

International Conference on Innovative Trends & Technologies in Engineering Sciences & Education

Columbia Institute of Engineering and Technology Raipur, Chhattisgarh (India)

8th & 9th September, www.conferenceworld.in

(ICITTESE-17)

ISBN: 978-93-86171-62-7

DOMESTIC WASTE WATER MANAGEMENT

Swapnil Singh¹, Karan Awasthi², Vishal Rasdiya³

Student of Civil engineering (Columbia Institute of Engineering & Technology Raipur (C.G.) 492001 India

ABSTRACT

The paper describes the various method used for domestic waste water management in Raipur City. Depending upon the use, the waste water has to be treated at different levels with increasing order of treatment. The current and future fresh water demand could be met by enhancing water rise efficiency and demand management. An estimated 277 MLD water is supplied to Raipur and but sewage treatment capacity is only 170 MLD. Waste Water –Irrigated field generated great employment opportunity for female and male agricultural labourers to cultivated crops, vegetable, flowers etc. The most problematic issue of this era is shortage of water for various domestic usage .So in this project there is management of the waste water (Sullage) for the flushing down the toilet which can save up to 150 litre of water per day from one family. The population of Raipur 1.01 million. So approximate 37,500,000 litre of water can be saved through this project which is wasted for flushing per day.

Keyword :- Sullage, Grey water, Screening filter, Skimming tank

I. INTRODUCTION

Domestic waste water consist of human waste, ablution water, kitchen water and other wastage of household activities in urban areas. House hold account for 55% of all water used in the Raipur Chhattisgarh. On average we each use 150 litres of water per day. All of the water that comes into your home is of drinking quality – 35% of which is flushed down in the toilet.

1.1 Grey Water Management:

The grey water includes all waste water generated in home as toilet water, kitchen sink, bathroom water, dishwasher water. The grey water is an abundant resource in both residential building. According to survey, dish, shower, sink and laundry grey water comprise 50-80% residential waste water.

Advantages of Grey water use results in:

- Less strain on septic tanks and water treatment plants;
- Effective water purification (grey water is better purified in the upper, most biologically active region of the soil);
- Reduced use of freshwater resources;
- Reduced use of energy and chemicals for water treatment;
- Groundwater recharge;
- Improved plant growth;
- Reclamation of nutrients (loss of nutrients via wastewater disposal in rivers/oceans is a significant form of erosion), and;
- Increased awareness of natural cycles .

What do you need for a grey water system?

- Grey water sources: Washing machine, shower, bathtub, and/or sinks .
- Collection plumbing: Pipes to transport grey water from the house to one or more points outside of the house.
- Surge tank, filter, and pump: Optional parts that add complexity and cost, but can make the distribution plumbing easier, especially for large flows.
- Distribution plumbing: Plumbing that transports grey water through the landscape and divides it among plants.
- A receiving landscape: Soil, roots, plants.

1.2 WATER SUPPLY IN RAIPUR :

About 88% of total municipal population of class-1 cities have been covered under organised water supply .Per capita water supply ranges from 9 lpcd to 584 lpcd .National average per capita water supply for class cities 1lpcd.The average per capita water supply has increased from 147 lpcd to 183lpcd at national level.

1.3 STATUS OF WASTE WATER IN RAIPUR:

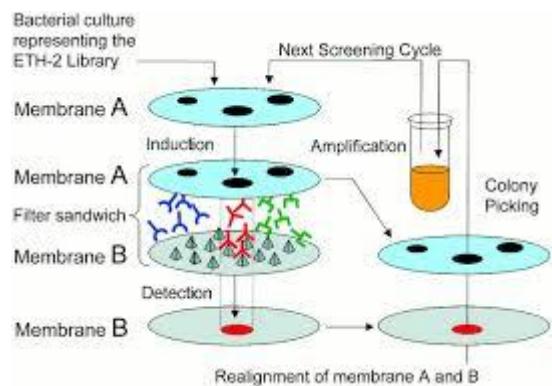
The total waste water generated by Raipur is 190MLD. Out of which 170MLD of water is treated .

II. METHODS FOR TREATMENT OF SULLAGE

2.1 Treatment of Solid Waste Sullage:

2.1.1 Screening :

Screening is the very first operation carried out at a sewage treatment plant ,and consist of passing the sewage through different types of screens, so as to trap and remove the floating matter , such as pieces of cloth , papers , wood, cork, hair, fibre, kitchen refusal, faecal solids, etc. present in sewage. These floating materials, if not removed, will choke the pipes, or adversely affect the working of the sewage pumps. Thus, the main idea of providing screens is to protect the pumps and other equipment from the possible damages due to the floating matter and sewage. Screening interventions are designed to identify disease in a community early, thus enabling earlier intervention and management in the hope to reduce mortality and suffering from a disease. Although screening may lead to an earlier diagnosis, not all screening tests have been shown to benefit the person being screened; over diagnosis, misdiagnosis, and creating a false sense of security are some potential adverse effects of screening. For these reasons, a test used in a screening program, especially for a disease with low incidence, must have good sensitivity in addition to acceptable specificity.



