LOW COST ACCESSIBLE TOILETS FOR PERSONS WITH DISABILITIES
(A COMPILATION OF SELECTED IDEAS TO BUILD LOW COST TOILETS WITH UNIVERSAL DESIGN IN RURAL AREAS)

Is this Sulab Shouchalaya( toilet) or difficult to use toilet?

Toilet for Men/Women and persons with Disabilities. A common sign in airports, bus stands which are not gender sensitive. Women with disabilities are forced to use this common toilet. Universal accessible design toilet for men and women are also made accessible.

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Why did we compile this manual?

Dear readers of this manual,

We wish to share with you why we are writing this manual on accessible toilets. There are many reasons behind this.

We conducted a study on the impact of disability on women in rural areas in India. The study was conducted for the National commission of Women, Government of India in the year 2002.

The study reveals how access to toilet facilities is the key factor for a woman with disability to lead a life with dignity and respect and lack of access can lead to abuse and atrocities against disadvantaged women.

The actual images of Sulab Shouchalaya(suppose to be Easy to use Public toilets built in Indian cities) in Bangalore on page 5 compelled us the need to share how lack of awareness can lead to inaccessible designs of public buildings.

In 2010 a conference on water and sanitation many designs of low cost toilets for rural areas was shared and none of them had taken the needs of persons with disabilities, senior citizens, pregnant women, women carrying children into account while designing the toilets. Why toilets are important? We are sure our readers know the reason. Look at the actual images of Sulab shouchalay, Bangalore (Easy to use toilets) in Indian cities.

The image of low cost toilets and high cost toilet shows the lack of awareness and sensitivity among the designers.

In this manual we share bad and good ideas of toilets and we hope it is of some use in the change of “Mind set” of designers of building and public facilities.
Low cost Accessible toilets for persons with disabilities

1. Poor sanitation negatively affects health, as well as dignity. Persons with disabilities already often marginalized, are further disempowered and even put at risk because of a lack of sanitation facilities. Persons with disabilities need access to private and secure areas to defecate. Where they do not exist, women and children with disabilities often use the night as privacy, which exposes them to the risk of abuse or other violence. Ignoring their natural bodily functions out of fear not only causes discomfort but also increases the likelihood of health problems such as urinary tract infections, chronic constipation or mental stress, especially during menses for girls young women with Disabilities. Aging and Disability go hand in hand. Many times older persons without accessible sanitation facilities lead a life in unhygienic conditions which leads to neglect by family members and community.

Access to appropriate and, most importantly, gender-sensitive WASH facilities would have a significant positive impact on both the daily lives and long-term prospects of millions of persons with disabilities that are currently living without them. Efforts to improve WASH services not only benefit women; they benefit everyone.

In most developing countries, persons with disabilities have poor access for health, child care, hygiene education, water, and sanitation provision. They remain excluded in the mainstream development programmes are most likely to get marginalized.

Disability in a person leads to many challenges and needs which are as diverse as nature, intensity of disability and the socio, cultural, economic condition they live in.

They know common habits and problems within a community, what kind of services are required, and where they should be built to be most effective so that it can meet their needs as well as other members in the family. In a school health programme sanitations must include the specific needs of children with disabilities which are not mere building ramps and railings.

Persons with disabilities should, therefore, be included in the planning, design, and implementation of WASH interventions. Involving them in community water and sanitation-related decisions can be an empowering experience. This can improve their status, creating opportunities for
income generation, as well as providing them with other public and influential roles – thus potentially making gender equality a reality. WSSCC advocates strongly for incorporating disability /gender and inclusive strategies into WASH Programmes.

2. What are Universal accessible strategies?

**Universal design** refers to broad-spectrum ideas meant to produce buildings, products and environments that are inherently accessible to both people without disabilities and people with disabilities.

The term "universal design" was coined by the architect Ronald L. Mace to describe the concept of designing all products and the built environment to be aesthetic and usable to the greatest extent possible by everyone, regardless of their age, ability, or status in life. However, it was the work of Selwyn Goldsmith, author of Designing for the Disabled (1963), who really pioneered the concept of free access for disabled people. His most significant achievement was the creation of the dropped curb - now a standard feature of the built environment.

