IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 12, Issue 1, December 2021
Impact Factor: 5.731

A Review Paper on ETP

Parag Ninawe, Amol Ninawe and Tushar Deotare
Students, Department of Mechanical Engineering
Yeshwantrao Chavan College of Engineering, Nagpur, Maharashtra,India

Abstract: *Most of the river basins are closing or closed to severe water shortages, brought on by the simultaneous effects of agricultural growth, industrialization and urbanization. Performance of state owned sewage treatment plants, for treating municipal waste water, and common effluent treatment plants, for treating effluent from small scale industries, is also not complying with prescribed standards. Thus, effluent from the treatment plants, often, not suitable for household purpose and reuse of the waste water is mostly restricted to agricultural and industrial purposes. The development of innovative technologies for treatment of wastewaters from various industries is a matter of alarming concern for us. Although many research papers have been reported on wastewater pollution control studies, but a very few research work is carried out for treatment of wastewater of steel industries, especially in reference to development of design of industrial effluent Treatment Plants (ETP) system. Another beneficial aspect of this research work will be recycling, reuse of water and sludge from steel industry The whole technologies for treating industrial wastewater can be divided into four categories: - Chemical, Physical, Biological and mathematical approaches. Keywords- Waste water, Effluent treatment plants (ETP), Environmental Impact assessment (EIA), and Physical treatment.*

I. INTRODUCTION

Water is one of the most vital natural resources for all life on Earth. The availability and quality of water always have played an important part in determining not only where people can live, but also their quality of life.Total utilizable water resource in the country has been estimated to be about 1123 BCM (690 BCM from surface and 433 BCM from ground), which is just 28% of the water derived from precipitation.Performance of state owned sewage treatment plants, for treating municipal waste water, and common effluent treatment plants, for treating effluent from small scale industries, is also not complying with prescribed standards. Thus, effluent from the treatment plants, often, not suitable for household purpose and reuse of the waste water is mostly restricted to agricultural and industrial purposes. The development of innovative technologies for treatment of wastewaters from various industries is a matter of alarming concern for us. Although many research papers have been reported on wastewater pollution control studies, but a very few research work is carried out for treatment of wastewater of steel industries, especially in reference to development of design of industrial effluent Treatment Plants (ETP) system.

1.1 Design of ETP

The purpose of Environmental Impact Assessment (EIA) is to identify and evaluate the potential impacts(beneficial and adverse)of development and projects on the environmental system. It is an useful aid for decision making based on understanding of the environment implications including social, cultural and aesthetic concerns which could be integrated with the analysis of the project costs.While all industrial projects may have some environmental impacts all of them may not be significant enough to warrant elaborate assessment procedures. The need for such exercises will have to be decided after initial evaluation of the possible implications of a particular project and its location. The projects which could be the candidates for detailed Environment Impact Assessment. This exercise should be undertaken early enough in the planning stage of projects for selection of environmentally compatible sites, process technologies and such other environmental safeguards.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 12, Issue 1, December 2021
Impact Factor: 5.731

