

Sustainable Operation of Waste Water Treatment Plants

In this article on waste water treatment we will focus on factors responsible for sustainable operations of Waste water Treatment Plants. The sustainable operation of a biological wastewater treatment plant is significantly linked to its pollutant removal efficiency, cost of sludge management, energy consumption and monitoring cost. The biological treatment offers high organic removal efficiency, it also entails significant sludge production, which contains active (live) and inactive (dead) microorganisms and must be treated prior to final disposal, in order to prevent adverse impact on public health and environment.



The efficiency of the activated sludge treatment process is correlated to an efficient solid and liquid separation, which is strongly depended on the biomass settling properties like Sludge Volume Index (SVI). The most commonly encountered settling problems in a wastewater treatment plant, which are usually associated with operating conditions and specific microorganisms growth, are sludge bulking, floating sludge, pin point flocs, filamentous bacteria and straggler flocs. Sustainable management of sludge and less energy consumption are the two principal aspects that determine the operational cost of wastewater treatment plants. Sludge treatment and management accumulate more than 50% of the operating cost. Aerobic wastewater treatment plants have high energy requirements for covering the needs of aeration and recirculation. In order to ensure wastewater treatment plants' effective operation, a large number of physicochemical parameters have to be monitored, thus further increasing the operational cost.

As the operational parameters are linked to microbial population, a practical way of wastewater treatment plants' controlling is the microscopic examination of sludge, which is proved to be an important tool for evaluating plants' performance and assessing possible problems and symptoms. Further the disposal of this generated sludge from WWTP can be disposed in scientific manner by analysing its chemical characteristics. Sludge generated from Effluent treatment plant primary clarification is generally disposed to Common Hazardous waste Disposal facility and sludge generated from biological process can be used for composting and reused as manure and cost of disposal can be saved and load of pollutant on environment can be minimized.

Electrical consumption for operation of Waste Water Treatment Plant is gaining importance and now in all new projects specific electrical consumption for operation plant is evaluated to award the project.

Further equipment selection in WWTP are gaining prime importance as we all know maximum electrical consumption in a WWTP by heart of the system i.e. Aeration blowers. Ten run continuously and responsible for maintaining residual dissolved oxygen level. Variable Frequency Drives (VFD) in major electricity consumption equipments are installed to minimise the consumption and low down the electrical cost for operation. Turbo blowers are also an option which consumes lesser energy compared to traditional twin lobe blowers

Effective treatment to waste water increases its potential for reuse. 130 MLD sewage reuse plant at Nagpur is providing treated sewage for cooling of ash and cooling towers. This scheme has been replicated for major fresh water consuming Thermal Power Stations (TPS). In case of Effluent treatment plants now a day's Zero Liquid discharge (ZLD) is ensured by Pollution control boards for high fresh water demanding industries and reuse potential for the same is already part of the scheme prior to grant consents and authorization.

Sources

<http://iopscience.iop.org/article/10.1088/1757-899X/161/1/012093/meta>

Image Source:

<http://smsbutiboricetp.co.in/process/>

<http://www.hnw.com.au/turbo-blowers-decrease-power-consumption-upgraded-warriewood-wastewater-treatment-plant-wwtp>