Universal design emerged from slightly earlier **barrier-free** concepts, the broader accessibility movement, and adaptive and assistive technology and also seeks to blend aesthetics into these core considerations. As life expectancy rises and modern medicine increases the survival rate of those with significant injuries, illnesses, and birth defects, there is a growing interest in universal design. There are many industries in which universal design is having strong market penetration but there are many others in which it has not yet been adapted to any great extent. Universal design is also being applied to the design of technology, instruction, services, and other products and environments.

3. Sanitation with universal accessible design

We need to build sanitation programme with universal accessible design to include persons with disabilities, senior citizens and other persons with special needs arising due to sensory, motor and other impairments.

This needs a rights based approach which enable and empower persons with disabilities to express their needs and also participate actively in building sanitation facilities. This needs using the existing knowledge available across the globe, build new knowledge relevant to socio-cultural-economic conditions of Indian community, research and validate new designs and approaches and promote evidence based documentation for scaling up sanitation with universal accessible standards.
Objectives

1. To understand the specific features of universal accessible design in sanitation programme.
2. Identify the barriers in the existing designs.
3. Identity strategies for satiation with universal accessible design based on global knowledge and local needs.
4. Identify partners to develop inclusive rights based universal accessible sanitation designs and demonstrate the efficacy in Indian communities in diverse socio-economic-ecological and cultural environments.

The following recommendations are becoming more common in public toilet facilities, as part of a trend towards universal design:

- A wheelchair-height toilet, to help the user on and off the toilet, with handles (grab bars);
- An emergency alarm, in the form of a red cord that reaches the ground, connected to a buzzer and a flashing red light;
- A wheelchair-height sinks and hand dryer;
- Wheelchair-width doors leading to it, allowing sufficient space for a wheelchair when a door is open.

Accessible toilets need larger floor space than other cubicles to allow space for a wheelchair to maneuver. This space is also useful for people who are not necessarily wheelchair users, but still need physical support from someone else. A wheelchair-height changing table is also recommended, but remains rarely available. Accessible changing tables are low and accessible to a wheelchair user, and long enough for a caretaker to change an older child or adult with a disability.
Case study of Sharada

Gaps in policies

‘I was born without any disability in a village near Chinthamani in the Kolar district of Karnataka. In my family I was the eldest of all the sisters. One day, when I was thirteen years old I was caught in a traffic accident and my spine got damaged. All of a sudden my life changed completely, I could barely walk and not go to school anymore as it was too far away and there was no toilet in the school.

Even though I really wanted to continue studying I couldn’t because the school had no toilet and with the bladder problem I got in the accident it became impossible. My teacher suggested that I could continue my studies in the National Open School, and so somehow I managed to complete 12th standard. Sometimes I don’t even know how I did it; there were so many problems I had to face. The contact classes and exams held for me were conducted on the third floor of the building, so my father had to carry me upstairs.

I started to feel like a burden to my father and the rest of my family and when I noticed that I started to gain weight and how difficult it was for my father to carry me, I quit my studies and started looking for a job. I really wanted to contribute to the family as the need for some extra money was great, but I ended up with nothing, it was impossible finding any work. No skills training were available in my village and everybody was self-employed so there was no need for me.

The local school says they implemented integrated education scheme But there are accessible toilets, transport and trained teachers..

The government had reservations for disabled people like me, but there were no recruitment policies and no jobs available. So, very sad that I could neither continue my studying nor get a decent job, I started rolling “agarabhatts”.

My mother died two years ago and whilst I live with my father my two younger sisters have gotten married and are living happily with their husband’s families. I survive on the disability pension that the government provides, but it is a very small amount and the money never comes on time.

This life has been so unfair to me, the only time I feel happy is when I play with my nieces and nephews, but even then I become sad because I
want to have children of my own. I feel depressed when I see other women, no one will ever love me and I will never get married. Instead the people in my village look down on me and call me names.

