



**TN**  
TAMIL NADU

**US**  
URBAN SANITATION

**SP**  
SUPPORT PROGRAMME

**iihs**<sup>TM</sup>  
INDIAN INSTITUTE FOR  
HUMAN SETTLEMENTS

In Association With:



# Training programme on Fecal Sludge Management for Engineers in Trichy Corporation

O&M of Fecal sludge treatment  
plant

# Operation and maintenance

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- The day to day activities adopted to ensure the
- smooth functioning of the treatment system and upkeep of a facility



# Difference between O & M

O

Operation runs the plant



PLANNED

M

Maintenance keeps the plant running

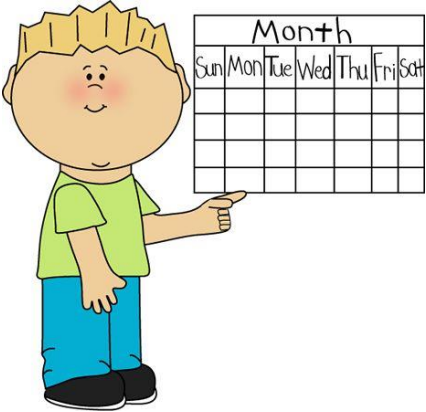


PLANNED/UNPLANNED

O&M

Regular

Periodic



# Need for operation and maintenance

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- To ensure desired functioning of the system
- To ensure health and safety in and around the project site
- To eliminate occupational hazards
- To ensure sustainability and efficiency



# 1. Feeding Tank



## Activity

## Why?

## Frequency

Feeding of faecal sludge into the feeding tank

During the feeding of Faecal Sludge into the Screening Chamber.

Every time load is from cesspool truck

# 1. Feeding Tank





## 2. Screening and grit chamber



Activity	Why	Frequency
Cleaning of the screen bars	<ul style="list-style-type: none"><li>• Accumulation of solid waste</li><li>• Obstruction of flow</li></ul>	<ul style="list-style-type: none"><li>• Once in a week</li><li>• Every time screen is clogged</li></ul>

## 2. Screening and grit chamber

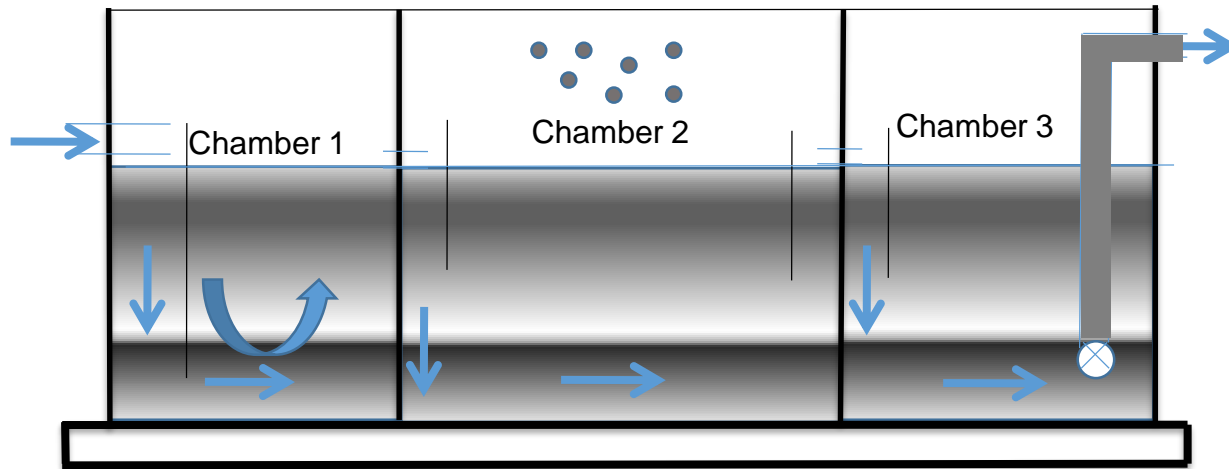


## 2. Screening and grit chamber



### 3. Stabilization Reactor

Activity	Why?	Frequency
Checking for scum in first chamber	Accumulation of scum leads to clogging	Every time the sludge load enters Stabilization reactor (daily)
Check for blockage in the pipeline	Pipe obstruction causes to chamber overflow	Every time there is a problem with the flow of sludge



### 3. Stabilization Reactor



### 3. Stabilization Reactor



# 3. Stabilization Reactor

Checking first chamber



## 4. Sludge Drying Beds



Activity	Why?	Frequency
Opening/ closing of the valve	To input the sludge into the bed	Everyday
Removal of dried sludge	To collect the dried sludge for reuse To make the bed ready for the next load	Everyday ( different bed each day)



