of women in Delhi slums are **verbally abused**; 46% are **stalked** and 30% are / were physically **assaulted** while accessing toilets.

With vice rising up, attack against women, juvenile rape, low budgetary allocation for hygiene, all of these issues gearing up to create a Jalianwala Bagh massacre every single day in our country. True patriots cannot stand this.

You should be able to use public toilets with ease, without discomfort, without having to say—"Come, let's go find a restaurant where we can go use the toilets and get away before they realize." Right to toilet is an **informal fundamental right**.

When you gotta go, you gotta go! We shouldn't need to hold it up for 2 long hours before we get home.

Presenting '**Saunter Toilets**', the future of Indian toilets. Toilets that are made of ocean containers, cheap, transportable, could 'work' 2 to 2.5 times productively than the regular toilets. When the same set of toilets can cater to a slum area from 4 am in the morning to 8 am; to a school during school hours and to a public marketplace in the evening, we only build lesser infrastructure and greater self-confidence.

1. THE PENTA POINT PROBLEM

We have more mobile phones in the country than toilets. Why did we get into this condition? Well, this can be explained by this theory.

"The way the sanitation works in India is highly pathetic". This is the statement that can be said in the most optimistic of ways. The actual scenario is much worse. The condition of sanitation in India is a snake with five venomous heads.

2. IMPROPER SANITATION

The first venomous head is improper sanitation, as we know it because we have all experienced unclean toilets and unhygienic neighborhoods at least once in our lifetime.

The city of Chennai has a population about 46.81 lakhs while there are only 714 public toilets in the entire city. Out of these only a quarter of these toilets are hygienic for human use. Some of the common problems which we see are:

- Toilets start much before the actual toilet.
- People are required to play hurdle jumping race to prevent them from stepping on shit.

Being unclean and being unhygienic is one thing but being subserviced is something else altogether. Reasons for being subserviced are:

- Negligence of sanitary workmen.
- Improper supervision and the chain of responsibility to be answerable to the public and not being demarcated.
- Funds allotted to maintain the toilets get blocked at some point as the benefit does not reach the end user.

3. SLUMS

The second venomous head being improper access to sanitation in the slum areas. We all know for sure from our latest surveys that 80% of the slum dwellers in urban areas have inadequate access to sanitation. Be it safe healthy drinking water, or adequate supply of domestic water or access to covered proper toilet or covered drainage systems, we lack in everything.

We haven't even reached an "Acceptable" state in any of the four parameters above, let alone providing "Proper Sanitations to the poor and the slums" being too idealistic and a far-fetched point.

4. LACK OF SECURITY FOR WOMEN & CHILDREN

Third and the central head of the five headed snake is the lack of security for women and children caused due to improper sanitary facilities. We learnt from a recent survey that 66% of the women in Delhi are verbally abused, 46% are stalked and more than 30% of them are or were physically assaulted at least once. These are not because they wore provocative clothing and roamed around the watering holes of the city at 1a.m. in the morning. These are only because they wanted to use the public toilets as their own house did not have any, Pity Us!

22% of the Chennai's toilets cater only to men why is this bias? 55% of city's toilets do not have lighting facility 68% of these toilets are locked at night which encourage open defecation with improperly lit toilets, which cater to men, that to only during the day time, what would the women in our country do, of they are verbally, physically and emotionally harassed every time they use the toilets, It would take eons and eons for us to achieve "Sanitation".

5. INADEQUACY OF THE TOILETS

The fourth head is inadequacy of toilets, If there are only 714 toilets in a city which caters to 46.81 lakhs people, we have hardly achieved the prescribed sanitation for 5% of population. No doubt we are not able to find toilet facilities in public areas, congregational spaces, bus stops, railway stations and market areas. Too often we see ourselves feeling:

- Toilets are located too far away.
- Toilets are smelly and of bad odor
- Toilets having no concealed space, without any Walls.
- A restaurant is a better option for sanitation.

As per norms the prescribed limit is 60 people per toilet seat, whereas we have achieved only 5% of the prescribed limit.

