

Ninja Labs

Waterless Urinal

Reap Benefit, which works to empower youngsters and believes in building next-generation problem solvers, Solve Ninjas, has developed **Waterless Urinal**, that do not have to be flushed after every use. Therefore, a waterless urinal saves a lot of water, about 50 litres a day, requiring to be flushed just once after 40-60 uses.

PROBLEM

We discovered that several government schools we visited had sanitation problems. There were either no urinals, or they smelled so bad they were rendered unusable. Also, there was water shortage in many of these schools. The waterless urinal was prototyped a few times and is now being implemented in 300+ schools in Karnataka.

PROTOTYPES

The first version of waterless urinal was prototyped by pouring engine oil down the mouth of the urine bowl. Oil acted as a sealant and blocked the passage of air from the underground sewage system. It was thus successful in combating the problem of odour. Even though this was a major victory for the concept, they were major downsides to the solution. Issues:

- It required a lot of maintenance with oil having to be poured every other day
- Given the lack of manpower in government school, the solution had to be low maintenance.
- Remnant of the oil in the sewage could cause clogging.

SOLUTION

TT ball had to be placed at the mouth of the drain pipe. When urinated upon the ball would lift up, spin and allow the urine to pass through. It would then settle down at the mouth of the pipe thereby blocking all unwanted odour from the sewage system.

Read more about our prorotyping journey [here](#).

COMPONENTS

1. Metal Urinal

- Upper Body
- Funnel - with pipe
- L-Angles - attached to both sides of funnel with fasteners



2. Plastic Strainer

- to prevent leaves/ stones from entering the funnel pipe and blocking
- Specification: 2"-3" diameter
- 1 per urinal



3. TT Ball

- to block smell coming from drain pipe
- 1 per urinal



4. Hex bolt

- to support TT ball inside the pipe
- 1 per urinal



5. PVC Drain pipe

- for horizontal and vertical drain piping
- 2 per urinal



6. PVC T-joint

- to connect to drain pipe
- Specification: 1.5" inner diameter
- 1 per urinal



7. PVC L-joint

- to close the drain pipe
- Specification: 1.5" inner diameter
- 1 per entire set up



8. Mounting nails

- to fix urinals on the wall
- 4 per urinal



9. Gatta (slim wood piece) - to use if nails attached to wall are loose

- 2 per urinal

TOOLS

1. Measuring tape



2. Hacksaw blade



3. Pencil / Marker



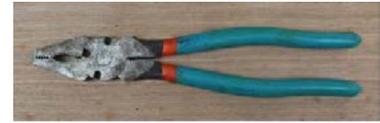
4. Drill gun



5. Hammer



6. Plier



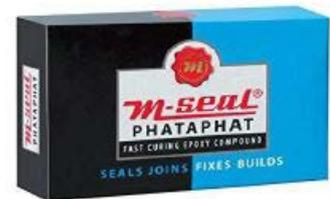
7. Screwdriver set



8. PVC glue



9. M seal



STEPS

1. Select the wall surface where the Urinal needs to be attached. The wall should be near a drain point, so that piping can be done to drain out urine from the selected space.

Choose the minimum height you have to install the Urinal at, by checking the shortest user's height and the maximum height by checking tallest user's height.

While placing Urinal and taking the height of the Urinal, leave a small gap between the Pipe and the Funnel and calculate length of Pipe needed accordingly.



2. Cut the Drain Pipe of 1.5 ft length according to required height with a Hacksaw Blade.

Make a sample layout with the drain Pipe of 2.5 ft length, putting a T-joint wherever a Urinal has to be placed. If there are partitions in the wall, cut the PVC pipe according to requirement.



3. The Urinal farthest away from the drain, will have an L-joint to close the piping at that end.



4. Check Pipe placement on the ground, after attaching all Urinals and make sure there is enough space to install the required number of Urinals.



5. Once height of drain pipe and position of Urinal is decided, again ensure there is a small gap between the funnel and the vertical PVC pipe. Hold the Urinal against the wall surface and mark the L-angle holes on both sides.



6. Tilt Urinal downward. Make punch marks with the nail on the wall, where you have marked dots for the L-angle of the Urinal to be attached. This makes hammering the nail to wall easier.



7. Place Urinal against wall again and cross check the marking is matching with mounting holes. Fix the L-angle to the wall using nail and hammer.



8. Use the plier to place hex bolt inside the Urinal funnel. Put TT ball in the funnel above the hex bolt.



9. Once all Urinals are mounted on the wall, use PVC glue on the circumference of the horizontal drain pipes and fit them permanently.



10. Take the strainer and smoothen the edges against a rough surface like wall/floor, so that the strainer side does not have an edge height.



11. Place strips of M-Seal on the strainer, curved along its edges as shown here.



12. Place Strainer on the drain mouth of the Funnel and press down to let M-Seal spread and fix the Strainer.



TESTS AFTER INSTALLATION

1. Check the sturdiness of all the Urinal fixtures to the wall by shaking it.

The urinal should not be loose while shaking the system. If nail is loose when placed in the wall directly, then drill the holes on marking, put a thin piece of wood (gatta) on it and put the nail.

If test FAILS, Urinal is shaking

Tighten the nails once again by using hammer.



2. Shake all the Drain Pipes to see how sturdy they are. Ensure that there is a slight angle sloping downwards to the drain to let the urine flow easily to the drain without any blockage, at all Drain Pipes.

All Drain Pipes are secure and not loose. All Drain Pipes should be tilting downward towards the Drain.

If test FAILS and pipe is like this:



Use a C-clamp to fix the pipe to the ground, where it is loose or is lifted upward.

3. Pour a mug of water into each urinal and check if it flows freely without blockage to the drain. Also check for leakage from the drain pipe at any location.

Water should come to the drain without blockage and there should be no leakage of water before it reaches drain.

If test FAILS:

Check and make sure the drain pipe has been placed at an angle to allow fluid to flow to drain. Use M-seal to fix points of leakage from the L and T joints.