## 4. Sludge Drying Beds



## 4. Sludge Drying Beds



# 5. Planted Drying Beds

## Regular Operation and maintenance of PDB

Activity	Why?	Frequency
Check for Strong odour	Could be because of leakage/ clogging of filter	Everyday
Removal of dry leaves or litter on the bed surface	Could decrease the quality of treatment	Everyday ( different bed each day)
Prevent mosquito/ flies	Could pose risk to health and safety	everyday

## 5. Planted Drying Beds



# 5. Planted Drying Beds

## Periodic Operation and maintenance of PDB

Activity	Why?	Frequency
Washing of filter materials	Clogging of the filter material has to be removed	Once in 2-3 years
Harvesting and replacement of plants	Plants attain maturity and need to be replaced	Once in 3 years
Removal of dried sludge	Dried sludge to be collected for reuse	Once in 3 years
Replacement of perforated collection pipe	In time, perforated pipes can clog	Once in 1 - 3 years

# 5. Planted Drying Beds



Collection of Dried sludge



Harvesting of plants



Planting new plants



Replacement of pipes

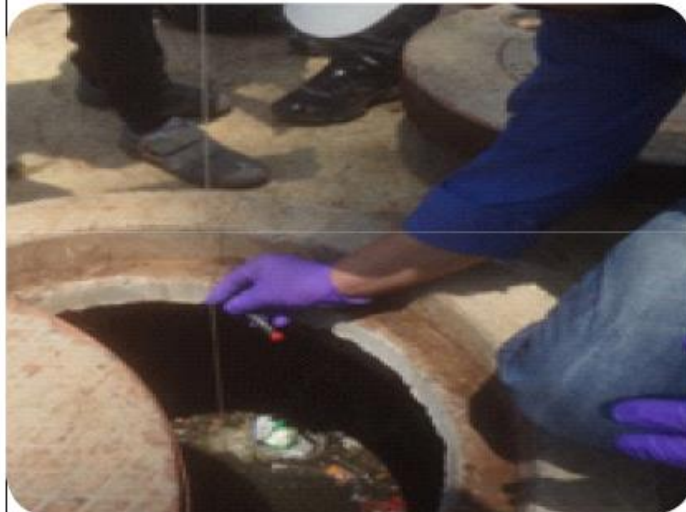


Cleaning and replacement of filter material

# 6. Settler

## Desludging

Why?	Frequency
<p>To avoid solidification of the sludge. To provide required retention time for the wastewater</p>	<p>Once in six months. Or, in the following cases:</p> <ul style="list-style-type: none"><li>— Large quantity of sludge in the chamber</li><li>— lack of efficiency in sample analysis</li><li>— backflow</li></ul>



# 6. Settler

## Descumming





# 7. Anaerobic filter

## Desludging

Why?	Frequency
<ul style="list-style-type: none"><li>• To allow the required free flow [to avoid clogging] of wastewater through the filter medium.</li><li>• To avoid large quantity of sludge accumulation in AF and subsequent treatment module.</li><li>• To retaliate the design treatment efficiency to the effluent quality.</li></ul>	<ul style="list-style-type: none"><li>• At least once in a year.</li><li>• Or, in the following cases<ul style="list-style-type: none"><li>—Excess sludge observed in the chambers of AF or in the subsequent treatment module.</li><li>—There is a backflow in the inlet chamber or no flow of wastewater into the subsequent treatment module</li></ul></li></ul>



Sludge in the de-sludging pipe



Solidified layer of sludge in de-sludging pipe

# 8. Planted Gravel Filter

## Check for swivel pipe

Why?	Frequency
<ul style="list-style-type: none"><li>• To ensure efficient usage of filter media for wastewater treatment</li><li>• To avoid flooding</li><li>• To avoid mosquito growth due to flooding.</li></ul>	<ul style="list-style-type: none"><li>• Once in a month.</li><li>• Or, in the following cases<ul style="list-style-type: none"><li>—The water level is observed on top</li><li>—There is dampness observed in the filter material</li><li>—There is no plant growth</li><li>—There is excess mosquito growth.</li></ul></li></ul>



## 8. Planted Gravel Filter

Check for swivel pipe



# 8. Planted Gravel Filter

## Weeding removal of dead leaf litter and other litter

Why?	Frequency
<ul style="list-style-type: none"><li>• To avoid rotting of dead leaf litter in the planted gravel filter</li><li>• To avoid clogging of filter material in the planted gravel filter</li><li>• To maintain the cleanliness and to increase aesthetics near the treatment module.</li></ul>	<ul style="list-style-type: none"><li>• Once in a month</li><li>• or, in the following case —There is excess weed or/and litter.</li></ul>



PGF with litters and debris



Clearing the litter from PGF

# 8. Planted Gravel Filter

Weeding removal of dead leaf litter and other litter



# 8. Planted Gravel Filter

- Trimming Plants

Why ?	Frequency
<ul style="list-style-type: none"><li>To avoid rotting of dead leaf litter in the planted gravel filter</li><li>To avoid blockages of sunlight.</li><li>To maintain the cleanliness and to increase aesthetics near the treatment modules.</li><li>To prevent blockages organic load by dead leafs.</li><li>To avoid odor</li></ul>	<ul style="list-style-type: none"><li>Once in a month</li><li>or, in the following case —There is excess growth of plants.</li></ul>



