International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2013): 6.14 | Impact Factor (2014): 5.611

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

Pramod Sambhaji Patil

Assistant Professor, Civil Engineering Department, R.C.Patel Institute of technology Shirpur District Dhule, Maharashtra, India

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:

1. 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.

Points To Be Considered In Design:

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

- The design period should be taken between 25 to 30 years.
- The design should not be done on the hourly sewage flow basis, but the average domestic flow plus the maximum industrial flow on the yearly record basis.
- Instead of providing one big unit for each treatment more than two numbers small units should provided, which will provide in operation as well as no stoppage during maintenance and repair of the plant.
- Overflow weirs and the bypasses should be provided to cut the particular operation if desired.
- Self cleaning velocity should develop at every place and stage.

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.

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

"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:

$$\frac{85\times 816728}{3}$$

$$= 23140626.67 \approx 23140627$$

Volume of sewage: $\frac{23140627}{1000} = 23140$ m3/day

Design of screen chamber :

Total flow of sewage = 23140 m3/day
Standing period of screen chamber is 10 minutes.
$\therefore$ Volume of screen chamber = 160.69 $\approx$ 161m3.
If we considered screen chamber of 2m height, then size will be 12.5m×6.5m×2m.

Design of grit CHAMBER:
Total flow of sewage = 23140 m3/day
Standing period of grit chamber is 10 minutes.
∴ Volume of one grit chamber = 160.69 ≈161m3.
If we considered grit chamber of 2m height, then size will be 12.5m×6.5m×2m.

Design of storage tank:
Total flow of sewage = 23140 m3/day
Standing period of storage tank is 2 hours.
∴ 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.
∴ 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.
We assume free board 100 cm.

2. Conclusion

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:

- For heating the plants of digester, buildings, incinerators and hot water supply.
- For plant power production-pumping, air and gas compressors.
- For gas supply to small factories and institutions.

  Motor fuel for municipal cars and trucks.

References

[1] Arceivala, Soli J. Waste water treatment for Pollution Control, Tata Me Graw - Hill, New Delhi,1986.
[2] American Society of Civil Engineers and The Water Pollution Control Federation. Sewage Treatment Plant Design, New York, 1959 .
[3] Central Public Health and Environmental Engineering Organisation, Ministry of Urban Development. Manual on Sewerage and Sewage Treatment, New Delhi, 1993.
[4] Garg, S. K. Sewage disposal and Air pollution Engineering, Khanna Publishers, Delhi, 1996.
[5] Junna, J. and Rintala, J. (1990) Evaluation of purification efficiency of activated sludge treatment plants for pulp and paper industry waste waters in Finland, Water Science and Technology, 22. 199-206.
[6] Metcalf and Eddy, inc. Waste water Engineering Treatment Disposal Reuse, Me Graw - Hill, New York, 1991.
[7] Peavy, Howard S., Rowe, Donald R. and George Tchobanoglous. Environmental Engineering, Me Graw - Hill, New York, 1985.
[8] Sastry, C.A., Hashim, M. A. and Agamuthu, P. Waste Treatment Plants, Narosa Publishing House, New Delhi, 1995.
[9] U.S.Environmental Protection Agency(1974) Process design manual for upgrading existing waste water treatment plants, U.S. Environmental Protection Agency-Technology transfer, 13-17.
[10] Robert Lafore, Object Oriented Programming using Turbo C++, Galgothia Publications, NewDelhi.

Author Profile

Prof. Pramod Sambhaji Patil Completed B.E. in civil Engineering 2009 and ME in 2014 Environmental Engineering North Maharashtra University Jalgaon. Presented and Publish paper 11 Research paper in National conference and 04 International Journal along with publication author had attended 07 workshop sponsored by ISTE. From last 5 year assistant professor in civil Engineering department in R. C. Patel Institute of Technology Shirpur