However Hussein Banu, teaches Braille in Raichur and has faced problems which reveal that there is a long way for us to see a gender sensitive society. She says, "We face a lot of difficulties when undergoing education with so called normal students. The major problem I have faced is constant discouragement from the teacher, who did not allow me to participate in the school activities such as games, drama, because I am disabled. That hurts me a lot. Governments schemes are just on paper and do not reach poor people. Employment for blind persons is so scarce; I do not understand who is getting benefit from the reservation? Lack of toilet in school was a major hurdle. I used toilet in a house near by the school. But I know Education plays an important role in the empowerment of women.

**Coming to school is a waste of time!**

Janaki was not in school when an evaluation team visited the village school in Pavagada. The team went to Janaki’s home and was surprised to see Janaki at the door playing with a street dog. They asked Janaki, "Why did you not go to school today?" She replied, "Miss (teachers are addressed in this manner) asked me not to come to school." The team was shocked to hear this. They went inside and met Janaki’s mother Parvathi. They asked her the same question as to why Janaki was at home and not in the school. Her mother replied that the teacher feels it is a waste of time coming to school because Janaki is not learning anything. We went to school to find out why the teacher felt this way. The teacher when asked was honest and admitted that she indeed had asked the child not to come because not only is she not learning anything but she is also mischievous and does not allow other children to learn she admitted since there is no one help Janaki to take to toilet and it is not possible for the teacher to help janaki to ease every time. We asked the teacher who was trained in inclusive education as to what had she learnt in the training as they should have taught her how to help Janaki learn and ensure that she did not disrupt the class. The teacher replied "Madam all that I learnt in the training was to identify disability and new terms." We asked another teacher, who was not trained, whether there was a need for a 45 days training to identify disabilities. She said that she could identify disabilities as they were so obvious!
Toilets and women

Geetha lives in a remote village in Orissa. The village uses nature to ease themselves every day. But Geetha is paralyzed below the waist and lives with her old mother…when an Ngo asked how she manages everyday she said young men carry her to the field. When we asked was there any abuse she said no…only after a lot of assurance from our end she said “How can I refuse? They help me every day”…Government spends so much money on water and sanitation but they have no inclusive policy to ensure toilets are accessible for disabled persons …

What do we mean by universally accessible toilet?

It simply means a toilet which everyone can use without difficulty.

Now the question what are difficulties and who are the persons who find it difficult to use a toilet which is built for “Abled bodies’ persons”?

1. Persons with difficulty in moving may find it difficult to use toilets if there are steps.

2. Persons with seeing difficulty and moving difficulty may find it difficult to use Indian commode which needs a person to Squat on the floor.

3. Persons with moving, seeing and intellectual disabilities may find it difficult to use a toilet without support bars to sit -get up, wash, open and close the door etc

4. Older persons may find it difficult to use without support bars to sit -get up, wash, open and close the door etc

5. Pregnant women persons may find it difficult to use without support bars to sit -get up, wash, open and close the door etc and to squat

6. Children may find it difficult to use without support bars to sit -get up, wash, open and close the door etc

The above list shows only youth without special needs can use the toilets without accessibility features. However a toilet with universal accessibility features can be used by everyone without difficulty.
Some examples of inaccessible toilet designs

Is this Sulabh to use for persons with Disabilities and senior citizens? Here are actual photos of a public toilet names Sulabh Shouchalaya(Means Easy to use Toilets) in Bangalore. The design shows lack of awareness of the designers about the needs of persons with disabilities, senior citizens, pregnant women and others with diverse needs.
Some examples of low cost toilets without universal accessibility designs

Some examples of accessible Toilets

CBR Toilets with universal accessibility features.
Accessible but high cost toilet

Accessible low cost toilet

Support bar from the top
Annexure

Low-cost materials boost toilets construction in rural Andhra Pradesh

Vasuki Belawadi

Medak – Andhra Pradesh: It’s a hot, sultry afternoon and most of Dharmaj pet village in Medak district prefers to stay indoors. A few meters from the entrance of the village, a group of six is quietly going about preparing the right mixture for mud bricks. The owner of the brick unit Parashuramulu gives instructions on the quantity of fine sand to be added to the mixture. He wipes the sweat off his brow even as he dusts off the two brick moulds and calls out to his cousin to bring the mixture to the machine that pops out the bricks. He has two large orders to deliver in about a fortnight’s time.