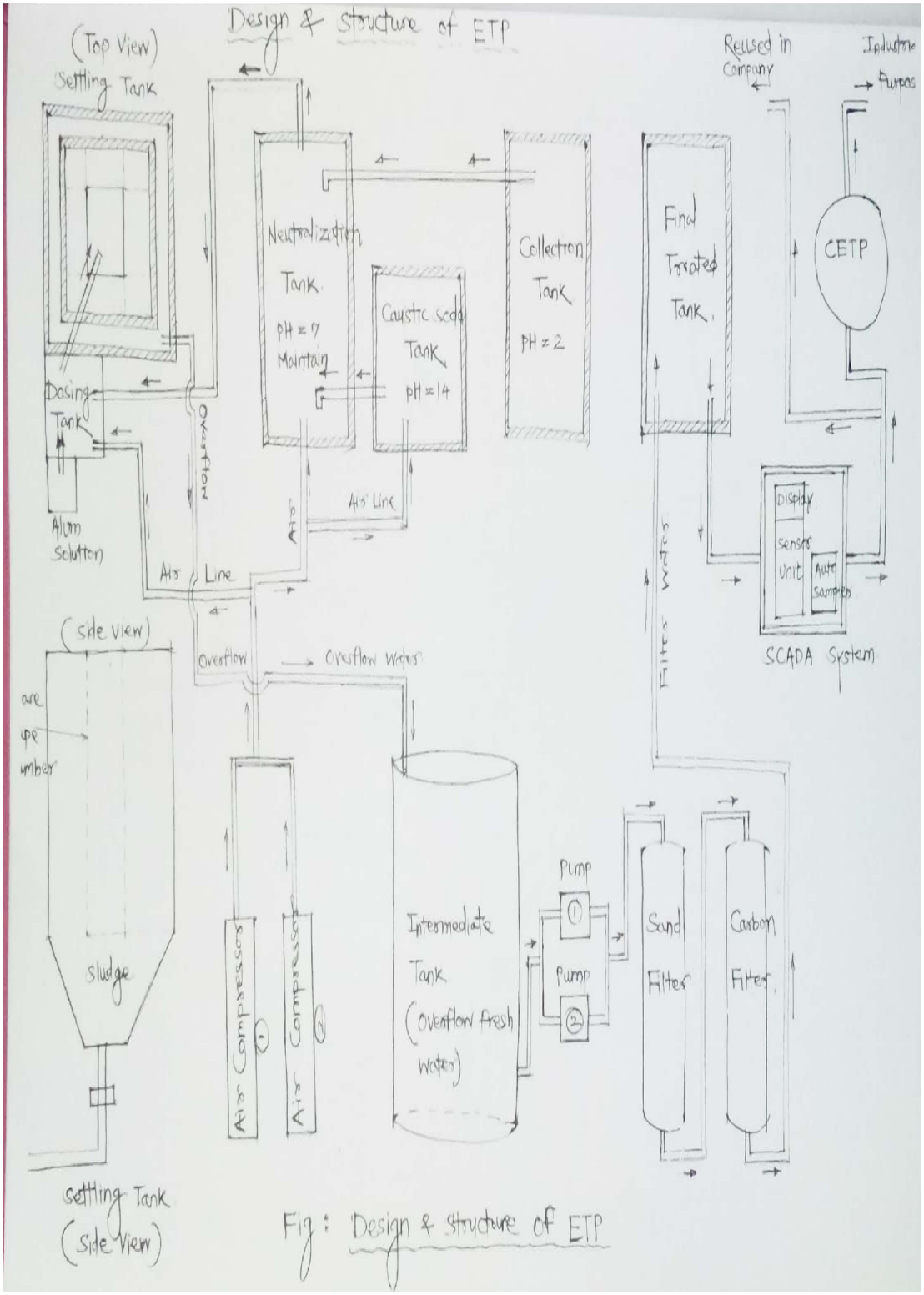

Figure 1: Design of ETP

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 12, Issue 1, December 2021
Impact Factor: 5.731

