

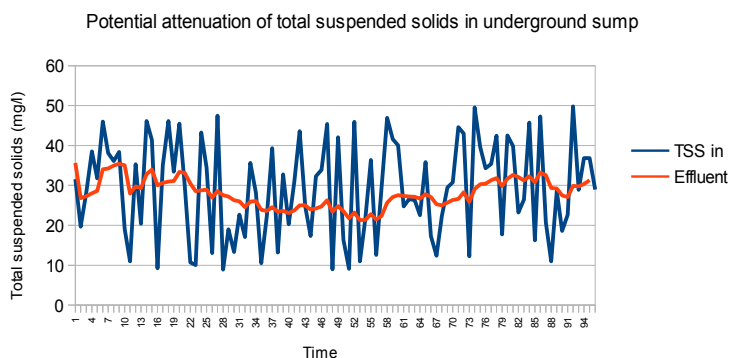
Effluent storage and mixing – don't neglect it

Blackwell Water Consultancy Ltd is often asked to get involved in projects where effluent treatment plants, and particularly those on industrial sites, are not performing well. We usually find the main treatment process is performing inconsistently and is often the focus of blame or disapproval. That's not always the case but we've seen a number of perfectly suitable treatment processes that have been replaced when they weren't at fault. What, then, can cause this to happen? In a word, 'mixing' or in two words, 'storage' and 'mixing', which the more pedantic of our readers may point out is probably three words.

No effluent treatment process, whether biological or physical or chemical works well when the flow and composition of effluent entering it are variable. Consequently, removing those variations is absolutely crucial to ensuring a treatment process works but we see a lot of examples where there is little or no effluent storage and no mixing at all. We tend to call such storage facilities 'balance tanks' but other terms include attenuation, retention, detention, buffer tanks or even header tanks.

The description might vary but the function should be the same: to store

effluent and homogenise the composition. Look at the graph above. This comes from a client who was having a problem with suspended solids entering a treatment process (the blue line). The client's treatment process relied on chemical dosing for coagulation and flocculation but the highly variable concentration of solids meant that dosing was not (and realistically could not) be optimised. We have a simulation of balance tanks that shows how concentration fluctuations can be smoothed out by correct balancing of the effluent. The orange line shows that if the client used a redundant storage facility on site then the composition of solids would be much less variable, which in turn would have a positive effect on chemical dosing. The client is now putting in place measures to use this storage tank to improve effluent treatment, a simple and relatively low cost answer to a vexing problem.



Stabilising the flow and composition of effluent to downstream processes is absolutely essential. Without stabilisation and homogenisation of effluent the risk of hydraulic problems, poor treatment and discharge consent failures is very real. Be careful, however, bigger isn't necessarily better. The volume of the storage facility should be matched to the rate and volume of effluent discharged and the size and aspect ratio of the vessel determine the best mixing strategy (do you induce mixing in the tank with flow patterns and baffles or use jet or paddle mixers? Great care and expert advice is needed).

Companies that operate municipal sewage works long ago realised the need for effective effluent balancing. Industrial sites, however, sometimes miss out this stage, often because of budget, lack of awareness of the benefits or simple lack of space. Making sure you do have balancing, however, can make the difference between successful effluent treatment and stressful effluent treatment. Stressful or successful? Now there's a good way of balancing the advantages and disadvantages of effluent storage (weak pun intended).

Blackwell Water Consultancy Ltd provide consultancy about all aspects of sewage treatment, industrial effluent treatment and water efficiency.

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