“I’m hoping to get a bigger order by the time I complete this lot,” he says. Parashuramulu is referring to an order he and 10 others are likely to get from the district administration for the Total Sanitation Campaign project in Medak district. Parashuramulu is the owner of one of the 11 production centers that UNICEF & Medak Volunteer Agencies Network (MEDVAN) helped establish in various blocks of the district.

UNICEF identified and provided technical support in setting up compressed earth brick (CEB) production units while MEDVAN provided the necessary training to 11 entrepreneurs some of whom are already trained masons under the UNICEF’s Masons Training Programme for its total sanitation campaign. “The 15-day training they provided helped me gain confidence in setting up this unit. I think once
people begin using these bricks, it will become a rage,” says Parashuramulu.

Parashuramulu points towards a room where the CEBs have been stored. The bricks will need to be treated for 14 days with water before they can actually be used for construction.

Although they take some time to produce (the present machine can only produce two bricks at a time) a major advantage with such compressed earth bricks is that they have 40% more compressive strength and do not require any plastering thus bringing down the cost of construction by over 40%. The bonus is that the construction looks aesthetic without having to do any extra embellishing.

Narasimhulu, a beedi worker was so impressed with the look of the brick that when he decided to construct racks in his living room, kitchen and bedrooms, he chose CEBs over country bricks. “They look so elegant! I didn’t have to spend on cement and yet the racks look so beautiful,” he says.

Parashuramulu is also busy attending Mandal level meetings, talking to local Gram Panchayat members and other leaders in the village to inform them about the product. MEDVAN, the district network has plans to promote CEBs through the local cable TV network, sharing information in district and mandal level meetings and bringing people to visit the centre.

The Andhra Pradesh government is keen on fully sanitizing rural areas under its Integrated Novel Development in Rural Areas and Model Municipal Areas (INDIRAMMA) programme. However, scarcity of cost effective construction materials in the rural areas is always a problem.

“Besides training masons, UNICEF hopes to provide solutions by promoting more CEB production centers through young entrepreneurs. We plan to promote onsite production so that transportation costs can be cut and construction costs can be reduced further thereby helping the state realize total sanitation,” says Michel Saint-Lot, State Representative, Andhra Pradesh and Karnataka.

UNICEF has already pioneered the concept of using low-cost construction material to construct toilets under the Total Sanitation Campaign programme (TSC). The cost of each toilet is just about Rs.3,500 (USD 88.60) including all materials. But when CEBs are used to
construct toilets, the cost of a toilet will fall further to Rs. 2,200 (USD 55.70)!

Advantages of Sulabh Toilets

Key advantages of Sulabh flush composting toilets are:-

• Hygienically and technically appropriate, and socio-culturally acceptable.

• Affordable and easy to construct with locally available materials.

• Design and specifications can be modified to suit householder's needs and affordability.

• Eliminates mosquito, insect and fly breeding.

• Can be constructed in different physical, geological and hydro geological conditions.

• Free from health hazards and does not pollute surface or ground water, if proper precautions and safeguards are taken during construction.

• Can be located within the premises as it is free from foul smell and fly/mosquito nuisance etc.

• Can be constructed on upper floors of houses.
• Pits are generally designed for 3-year dislodging interval, but if desired, it can be designed for longer periods or it can be reduced even to two years.

• Maintenance is easy, simple and costs very little.

• Needs only 1.5 to 2 liters of water for flushing, while conventional flush toilet needs 12 to 14 liters of water.

• Needs less space than a septic tank toilet system.

• Does not need scavengers for cleaning the pits or disposal of sludge. This can be done by the householder.

• Makes available rich fertilizer and soil conditioner.

• Can be easily connected to sewers when introduced in the area.

• A low volume flushing cistern could be attached to avoid pour flushing.

**Minus point of Sulabh toilets - They are not accessible**

No Need of Vent Pipe, Sulabh flush compost toilets do not need vent pipes as gases are dispersed into the soil.