1.2 Plant Layout

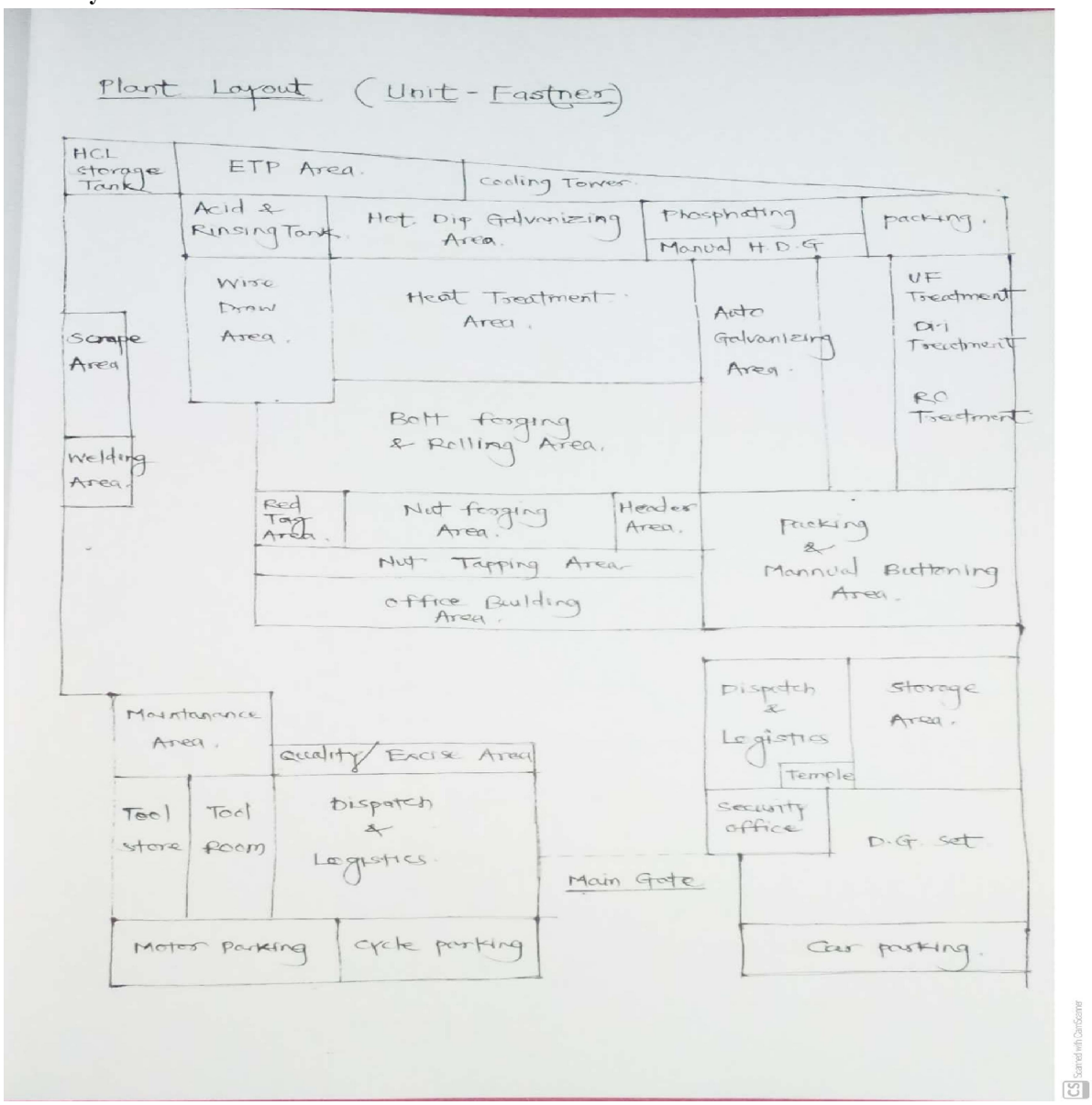

Figure 2: Plant layout

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 12, Issue 1, December 2021
Impact Factor: 5.731