6. SWACHH BHARAT ABHIYAN

The fifth and the final venomous head pretty much sums up all the other heads, recently the Government of India initiated a National level campaign called Swachh Bharat Abhiyan, covering 4041 statutory towns to clean the streets, roads and infrastructure of the country. This campaign was officially launched on 2 October 2014 at Rajghat, New Delhi, where Prime Minister Narendra Modi himself cleaned a road. The Objectives of this campaign were as follows:

- To eliminate open defecation.
- Conversion of insanitary toilets to pour flush toilets.
- To Eradicate manual scavenging.
- 100% collection and scientific processing/disposal reuse/recycle of Municipal Solid Waste.

- To bring about a behavioral change in people regarding healthy sanitation practices.
- To generate awareness among the citizens about sanitation and its linkages with public health.
- To strengthen urban local bodies to design, execute and operate systems.
- To create enabling environment for private sector participation in Capital Expenditure and Operation & Maintenance (O&M) costs.

This campaign was also called as Clean India Initiative, set to achieve the above objectives. All the four venomous heads which have been discussed only add fuel to the fire, none of which really helps the Swachh Bharat Abhiyan, the facts are set, the balls are in motion, and there is nothing that we could do to help this Clean India Campaign if the situation prevails at this peace.

This is certainly not what we wanted; a question arises of what actually we want for a better sanitation in our country, perhaps the answer to this question is addressed in the next section.

7. SOLUTION

The solution seems very simple; we just need to build more and more toilets each one addressing to all the problems as mentioned earlier.

A question arises that is it actually that simple to build toilets, Building materials like Concrete, Steel, Brick, Cement etc. are used to build not only toilets but also the infrastructure which we see around us, Huge amounts of these building materials including time, labor, maintenance are being spent for building and manufacturing every single piece of infrastructure around us.

8. RESOURCE ANALYSIS

Assuming a normal distribution of similar survey results across the length and breadth of the nation (which is optimistic, at the least), if it costs us 2 Lakh INR (approx.) to build a normal toilet of 6 cubicles and it also costs us 40,000 to 50,000 INR (approx.) annually to maintain that toilet. In order to satisfy the toilet demand of our current population we need to be building at least 32, 00,000 of such toilets with 6 cubicles each. As mentioned above assuming that it takes 2 lakh INR for construction of each such toilet, in order to build 32, 00,000 of these toilets we need 640 Billion INR. Similarly assuming on an average construction period of 2 months per toilet and 100 toilets built simultaneously, it takes about 64000 months to build 32 lakh of these toilets, this number is assuming that the population of India is not going to expand from today till the time we complete it i.e. 64000 months.

To translate this to more realistic terms, let us just say that in order to solve the sanitation problem of India's current

population in the next 5 years, we need to be building 32,00,000 toilets in 60 months, which is 53,000 toilets a month, 1,780 per day..., 74 toilets per hour. So, we need to build more than 1 lakh toilets parallel (at 1 lakh different locations) continuously, strenuously for the next 60 months so that we can achieve our ordeal.

Next is the money impact. The total estimated cost for solving the complete sanitation problem of India as per the standards would be close to 640 Billion INR. In simpler terms it is 9 times the amount of money allocated to build 100 smart cities in India, and about 10 times the money spent at the Melbourne Commonwealth Games, and it approximately costs about 22 Statues of Unity, the tallest freestanding statue in the world.

So to solve the sanitation problem in India, we need about 640 Billion INR of money and 64000 months of time to build these toilets, Isn't this just fantastic.

Clearly, we don't have the specified amount of money nor do we have the specified amount of time in order to build toilets for a population which was 1.252 Billion in 2013. It is now an undisputed fact remains that we will be achieving sanitation for the current population only if we work with imaginary numbers and impossible targets if we consider the current conventional method of making toilets.

Hence the solution is to introduce a non-conventional method of constructing toilets which requires much lesser money to construct at much lesser time, therefore we introduce you the **Saunter toilets**.

9. THE SAUNTER TOILETS

Imagine somehow we can circumvent all the time and costs incurred to a bare-minimum, will we be still able to make this happen? A clean India?

Saunter toilets are toilets that are designed as per Indian and International standards, highly hygienic, clean, efficient toilets that can be of a constant use, and are 2-2.5 times more productive than the regular toilet, twice as durable as a regular toilet, even after its time is done, we can re-use the materials almost completely.