2.1.2 Skimming Tanks:

2.2 For Waste Water Treatment :

A skimming tank is a chamber so arranged that the floating matter like oil, fat, grease etc., rise and remain on the surface of the waste water (Sewage) until removed, while the liquid flows out continuously under partitions or baffles.

It is necessary to remove the floating matter from sewage otherwise it may appear in the form of unsightly scum on the surface of the settling tanks or interfere with the activated sludge process of sewage treatment. It is mostly present in the industrial sewage. In ordinary sanitary sewage, its amount is usually too small.

The chamber is a long trough shaped structure divided up into two or three lateral compartments by vertical baffle walls having slots for a short distance below the sewage surface and permitting oil and grease to escape into stilling compartments.

The rise of floating matter is brought about the blowing air into the sewage from diffusers placed in the bottom. Sewage enters the tank from one end, flows longitudinally and leaves out through a narrow inclined duct. A theoretical detention period of 3 minutes is enough. The floating matter can be either hand or mechanically removed.

Grease traps are in reality small skimming tanks designed with submerged inlet and bottom outlet (Fig. 5.12). The traps must have sufficient capacity to permit the sewage to cool and grease to separate. Frequent cleaning through removable covers is essential for satisfactory operation. Grease traps are commonly employed in case of industries, garages, hotels and hospitals.

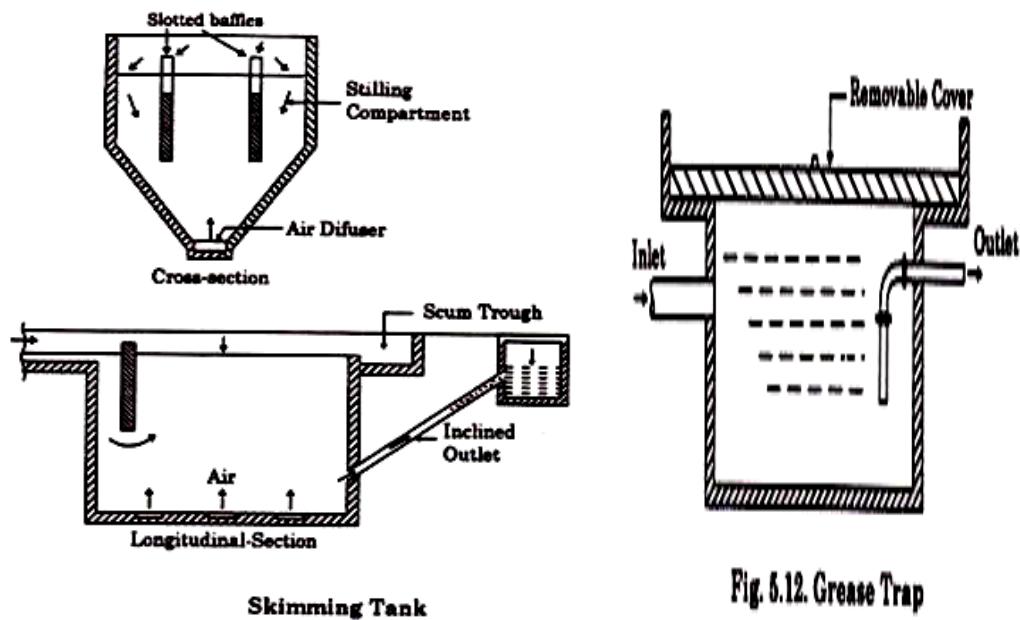


Fig. 5.12. Grease Trap

WHY GOING GREY IS GOING GREEN!

1 Grey water harvesting is particularly efficient for premises with high water consumption.

2 Reuse of grey water for landscape irrigation can greatly reduce the amount of drinkable water used during the summer months when landscape water may constitute 50-80% of the water used at a typical home.

