
To Study the Feasibility of Fixing Aerator in Housing Society for Water Conservation

Project Guide

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ABSTRACT

About 71 percentage of Earth surface is water covered and remaining is land surface. It looks like there is presence if huge amount of water but; out of 71 percentage of water, oceans hold about 96.5 percentages and remaining few percentages are potable and used by human being and all other living beings. From large extent of water only some percent of water can be used by human beings and all other livings for their life cycle maintenance, stability, development and growth. As we have, such a small extent of water to be used for the overall life cycle of all the human beings, there should be proper and well planned water distribution and management system to avoid excess water use, unintentional losses for the conservation of life resource.

Water scarcity involves water stress, water shortage or deficits and water crisis. This may be due to both natural and human factors. But many reports suggests that the scarcity is more due to the human factor than anything – such as industrialization, irrigation, domestic uses etc. Water scarcity is the lack of sufficient available resource to meet water needs within a region. It affects every continent and around 2.8 billion people around the world at least one month out of every year. More than 1.2 billion people lack access to clean drinking water. Physical water scarcity results from inadequate natural water resources to supply a region's demand and economic water scarcity result from poor management of the sufficient available water resources.

As referred to housing societies because of excess use of water by occupants , losses from the distribution lines , losses due to high pressure water discharges at outlets , improper working of pumping stations , improper location of fixtures ; there is wastage of huge amount of water .So for the preservation of wastage of water and to attain adequate water use for various purposes by the occupants , there is need of implementation of proper and well planned water distribution and management system. This water distribution and management system (WDMS) should give proper attention towards type of water distribution.

KEYWORDS

(Air, water, conservation, performance, flow rate, pressure, aerator, faucet, saving, WDMS)

INTRODUCTION

Water conservation is not a job that is just for the technician, soil scientist, hydrologist, forester, wildlife manager, plant scientist, city planner, park manager, farmer, rancher, or mine owner alone. It is a job for the every day person who just likes to have access to the life sustaining resource of water. We must all recognize that water conservation really is our personal responsibility and not just leave it up to other people.

Faucet aerators are actually a great way to cut down on water usage, lower utility bills, and preserve the environment with very little investment. Most faucet aerators are marked with the amount of water they allow to pass through. This is measured in gallons per minute, and there are four general categories. If an aerator says it is "full flow" it doesn't restrict water usage aside from the small amount that is naturally conserved by using an aerator, meaning that whatever the flow rate of your faucet the aerator will be about the same. "Standard" water flow for aerators is 2.2 gpm, while "water saving" flow is considered 1.5 gpm - saving up to

30% more water in comparison to a standard flow. Some aerators are designed for maximum water savings and have a flow of just 1.0 gpm which saves up to 55% more water than a standard flow. The beauty of an aerator is that you probably won't even notice the difference.

LITERATURE REVIEW

Umesh V, Nagaraj Sitaram (2014): Based on the experimental results of the 3 aerators of different geometrical configuration which are operated on similar hydraulic conditions (for a given pipe size) it is observed that water saving is relatively more with 2 –dissimilar mesh combination as compared to single mesh or 3-mesh type. The length of air passage need to be equal to diameter of aerator for maximum saving of water for a given line pressure and flow rate

Abdul Shaban, R N Sharma (2007): To provide sufficient water to every household in every city as per the WHO & BIS standards so that no household lacks water . Households with income below Rs 3000 a month suffer a lot i.e. about 72% of household in the cities lack sufficient water.

PARTS OF AERATOR:

The typical parts of an existing commercial faucet aerator are: Steel body, Water-Inlet, Wire meshes & other internal geometry, restrictions (for stream-lining of flow). The important geometric parameters are, Air-Inlet (for mixing air with water and reduce the flow rate), and number of Plastic Restrictors (function is to save the water by distributing the flow) Selection of aerator according to its purpose at different places.

