



An Average Reduction In Sludge of Approximately 20% Was Observed at Zutphen Plant in the Netherlands

Location: Zutphen Municipality Netherlands

Background: Zutphen is a medium sized activated sludge system treating an average of 6,600 m³ of wastewater per day. The plant comprises two parallel trains with segregated recycle lines so that a side-by-side comparison could be conducted.



Fig. 1: This picture shows the parallel aerated basins side by side. Since these trains have segregated recycle lines they can be treated separately and the sludge from each train can be evaluated and compared.

MICROBE-LIFT® is **Ecological Laboratories'** core wastewater technology.

Based on the successful sludge reduction experience in municipal wastewater treatment plants, Zutphen worked with **Ecological Laboratories** to plan a trial in their plant.

Objective: In March 2006 the City of Zutphen initiated a 120-day trial augmentation program. Their goal was to increase biological treatment reducing the yield of sludge. Two products were applied to Train AT2, **MICROBE-LIFT®** technology and a natural organic compound known to potentiate the sludge reduction capabilities of **MICROBE-LIFT®** technology in past applications. Train AT1 was left unseeded as a control. The design of the plant was ideal for testing since each train handled their sludge independent of the others.

Results Achieved:

Within 60 days, an average reduction in sludge of approximately 20% was observed from the treated train with a maximum reduction of 26% observed late in the latter part of the 60-day period. Between the 60th and 90th day of the trial some settling instability was observed as was typically observed in the transition from cold weather to warm weather operation. Once through the transition the plant quickly stabilized and again a sludge reduction was observed in the treated train, but for this time period was in the 12% to 16 % range. Upon further evaluation of the data and process, it was determined that there was some co-mingling of the supernatant from the digestors, leading to an inadvertent low-level seeding of the control train. While the differential between the seeded and “control” trains had been reduced, a comparison to historical sludge production numbers indicated that both trains were generating on the order of 20% reduction, despite higher hydraulic and organic loadings in 2006.

Zutphen Sludge Reduction Trial

Sludge Wasted (Kg)

	AT1	AT2	Average	Average/Day
Q1: 1 Jan to 13 March	250,597	252,883	251,740	3496
Q2: 14 March to 16 July	319,136	319,136	319,136	2574
			% Reduction	26.4%

Fig. 2: Sludge reduction efficiency improvement during trial exceeds 26%.
This was achieved in spite of dramatically increased BOD & TSS loading.

Another typical measure of sludge production is the yield coefficient, which is measured by the equation:

$$\frac{\text{Solids Processed} - \text{Cum Solids inf (kg)}}{\text{Cum BOD inf} - \text{Cum BOD eff}}$$

The calculated yield coefficient for the trial period is 22.4% lower than for the period immediately before the trial in 2006 and 36.1% lower than the yield coefficient for the same period in 2005. (Actual data available)

These impressive results validate the potential sludge reduction benefit of bioaugmentation even when applied to a very well operated system. Since sludge treatment and handling accounts for approximately 50% of the overall cost of wastewater treatment, reduction in sludge volume is a very cost effective benefit.

For more information on **MICROBE-LIFT®** Technology contact
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