3 It is estimated that 42 to 79% of household grey water comes from the bathtub and shower.

4 Recycled grey water constitutes a “new” water supply by allowing water, previously wasted ,to be used

5 Water reuse also reduces energy and fossil fuel consumption by requiring less water to be purified and pumped, long distances from storage dams to homes.⁶ A grey water harvesting system using JoJo tanks, reduces water consumption and saves money and the environment

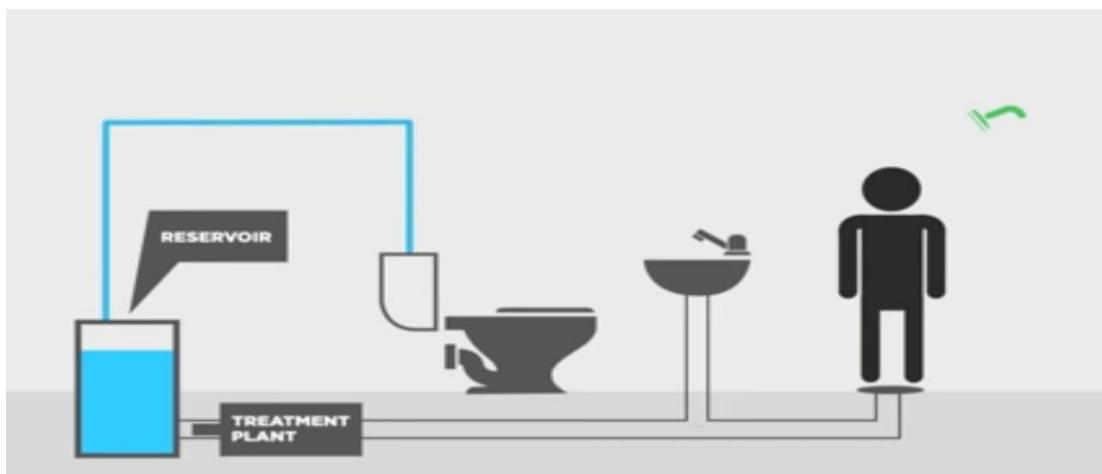


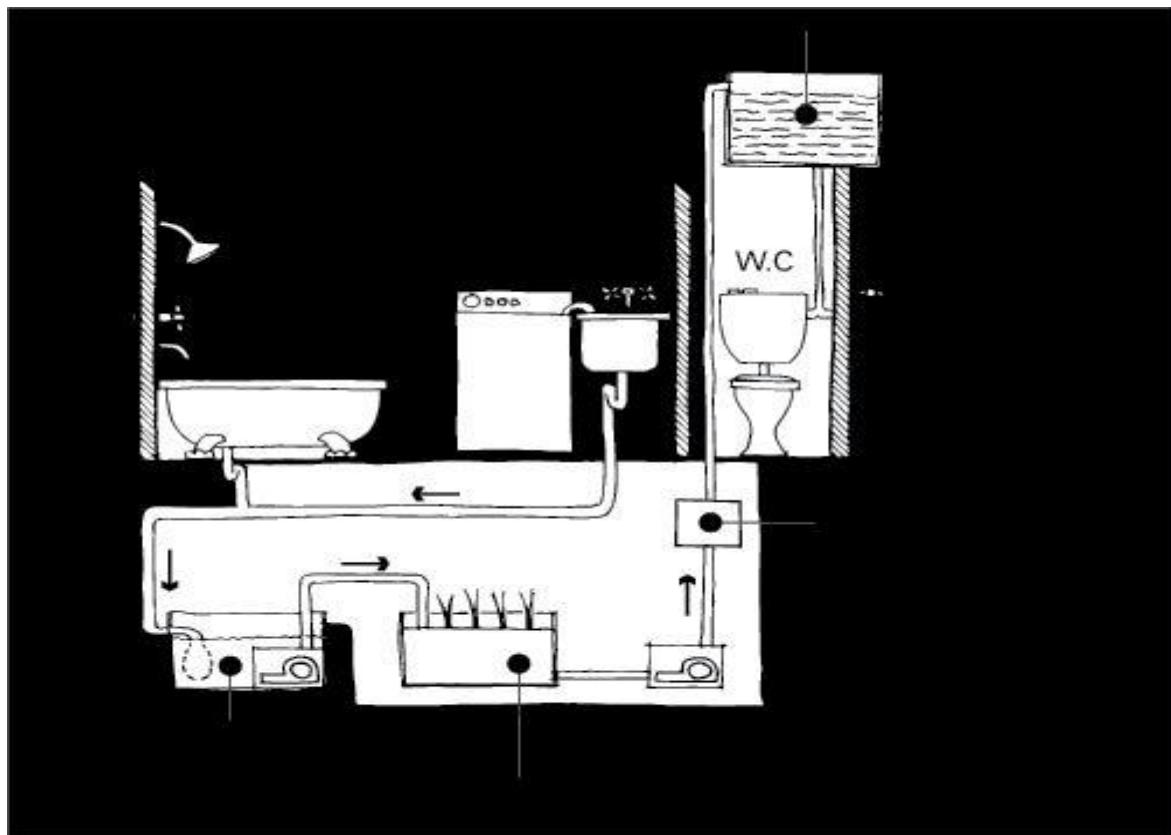
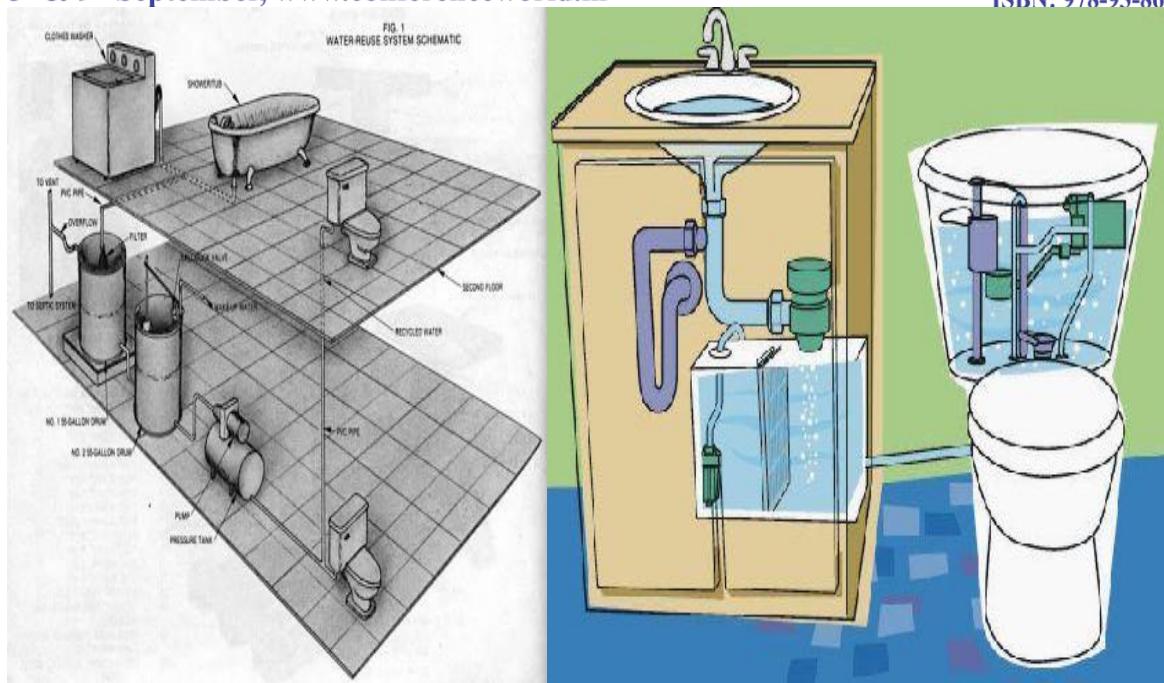
Figure 1: A range of possible sources of household wastewater showing wastewater from toilet, kitchen, bathroom, laundry and others