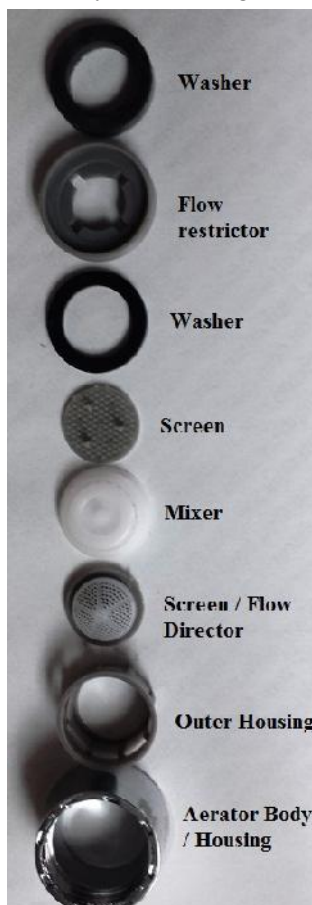


Fig 1: Parts of aerator

RESULT AND DISSCUSION

USE OF AERATOR IN HOSTEL BATHROOM OF ARMY INSTITUTE OF TECHNOLOGY:

The water conservation using pressure compensating aerators is done by fixing them at the mouth of the tap which allows less water discharged as compared to conventional tap without aerators. The project is undertaken to conserve water in hostel washrooms of army institute of technology.

Observations and calculation:

1. Time spent by one person at wash basin= 12 minutes
2. No. of persons using washroom in hostel= 70

TABLE 1: OBSERVATION

SR. NO:	WITHOUT AERATOR	WITH AERATOR
1.Discharge from wash basin	12 LPM (practical flow rate)	2.5 LPM (Standard flow rate)
2.Discharge in 12 minutes	144 Litres	30 Litres
3.Quantity of water used in one day	$144*70=10080$ Litres	$30*70= 2100$ Litres
4.Quantity of water used in one week	$10080*7=70560$ Litres	$2100*7= 14700$ Litres
5.Quantity of water used in one month.	$10080*30= 302400$ Litres	$2100*30= 63000$ Litres
6.Quantity of water used in a year	$10080*365=3679200$ Litres	$2100*365= 766500$ Litres

SUMMARY:

YEARLY USAGE AND PERCENTAGE SAVING OF WATER:

1. Quantity of water discharged from wash basin with aerator= 7,66,500L
2. Quantity of water discharged from wash basin without aerator = 36,79,200 L
3. Percentage of water saving = 80 %

USE OF AERATOR IN BATHROOM AT GROUND FLOOR OF DR D. Y. PATIL SCHOOL OF ENGINEERING:

The water conservation using pressure compensating aerators is done by fixing them at the mouth of the tap which allows less water discharged as compared to conventional tap without aerators. The project is undertaken to conserve water in washrooms of SOE building.

Observations and calculation:

1. Time spent by one person at wash basin= 7.5 seconds
2. No. of times wash basin used by a person= 2 times
3. No. of persons on ground floor using washroom= $50+50+50+15+15= 180$

TABLE 2: OBSERVATION

SR. NO:	WITHOUT AERATOR	WITH AERATOR
1.Discharge from wash basin	12 LPM (practical flow rate)	2.5 LPM (Standard flow rate)
2.Discharge in 7.5 seconds	2 Litres	0.3125 Litres
3.Quantity of water used in one day	$180*2*2= 720$ Litres	$180*2*0.3125= 112.5$ Litres
4.Quantity of water used in one week	$720*5= 3600$ Litres	$112.5*5= 562.5$ Litres
5.Quantity of water used in one month	$720*22= 15840$ Litres	$112.5*22= 2475$ Litres
6.Quantity of water used in a year	$720*220= 158400$ Litres	$112.5*220= 24750$ Litres
7.Total discharge of water at all five floors in a year	$158400*5= 792000$ Litres	$24750*5= 123750$ Litres

SUMMARY:
YEARLY USAGE AND PERCENTAGE SAVING OF WATER:

1. Quantity of water discharged from wash basin with aerator= 123750 L
2. Quantity of water discharged from wash basin without aerator = 792000 L
3. Percentage of water saving = 84.37%

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