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Expansion of S.T.P. (Sewage Treatment Plant) for Dhulia City

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Abstract – The earth is divided into the lithosphere or land masses and the hydrosphere or the oceans, lakes, streams and underground waters. The hydrosphere includes the entire aquatic environment. Our world both lithosphere and hydrosphere is shaped by varying life forms. Permanent forms of life create organic matter and in combination with inorganic materials help establish soil. Plants cover the land and reduce the potential for soil erosion – the nature and rate of erosion affects the distribution of materials on the surface of the Earth. Two environments, biotic (living environment or community) and abiotic (non living environment), combine to form an ecosystem.

Keywords – *STP: SEWAGE TREATMENT PLANT*

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I. INTRODUCTION

Dhulia city is an ancient city which is situated on the bank of river "Panzara". Old part of Dhulia city; generally called as old Dhulia is well planned according to civil engineering point of view. The planning of Dhulia city is done by Bharat-ratna sir. M. Vishweshwarayah. Because of this the Dhulia city is awarded by "Guinese Book of World Record" for "Well Planned City". Now a days Dhulia city is at developing stage having population up to 4 to 5 lacks but till now the Sewage Treatment Plant is not constructed in Dhulia city. The whole waste water is carried from main drainage line in old Dhulia and Sushi Nallah in Deopur region and further meets at Panzara River because of this pollution is increasing day by day and peoples are facing many diseases. So, it is needed to construct Sewage Treatment Plant at place where sewage water meets to the Panzara River. Cause of this population is increase day by day and quantaritating the water of river Panzara too So it is need of city to construct water sewage treatment plant of place where sewage water meet to the Panzara river.

A) Points to be considered in design:

Following points are considered during the design of sewage treatment unit:

- The outline period ought to be taken between 25 to 30 years.
- The configuration ought not be done on the hourly sewage stream premise, yet the normal residential stream in addition to the most extreme mechanical stream on the yearly record premise.
- Instead of giving one major unit to every treatment more than two numbers little units ought to give, which will give in operation and in addition no stoppage amid upkeep and repair of the plant.
- Overflow weirs and the detours ought to be given to cut the specific operation if fancied.
- Self-cleaning speed ought to create at each spot and stage.

B Methods of forecasting population:

1. Arithmetical increase method
2. Geometrical increase method
3. Decrease rate method
4. Incremental increase method
5. Simple Graphical method
6. Comparative Graphical method
7. Logistic curve method

Out of seven methods, in the present study, the population is forecasted by first four methods.

B) Population of Dhule City from 1951 to 2011

YEAR	POPULATION
1951	76,880
1961	98,893
1971	1,37,129
1981	2,10,759
1991	2,78,317
2001	3,41,473
2011	4,18,446

II. DESIGN

"The population is forecasted by four methods and compared. Based on the comparison, it is observed that the Decrease Rate method gives most appropriate results for forecasting the population. By this method, the forecasted population is obtained equal to the 8, 16,728".

Design of Treatment Units

Population as calculated by decrease rate method: 8, 16,728

Sewage: 85lit/day/capita

Quantity of effluent in lit/day:

$$\frac{85\times816728}{3}$$
$$= 23140626.67 \approx 23140627$$
$$\frac{23140627}{1000} = 23140$$

Volume of sewage: 23140 m^3/day

A) Design of screen chamber:

Total flow of sewage = 23140 m^3/day

Standing period of screen chamber is 10 minutes.

$\therefore$ Volume of screen chamber = 160.69 $\approx$ 161m^3.

If we considered screen chamber of 2m height, then size will be 12.5m×6.5m×2m.

B) Design of grit chamber:

Total flow of sewage = 23140 m^3/day

Standing period of grit chamber is 10 minutes.

$\therefore$ Volume of one grit chamber = 160.69 $\approx$161m^3.

If we considered grit chamber of 2m height, then size will be 12.5m×6.5m×2m.

C) Design of storage tank:

Total flow of sewage = 23140 m^3/day

Standing period of storage tank is 2 hours.

$\therefore$ Volume of storage tank is 1928.33 m3

If we considered height of storage tank is 9m then diameter of storage tank will be 17m.

Total flow of sewage = 23140 m3/day

Standing period of settling tank is 6 hours.

$\therefore$ Volume of settling tank is 5785m3.

We assume three settling tanks then volume of one settling tank will be 1930m3.

If we considered height of settling tank is 8m then diameter of tank will be 18 m. and We assume free board 100 cm.

III. CONCLUSION

A) Gas collection from sludge digestion tank :

From the sludge digestion tank various gases are collected such as methane (CH4), carbon-dioxide and hydrogen sulphide (H2S). The main combustion constituent in gas is methane i.e. 60%-70%. Sludge gas having 70% methane has a fuel value.

This gas can be used for following purposes:

B) For heating the plants of digester, buildings, incinerators and hot water supply.

C) For plant power production-pumping, air and gas compressors.

D) For gas supply to small factories and institutions. Motor fuel for municipal cars and trucks.

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