**Why Two Pits are Better than One Pit**

Single leach pit is appropriate only if they can be dislodged mechanically by a vacuum tanker, since its contents are not pathogen-free. In the two-pit system, since one pit is used at a time, the filled up pit can be cleaned manually even by the householder himself because of the long period of digestion which makes it free of foul smell and safe for handling. In the single pit system, dislodging has to be done almost immediately after the pit has been filled to enable its reuse; this involves handling of fresh and undigested excreta which is hazardous for health. If a deeper and larger single pit is provided, dislodging operation will be difficult and chances of pollution would be more especially where the ground water table is high.
Fixing of Pan and Trap

Squatting pan of design specified for pour flush and trap with 20mm water seal should be used in Sulabh toilets. The pan can be of ceramic, fiber glass, PVC, mosaic or cement concrete. With fiber glass pan, traps of HDPE are used. With ceramic and PVC pans, traps of the same material are used. For mosaic and cement concrete pans, traps are of cement concrete.

Shape of Two Pits

As far as possible, separate circular pits should be constructed as these are structurally more stable and the sludge is dry and safe to handle. Where separate circular pits of standard sizes cannot be constructed due to space constraint, pits of smaller diameter (not less than 750mm) are provided, but the depth should be increased suitably to provide required storage volume and infiltration surface area. If it is not possible to construct small diameter pits, combined oval, square or rectangular pits divided into two equal compartments by a partition wall can be provided. The partition wall should be taken 300mm below the bottom of the pit and be plastered on both sides with cement mortar of 1:6 ratio. The partition wall and pit lining in 300mm width adjoining the partition wall should not have holes. However, the possibility of water from one pit finding its way to the other pit is very much there. Therefore the dislodging of the filled up pit has to be done with care to avoid health hazards.
Spacing between Two Pits

The minimum space between the two pits should be one meter or equal to the depth of pits below the level of incoming pipe or drain, whichever is more. Where it is not possible to maintain this space, an impervious barrier like cut off screen or a mud wall may be provided between the two pits.

Lining of Pits

The pits should be lined to avoid collapsing. Lining could be in brickwork, stones, laterite bricks, burnt clay or cement concrete rings. Lining could be done with treated bamboos, wooden logs, tar drums depending upon availability etc. 50mm wide holes should be provided in alternate brick courses by laying bricks 50mm apart. Above the invert of incoming pipes or drains, no holes should be provided. Where the soil is sandy, sand envelope is provided or where there are chances of damage by field rats, the width of the holes should be reduced to 12-15mm.

Prevention of Pollution

To check pollution of drinking water sources, the pits in fine soils (effective size 0.2mm or less) should be located at a minimum distance of 3 meters from open wells and shallow hand pumps provided ground water table throughout the year is 2 meters or more below the bottom of the pit; if water table is higher, the distance should be increased to 10 meters. In coarser soils (effective size more than 0.2mm), the same safe distances can be maintained by providing 500mm thick sand envelope of 0.2mm sand all round the pit and sealing the pit bottom by some
impervious material like puddle clay, polythene sheet, lean cement concrete or cement stabilized soil.

Normally bacteria do not move beyond 3 meters horizontally in homogeneous soil and vertically they do not permeate more than 1 meter, however there can be marginal deviations depending upon the types and compaction of the soil. It may be noted that chances of ground water occur due to higher hydraulic load. Since in this system hydraulic load is only 1.5 to 2 litres per use, there is no such chance of ground water pollution.

Sizes of Pits

The sizes of pits where ground water level is always below the bottom of the pit and infiltration rate of soil is 30 l/m2/day, for 3 years sludge storage volume works out as follows:

Circular Combined rectangular pit divided by partition wall in two pits equal compartments. Size of each compartment.