1.3 ETP Process Flow Chart

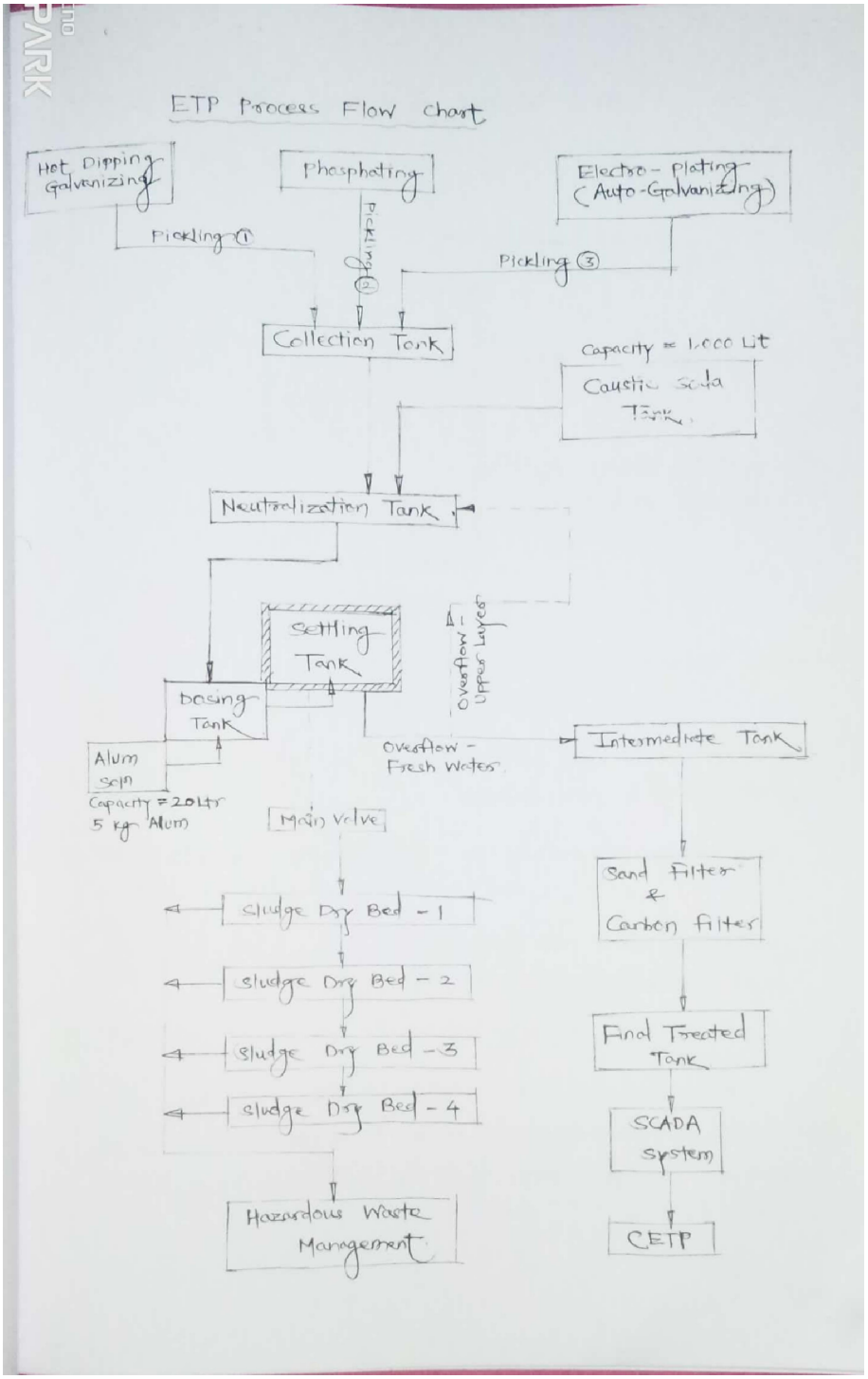

Figure 3: ETP Flow chart

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 12, Issue 1, December 2021
Impact Factor: 5.731

