

## SAN-Sadhan Hackathon: for Divyang accessible toilets



A whopping 2.68 crore people of the country suffer from some form of disability or the other, as per the 2011 census. In an effort to garner designs that would make toilets (urban and rural) accessible and affordable to such persons with disabilities, enabling them to lead productive, safe and dignified lives; a hackathon was organised at 91Springboard, Gurugram of Haryana on 14<sup>th</sup> and 15<sup>th</sup> September, 2019.

Organised by the Department of Drinking Water and Sanitation, Ministry of Jal Shakti along with the Department of Empowerment of Persons with Disabilities (Divyangjan) and Niti Aayog; the nationwide SAN-Sadhan Hackathon brought together innovators - students, start-up companies, professionals and academics who came up with unique toilet designs and solutions that would address challenges of both physically and mentally challenged individuals.

### Some participants:

**Jaisingh Narwariya** showcased a bio-toilet chair, suitable for both rural and urban areas. With multi-biodigester chambers, the unit uses anaerobic microbial consortium and is connected to a water connection. It takes 1/3<sup>rd</sup> the time of DRDO's bio-toilet decomposition and uses 1/10<sup>th</sup> the amount of water used in a normal toilet.



**Madhu, Harsh and Harshad** from VIT, Vellore came up with a design for community toilets (urban) with foldable seats and adjustable hand bars. Several of its features such as voice assistance were to support persons with visual impairments.

**Mayank Saravagi and Kriti Aggarwal's** offering was a universal layout for Divyang friendly urban and rural community toilets. Sarv

Sulabh Shauchalay is light weight and sustainable, made with local material (bamboo columns and roofing with brick walls) and can be built off site and carried to site. The wheel chair friendly design which allows for natural light has tactile tiles to suit visually impaired and wall mounted sink, wash basin and urinals to suit those who are shorter in height.

**Adit, Nilesh and Vanshika** from VIT Kanpur showed how they can transform a conventional toilet to a Divyang accessible toilet with electronic door knobs, flexible grab bars, commode with adjustable foot rest, sensor based sprinkler, composite sink, sensor based hand drier, sanitizer, light and exhaust fan; and automatic dustbin.



**Ruthir Mishra, Prakhar Mishra, Nalin Deepak, Maithil Mehta and Aman Gupta** from BITS Pilani focused on improving accessibility for all 21 categories of persons with disability. This included height adjustable commode, foot pedal control for jet system, raised tactile tiles, IR sensor for flushing, handrails, footrest that allows sitting in semi-squatting position, and an ambience suitable for people with mental disorders.

**Sharad Yadav and Dr. Biplab R. Pattanaik from Techstain Technologies** came up with a toilet design to change perception and experience of toilets. They incorporated in-situ waste processing, green sanitation and ergonomics – a design which can run for 15 years with minimum maintenance.

**Dewaj Baruah and Lakshmikant Banjarey** from Arcatron Mobility demonstrated a wheel chair that would improve accessibility and support assisting living. Frido-Go is foldable and allows a person to shower, use the toilet and travel; improving safety, independence and adjustability.



**Abhishek Sankhe, Eram Scientific:** Showcased designs for Smart She Toilet, Unisex Toilet Model, School Toilet Model and Disabled Friendly toilet with a wheeling facility

**Ravi Senji, RaVikas** – demonstrated a clip on or fit on for western and Indian toilets that would use just 250 ml of water per flush

**Sailesh Arya, Pulkit Gambhir and Ojasvi Kumar** – designed a prototype for the visually impaired and people with other disabilities featuring voice technology, IR sensor, auto flush

**Aniket Kumar, Aditya Saini** (engineering students) demonstrated how current toilets can be modified in terms of height, automatic door opening, fixing of button operated parallel bars, automatic flush and jet spray, to make them accessible.

**Manish, Dilip, Rozario and Aminulla**, final year engineering students from Tiruchirappalli of Tamil Nadu focussed on cleanliness and accessibility of toilets, by adopting a sensor interface which would provide alerts on water, cleanliness and energy through a portal.

**Shreyasi Neogi and Vaibhav Singh** (final year architectural students from Kolkata) demonstrated a design that focused on easy transfer from wheelchair to toilet seat; and a flexible and squeezable commode.



The Hackathon was open to those interested in technology and innovation and had an interesting project or ideas to develop accessible toilets within the scope of the challenges proposed.

Solutions could either be along the lines of specific products (such as assistive devices, IT innovations etc.) or allied infrastructure (such as approach mechanism, entry/exits, fitments and control mechanisms etc) and could be developed for any one of the following categories:

- Rural community use toilet

- Rural Individual use toilet
- Urban individual use toilet
- Urban community use toilet

Two winners will be awarded in each category with a Reward of Rs. 2 Lakhs and Rs. 50,000/- respectively.

The Rights for Persons with Disabilities Act, 2016 mandates universal accessibility for PwDs in public oriented premises and services such as health, transport, educational facilities as well as sanitation.



The Hackathon called for innovations in the sanitation paradigm, driven by accessibility, affordability and scalability. Participants needed to address demands of different disabilities, geographies, age group, gender and cultures. Specifically, issues of wheelchair users, amputees, visually impaired and conditionally disabled (person with fracture, pregnant women, lactating mothers, elderly, etc.) had to be kept in mind.