Toilets are made of Ocean Containers. A typical ocean container can be split into two such toilets which we had designed; each of the toilets will still have 6 toilet cubicles, washbasin area, and a drinking water point. All designed as per latest Indian and international codes and standards. These toilets can be mounted on wheels, and can be

moved across the city like a pick-up van. These toilets can serve the slum areas from 4.00am in the morning to 8.00 am in the morning, at a time when the slums need them most.; they can then be transported to government schools, where the school children are in dire need of clean and proper access to sanitation. Cleaner toilets are proven to ensure more children attending schools. As soon as the school gets over, these toilets can be transported to areas which are busy, like street shopping areas, bazaar streets, and busy nodal junctions.

We in India believe in a space being too busy at one particular time and rather empty at the other times, and one space being used for multiple reasons by multiple people.

The idea started with a simple question - Why can't the toilets be made to do double shifts? We do not intend to 'build' toilets in government schools as these toilets cannot be used or shall remain dormant between 4pm in the evening to 8.00am in the morning of the next day.

More details of material, construction and detailed design shall follow.

10. MATERIAL

These toilets are made of Ocean containers, which can be purchased from the ocean liner companies. These companies sell used containers at a much cheaper price. Used containers might not be fit enough to cruise the high seas in a cargo ship. But they are definitely useful as a toilet, if we design it the right way.

Table 1 : Measurements of 20'foot Standard Container

Exterior	Interior	Weight
Length 6.058 m	Length 5.898m	Tare weight
Width 2.440 m	Width 2.352 m	2200kg
Height 2.502 m	Height 2.414 m	

11. ADVANTAGES

Strength and durability:

Shipping containers are in many ways an ideal building material. They are designed to carry heavy loads and to be stacked in high columns. They are also designed to resist harsh environments, such as on ocean-going vessels or sprayed with road salt while transported on roads. Due to their high strength, containers may be adapted for secure storage.

Modular:

All shipping containers are the same width and most have two standard height and length measurements and as such they provide modular elements that can be combined into larger structures. This simplifies design, planning and transport. As they are already designed to interlock for ease of mobility during transportation, structural construction is completed by simply emplacing them. Due to the containers' modular design additional construction is as easy as stacking more containers. They can be stacked up to 12 high when empty.

Labour:

The welding and cutting of steel is considered to be specialized labor and can increase construction expenses, yet overall it is still lower than conventional construction. Unlike wood frame construction, attachments must be welded or drilled to the outer skin, which is more time consuming and requires different job site equipment.

Transport:

Pre-fabricated modules can also be easily transported by ship, truck or rail, because they already conform to standard shipping sizes.

Availability:

Used shipping containers are available across the globe.

Expense:

Many used containers are available at an amount that is low compared to a finished structure built by other labor-intensive means such as bricks and mortar — which also require larger more expensive foundations. Construction involves very little labor and used shipping containers requiring only simple modification can be purchased from major transport companies for as little as 60,000 INR each. Even when purchased brand new they are seldom more expensive than 1, 40,000 INR.

Foundations:

Containers are designed to be supported by their four corners making a very simple foundation possible. As well the top four corners are very strong as they are intended to support a stack of other containers.

Benefits of construction using shipping containers:

- Strongest building construction on the planet
- Earthquake proof
- Fire proof

- Tornado / Hurricane proof
- Strong non-corrosion Corten steel
- Extreme security
- Recyclable - Green construction an

Modifications

- Saves trees
- Unibody construction
- Ideal for multiple floors and levels
- Fast construction
- Insulation: bonds easily with space-age Ceramic
- Insulations
- Easily adapted to Prefab automation
- Easily adapted to Custom homes
- Economically covered with traditional stucco, Vinyl siding, woods, or brick