# 8. Planted Gravel Filter

## Trimming Plants



# 8. Planted Gravel Filter

- Cleaning of filter material

Why ?	Frequency
<ul style="list-style-type: none"><li>• To allow the required free flow to avoid clogging] of wastewater through the filter medium.</li><li>• To retaliate the design treatment efficiency to the effluent quality.</li></ul>	<ul style="list-style-type: none"><li>• At least once in four to five year.</li><li>• Or, in the following cases<ul style="list-style-type: none"><li>—Sludge observed in the filter materials .</li><li>—There is a backflow in the inlet chamber.</li></ul></li></ul>





# 9. Collection Tank

## Cleaning of Collection tank

Why ?	Frequency
<ul style="list-style-type: none"><li>• To avoid rotting of dead leaf litter in the collection tank.</li><li>• To avoid accumulation of excess debris.</li><li>• To avoid stagnation of water.</li><li>• To maintain the cleanliness and to increase aesthetics near the treatment modules.</li></ul>	Once in 10 days.



Debris in collection tank



Cleaning the collection tank

# 9. Collection Tank

## Cleaning of Collection tank



# Regular Maintenance

Tasks	Place	Frequency
Check the Wastewater Flow	All Modules	1x/1 month
Check for Grease Formation	Grease Trap	1x/1-7 days
Check for Scum Formation	Settler	1x/1-6 months
Check for Sludge Level	Settler, ABR,AF	1x/1-6 months
Check the Condition of Filter Material	AF, PGF, UDB, PDB	1x/2 years
Check for Swivel Pipe Level	PGF, UDB, PDB	1x/3 months
Deweeding, Removal of Dead Leaves and Litter	PGF, PDB	1x/1 months
Trimming of Plants	PGF, PDB	1x/3 months
Cleaning of CT	CT	1x/3 months
Check Treated Water Quality	Settler, ABR, PGF	1x/6 months (pre and post monsoon)
Feeding of faecal sludge	Feeding tank	1x/1-7 days
Cleaning of screen and grit chamber	Screening and grit chamber	1x/1-7 days

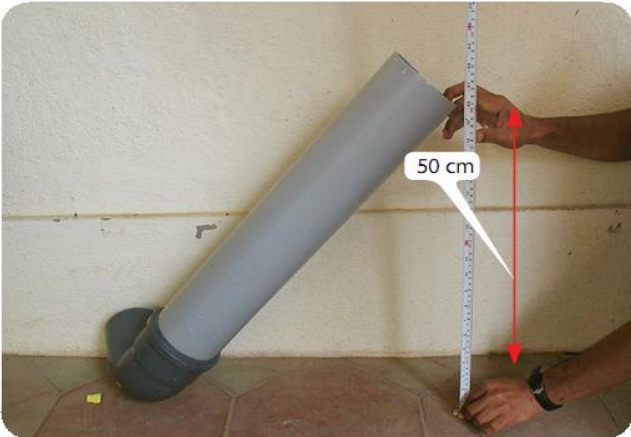
# O&M- Regular activities



Removal of obstacle from the sewer pipeline



Cleaning of inspection chambers



Measuring the level of swivel pipe top



Weeding and cleaning of litter



Trimming the plants

# O&M- Periodical activities

Tasks	Place	Frequency
Descumming	Settler	1x/3-6months
Desludging	Settler, ABR	1x/2-3 years
Washing of filter material	AF, PGF, Drying beds	1x/3-5 years
Replacing plants	PGF, PDB	1x/3-5 years



Removal of scum



De-sludging



# RECAP: Need for operation and maintenance

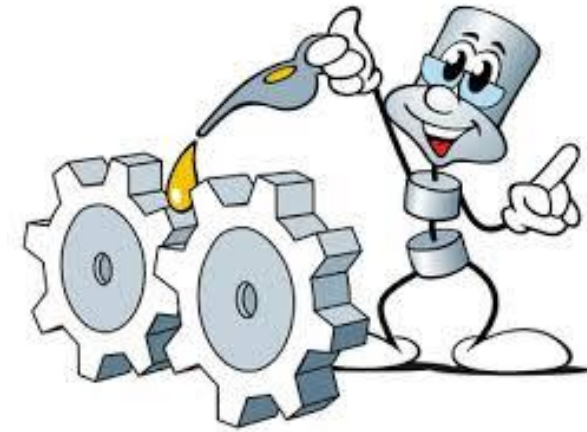
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- To ensure desired functioning of the system
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# Considerations for successful O&M

- Thorough knowledge about plant, machineries and equipment provided in the FSTP
- A thorough knowledge of the process
- Assignment of specific tasks for operating staff
- Training for all operating staff
- Good house keeping
- Proper logging of all O&M activities



# Thank You