Innovative Waste Water / Sewage Treatment Technologies for Hotels, Civic Bodies & Industries

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SYNOPSIS

The Wastewater Treatment industry has been generally traditional in its approach and bold and innovative designs have generally been regarded with an air of suspicion. There have been attempts to make plants more compact but not much headway has been made, barring a few exceptions on achieving energy efficiency. Innovativeness, if it may be called so, has been limited to a few modifications of the age old activated sludge process invented by Arden and Locket in 1914. A popular method of treatment and most frequently encountered in public sector tenders over the past decade or so, has been the Sequencing Biological Reactor (SBR). Though effective, the SBR still remains a traditional technology with innovations being limited to an enhanced sophistication of engineering interfaces like the decanter and the automation. Other modifications have primarily been the introduction of microbial support media of a high specific surface in an attempt to concentrate or intensify microbial growth, thereby enabling reduction in biological reactor volumes. Processes like the Stationary Aerobic Fixed Film (SAFF), Moving Bed Bio Reactor (MBBR) and the Membrane Bio reactor (MBR). A debatable point here is whether these modifications really achieve the intensification desired. This was evaluated in a study and it was found that while it is claimed that the MBBR concentrates the microbes, measured as MLVSS, to around 8000 mg/l, in actual practice, air scour of microbial films due to intense aeration reduced the MLVSS to less than 3500 ppm which is more or less the same as that maintained in traditional suspended growth activated sludge process. Innovation in the aerobic biological processes has primarily been with systems that do not need bubbled aeration that scours out bacterial growth. The innovative way forward in treating organic wastewater is clearly that which uses the much more energy efficient sewage film exposure for oxygen transfer from the atmosphere to the biological film. Such methods of aeration promote the concentration of bacteriological growth on a support surface.

Microbial immobilisation technology for highly intensified biological systems does not have sufficient track record and needs a strong and bold push to yield massive savings in

wastewater treatment systems. The use of adsorptive material in tandem with activated sludge to fortify the bio-sorption process needs to be revived as it has tremendous benefits in terms of treated effluent quality and enhanced settling characteristics of biological solids. Optimal utilisation of anaerobic immobilized microbial systems upstream of their aerobic counterparts have a tremendous potential to reduce footprints and power consumption at wastewater treatment plants. The release of oxygen rich Dissolved air, akin to the Dissolved Air Flotation (DAF), into bio reactors needs some R&D effort as it could alleviate the oxygen bottleneck inevitably encountered in the biological intensification process.

The future endeavour should be to drastically reduce the footprint of wastewater Treatment Plants, cut down power consumption, reduce sound and contaminated aerosol generation, and above all, drastically simplify the user interface. Such technologies will facilitate the decentralisation of wastewater treatment plants for a drastic reduction of life cycle costs.