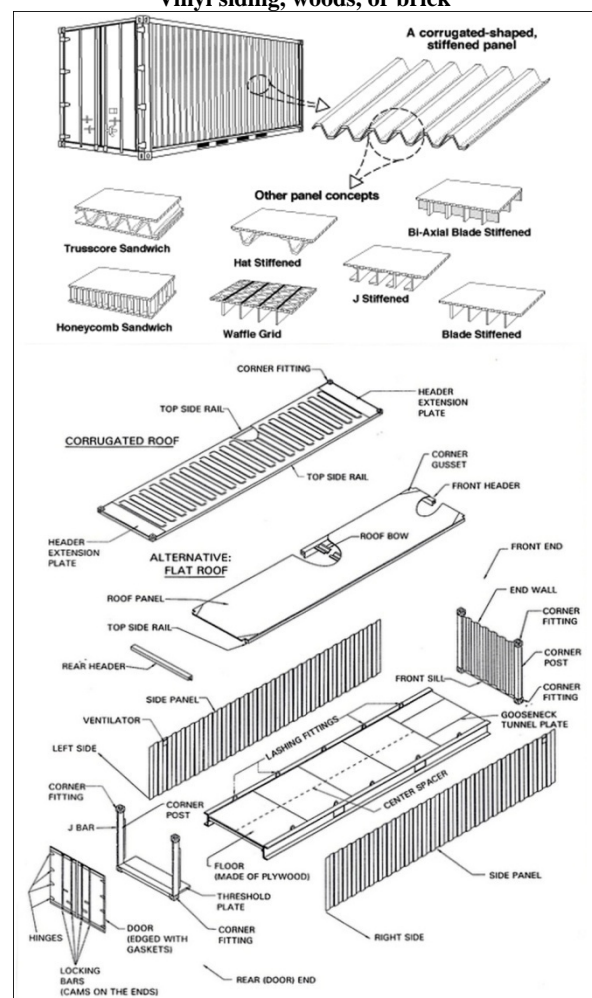


Fig. 1: Construction of Ocean Shipping Containers

12. DESIGN

The height of the whole toilet area with respect to the ground isn't much high either. Otherwise we need to think

unnecessarily of how to achieve the height., steps access ramps for the physically challenged, and again would add to cost. The height of the toilet floor is hardly 200mm from the Formed Ground Level.

Each Ocean container can be used to produce 2 toilets. Each of these halves can accommodate up to 6 WC cubicles plus 3 tap for wash plus 1 tap separate for drinking water. The water supplied to the toilets and wash are regular domestic water whereas potable water needs to be supplied to the drinking water tap, thereby requiring a partition in the water tank.

Each of the cubicles and the entrance to the toilet plus the wash area are well lit during the dark times using luminaries. These luminaries are powered by a solar power panel and a power bank located in the roof of this vehicle.

Vinyl flooring, in seamless fashion for the entire toilet is easy to clean and maintain., SS toilet seats with water-saving push-type taps instead of the cork-screw types, which might waste water when left open, natural ventilation to each toilet cubicle, partitioned by HDPE / Particle board, whichever is easily source-able for the factory.

The sewage from these saunter toilets can be processed by effectively collecting the sewage into soak pits, collection chambers and percolation pits, located at various strategic points and thereby processing it for manure or biogas.

Also, wherever these soak pits, collection chambers and percolation pits are not available or out of reach, saunter toilets can simply be connected to the existing or the main sewage line through manhole or various other means.

At places where there is no existing sewage line, these saunter toilets can be used also as mobile toilets, sewage gets collected below the floor in to sewage collection tank and their by processing it to solid and liquid waste management inside the tank, this tank should be cleaned at defined intervals and the solid waste can be sent to manure or biogas processing whenever the saunter units could get close to one of these plants..

These toilets also consume less energy, A solar panel is fixed right on top of the modules which helps reducing energy consumption and also helps in rain water harvesting through its slope, thereby making these saunter toilets green.

Utilization of less space and usage of ocean container material make these saunter toilets cheap and economical to build. Saunter toilets are productive, In a country where motorcycles are purchased based on mileage, it only makes sense to design a toilet that could work for 20 hours rather than an usual toilet that could only work for 8-10 hours.

Addressing to female and children safety, female toilets are well lit and have siren alarms which are placed for the safety

and protection of women. Male and Female toilets have separate access and have a definite demarcation of the cubicles by not encouraging visibility of the opposite sex.

Some cost of the toilet can be obtained back by taking certain income generating methods. There are 2 things that almost all toilets have which can generate revenue. One is the bio-waste itself, which, when properly composted can help manufacture manure. The other is the most useful thing which is being overlooked by many people. It's advertising. We have at least 3 complete full faces of walls which are free to be used by us for advertising. We can get all the international brands to advertise in this as this is going to be manufactured in large numbers and we are going to see them in every corner of every street. Since these kinds of toilets would become common place in the near future, companies would like to advertise with us. In some areas, the advertising can be substituted by displaying social awareness messages by NGO's, population control, save the girl child campaign, child labor protests, polio campaign etc. This can generate considerable revenue and provide the awareness that we require for the nation to flourish, these are some fringe benefits of saunter toilets.