<table>
<thead>
<tr>
<th>No. Of Users per day</th>
<th>Diameter mm</th>
<th>Depth mm</th>
<th>Length mm</th>
<th>Breadth mm</th>
<th>Depth mm</th>
</tr>
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<tbody>
<tr>
<td>5</td>
<td>1050</td>
<td>1000</td>
<td>850</td>
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<td>1400</td>
<td>1400</td>
<td>1200</td>
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</tbody>
</table>
The above depths are from the invert of incoming pipes or drains to the bottom of the pit. These depths are to be increased by 225mm to provide free space above the invert of the pipes/drains.

**Pits in High Subsoil**

Waterlogged and Flood Prone areas in waterlogged, flood prone and high subsoil water areas, the pits should be raised so that the invert of pipe or drain is just above the likely water level. The raising of pits will necessitate rising of toilet floor also. Earth should be filled and well compacted all round the pit. Interconnection between Trap and Pits the trap should be connected to leach pits through 'U' shape covered brick drains of 75mm dia PVC non pressure pipes. In case pipes are used, a junction pits. Keeping the basic design unchanged, Sulabh has a number of such toilet models for demonstration.

**Manure from Human Excreta**

One of the major difficulties for the use of human excreta as manure is the presence of bacterial and other pathogens. Human excreta contain a full spectrum of pathogens causing various infections. It should be free from pathogens before being used as manure. Another problem is psychological/chamber (250mm x 500mm internal size) should be constructed at the place from where the pipe is bifurcated to connect the two pits. The pipes of drains should have a minimum gradient of 1:15.
Uses of Pit Cover for Household Purposes

Since the pits are covered air tightly with RCC slabs, they can be used for different household purposes or even for running a small shop and so forth.

Cost of Sulabh Flush Compost Toilet

The cost of Sulabh flush composting toilets varies widely to suit people of every economic stratum. The cost ranges from US$ 10 to US$ 1000 per unit. It depends upon materials of construction of pits and seat as well as of the superstructure. The pits can be constructed with bricks or any locally available materials like stones, wood logs, burnt clay rings, concrete rings or even used coal tar drums. Similarly, the qualities of superstructure ranges from simple gunny bag sheets, or thatch to well finish tiles with R.C.C. roof, doors, wash basin, etc. Cost varies also due to size and capacity of the pits, varying from 2 years to 20 years capacity for each pit. Keeping the basic design unchanged, Sulabh has a number of such toilet models for demonstration.

Manure from Human Excreta One of the major difficulties for the use of human excreta as manure is the presence of bacterial and other pathogens. Human excreta contain a full spectrum of pathogens causing various infections. It should be free from pathogens before being used as manure. Another problem is psychological/ religious taboos associated with it. The studies carried out by the Sulabh have revealed that the content of a Sulabh toilet pit is almost free from pathogens when taken out after two years of resting period. To make it completely pathogen free, digested sludge is sun dried for 2 to 3 weeks. During drying of sludge big lumps are formed making it difficult to mix in soil homogeneously. Sulabh developed a technology to granulate such dried lumps into small size graded granules which look like processed tea
leaves. Before granulating, it is processed in a ball mill to break it into small pieces. Then it is passed through the mass mixer where the moisture content of manure is regulated by adding water. Such manure has a good percentage of plant nutrients. Besides, it increases humus and water holding capacity of the soil. The Institute has carried out experiments to monitor its manorial effects on different vegetables and flowering plants. In all the cases tested, the effect of manure on the growth of plants was very encouraging.

**Operation and Maintenance**

Operation and maintenance of a Sulabh flush compost toilet is very easy and simple:

- Before use, wet the pan by pouring only a little quantity of water.
- After defecation, pour 1.5 to 2 liters of water in the pan for flushing.
- Pour about half litre of water in the pan after urination.
- The pan should be cleaned once a day with a brush or a broom and with soap powder periodically.
- One of the pits is to be used at a time by plugging the drain for the other pit.
- Kitchen, bathroom waste water or rain water should not be allowed to enter the pits.
- Other solid wastes like kitchen waste, rags, cotton, sweepings etc. should not be thrown in the pan, this could block the toilet.
- When the first pit in use is full, the flow should be diverted to the second pit and the filled up pit should be dislodged after 1.5 to 2-year rest period. The first pit can then be put to reuse, when the second pit fills up.