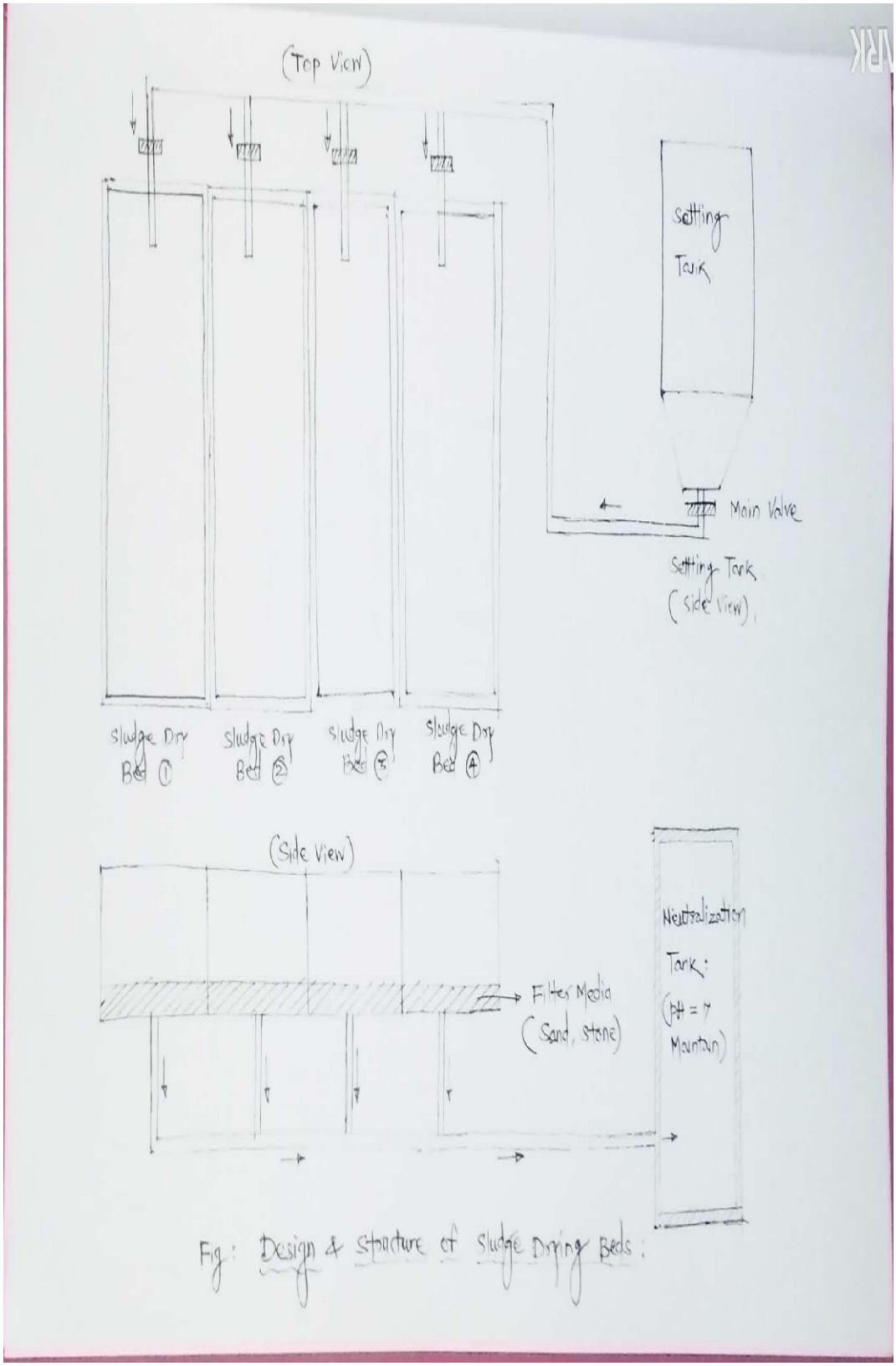

Figure 4: Design of Sludge

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 12, Issue 1, December 2021
Impact Factor: 5.731

1.5 Need of ETP

- To clean industry effluent and recycle it for further use.
- To reduce the usage of fresh/potable water in Industries.
- To cut expenditure on water procurement.
- To meet the Standards for emission or discharge of environmental pollutants from various Industries set by the Government and avoid hefty penalties.
- To safeguard environment against pollution and contribute in sustainable development.

II. Treatment Levels & Mechanisms of ETP

Primary Treatment Level Purpose: Removal of floating and settleable materials such as suspended solids and organic matter.

- Methods: Both physical and chemical methods are used in this treatment level.
- Chemical unit processes: Chemical unit processes are always used with physical operations and may also be used with biological treatment processes. Chemical processes use the addition of chemicals to the wastewater to bring about changes in its quality. Example: pH control, coagulation, chemical precipitation and oxidation. pH Control: To adjust the pH in the treatment process to make wastewater pH neutral. For acidic wastes (low pH): NaOH, Na2CO3, CaCO3or Ca(OH)2. For alkali wastes (high pH): H2SO4, HCl. Chemical coagulation and Flocculation:
- Coagulation refers to collecting the minute solid particles dispersed in a liquid into a larger mass.
- Chemical coagulants like Al2 (SO4)3 {also called alum} or Fe2 (SO4)3 are added to wastewater to improve the attraction among fine particles so that they come together and form larger particles called flocs.

Secondary Treatment Level Methods: Biological and chemical processes are involved in this level. Biological unit process To remove, or reduce the concentration of organic and inorganic compounds. Biological treatment process can take many forms but all are based around microorganisms, mainly bacteria. Aerobic Processes Aerobic treatment processes take place in the presence of air (oxygen). Utilizes those microorganisms (aerobes), which use molecular/free oxygen to assimilate organic impurities i.e. convert them in to carbon dioxide, water and biomass. Anaerobic Processes the anaerobic treatment processes take place in the absence of air (oxygen). Utilizes microorganisms (anaerobes) which do not require air (molecular/free oxygen) to assimilate organic impurities. The final products are methane and biomass

Tertiary / Advanced Treatment Purpose: Final cleaning process that improves wastewater quality before it is reused, recycled or discharged to the environment. Mechanism: Removes remaining inorganic compounds, and substances, such as the nitrogen and phosphorus. Bacteria, viruses and parasites, which are harmful to public health, are also removed at this stage. Methods: Alum: Used to help remove additional phosphorus particles and group the remaining solids together for easy removal in the filters. Chlorine contact tank disinfects the tertiary treated wastewater by removing microorganisms in treated wastewater including bacteria, viruses and parasites. Remaining chlorine is removed by adding sodium bisulphate just before it's discharged

III. Conclusion

The problems associated with wastewater reuse arise from its lack of treatment. The challenge thus is to find such low-cost, low-tech, user friendly methods, which on one hand avoid threatening our substantial wastewater dependent livelihoods and on the other hand protect degradation of our valuable natural resources. The use of constructed wetlands is now being recognized as an efficient technology for wastewater treatment.

References

[1]. Dean J. G., F. L. Basqui and Lanouette, 1972, Removing heavy metals from wastewater Env. Sci. Tech. 6:518

[2]. Huang C. P. 1977, Removal of heavy metals from industrial effluents J. Env . Eng. Division, ASCE 118 (EE6): 923-947.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 12, Issue 1, December 2021
Impact Factor: 5.731

[3]. Loomba, K. and G. S. Pandey 1993, Selective removal of some toxic metals ions (Hg(II), pb (II) and Zn(II)) by reduction using steel plants granulated slag. Indian J. Env., Health A:20:105-112.

[4]. Shrivastava, A.K., A Review on copper pollution and its removal from water bodies by pollution control Technologies, IJEP 29(6): 552-560, 2009.

[5]. Journal of environmental Management, vol. 88, issue 3, August 2008, pp. 437-447.