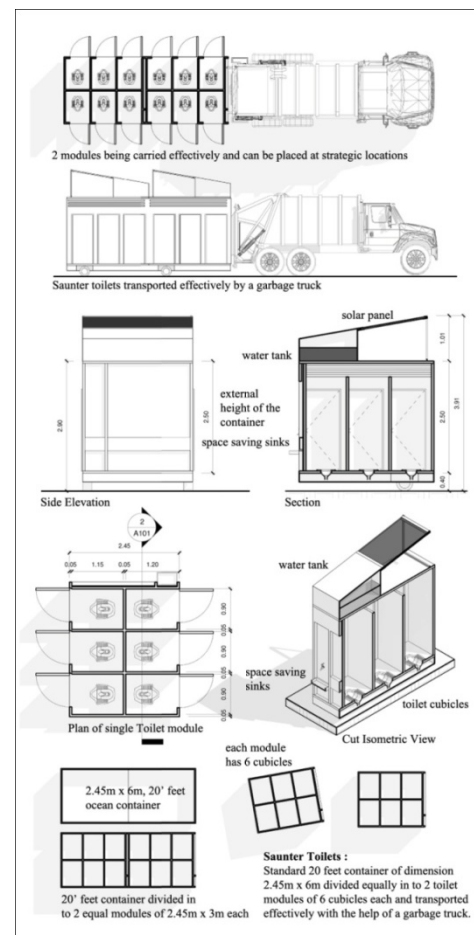


Fig. 2: Saunter Toilets

13. USAGE OF SCHEMES

This usage could also be done in 2 additional schemes.

14. STALLED TOILETS

Stalled toilets are nothing but the same Saunter toilets that do not, well, saunter. They do not move. They are not connected to any vehicles. They are just mounted on pedestals or raised platforms just so as to prevent water from getting inside the toilet floor.

These toilets are semi-permanent in nature. For example if a school decides to have the toilets round the clock all through the year except for those 2 months of summer vacation, we can have the Stalled toilets installed at these locations for 10 months in a year, these toilets can be transported to other locations during the 2 months. For examples, city fairs, exhibitions, and other gatherings usually are organized in a city / town during summer vacations. These can be of very great importance at these locations.

15. SPARE TOILETS

It never hurts to have spare stuff of everything. Even toilets. In this case, spare toilets are specific toilets which can be used for miscellaneous purposes such as being attached to a bus, army caravan, camping area, open ground wedding parties, new-year parties, festival times,

These are toilets that can be placed along the highways, which will be useful for all the vehicles that cruise along the highway. They can be placed at strategic locations.

16. SUMMARY

In summary, Saunter toilets are cheap, efficient, durable, ergonomic, standard toilets that can be used almost anywhere. The compact size, quick building mechanism, low price in building all helps in making saunter toilets the most preferred toilet design technology, especially if what Shri. Narendra Modi told during October 2nd to be true – “GANDAGI KA NAAM AUR NISHAAN NAHI REHNE DENGE”.

BHARAT MATA KI JAI

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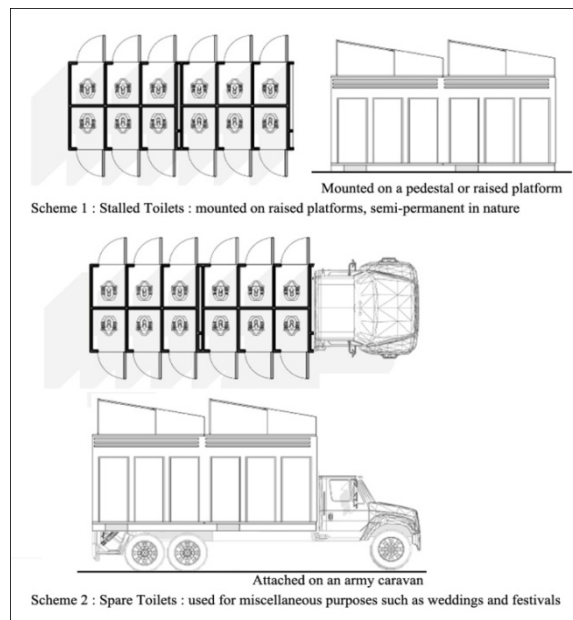


Fig. 3: Various Schemes of Saunter Toilets