III. INSTALLATION PROCESS OF TREATMENT PLANT

Waste water from shower and basin sink is being discharge directly to sewer this is waste full waste water from shower and kitchen sink and hand was basin is collected and treated. The recycled grey water is then used for toilet flushing

At the first all the sullage from the house and apartment is transferred to the treatment plant and after treatment the treated water is collected in the reservoir and transferred to the flush tank. Of every toilet through the pipe line and used for flushing of toilet by this process.





IV. CONCLUSION

In India almost four members are in a family and the total population of Raipur is approx 1.01 million as per census 2011 So there are 2.5lakhs families in Raipur and one family use approx 150 to 170 litre water for toilet flushing so our project is based on using kitchen sink water and bathroom water for toilet flushing which can

International Conference on Innovative Trends & Technologies in Engineering Sciences & Education

Columbia Institute of Engineering and Technology Raipur, Chhattisgarh (India)

(ICITTESE-17)

8th & 9th September, www.conferenceworld.in

ISBN: 978-93-86171-62-7

save up to 375, 00,000 litre water per day and the project is to much effective in apartment in commercial building and is of economic cost and save millions of water

REFRENCES

- [1.] S.Arceivala 1999 Design of Waste Water Irrigation System
- [2.] Chhattisgarh Environment Conservation Board, Raipur (C.G). Status of water supply and waste water generation, collection , treatment and disposal in class-1 city of Chhattisgarh.
- [3.] Raipur Municipal Corporation (C.G)
- [4.] National Research Council ,1996 Use of reclaimed water and sludge committee .
- [5.] Mr. S.K.Garg, (Environmental Engineering, Vol-2).
- [6.] Dr. P.Jaya Rami Reddy,Textbook of Hydrology Third Edition.
- [7.] Mr. Rajesh Shrivastav and Ashu Jain , Engineering Hydrology.