



OVERLOADED STP DEMANDS PERFORMANCE BOOST

CLIENT:	Swing Corporation
LOCATION:	The Middle East
TREATMENT TYPE:	Decentralized sewage
CAPACITY:	30m ³ per day
SYSTEM SIZE:	2 x BioGill bioreactors

SITUATION

Numerous Sewage Treatment Plants (STPs) in the Middle East are experiencing loads in excess of the design capacity, as the population increases.

Swing Corporation was charged with finding a solution for existing STPs facing difficulties stemming from peak flow rates, particularly in the morning and evening periods. As a result, these systems are hydraulically and biologically overloaded, resulting in poor treatment performance.

At an overloaded STP using Conventional Activated Sludge (CAS), BioGill bioreactors were retrofitted to demonstrate how the technology could improve treatment performance and capacity. The objective of the project was to demonstrate the application of BioGill technology as a performance boost for overloaded wastewater treatment plants. This project also sought to determine the optimum batches and plant throughput per day, based on grams of Biological Oxygen Demand (BOD) removed per m² per day.

SOLUTION

In November 2015, two BioGill bioreactors were installed to treat an influent stream parallel to the existing STP.

The project was split into three stages. The initial first week start up period treated one batch per day. This progressively increased to four and finally five batches per day with a treatment time of 4.5 hours per batch or 30m³ per day.



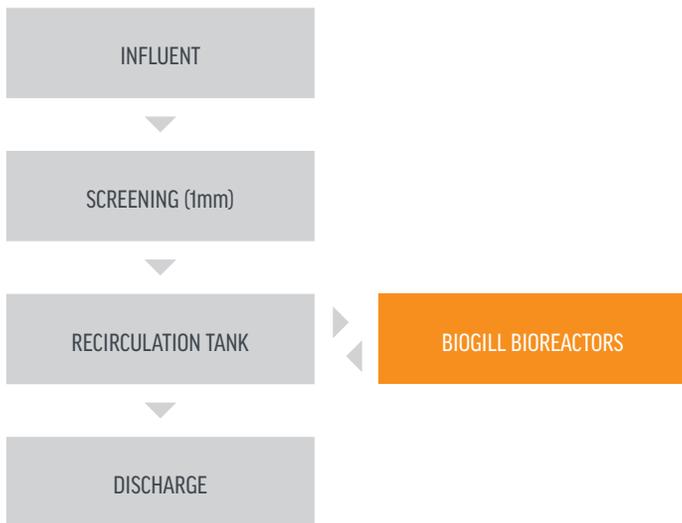
Two BioGill bioreactors were added to demonstrate the application of BioGill technology as a performance boost at the overloaded STP.



DESIGN

In order to help the existing STP handle shock loads and daily peak volumes in excess of what the original plant design allowed, a parallel stream of sewage influent is pumped to a recirculation tank after primary screening (down to 1mm).

A submersible pump then carries the wastewater to the top of the BioGill bioreactors where it is gravity fed over and down the gills. These gills were seeded with activated sludge from the existing plant which allowed the system to start treating in less than 6 hours..



Untreated water



Treated water after 4.5 hours

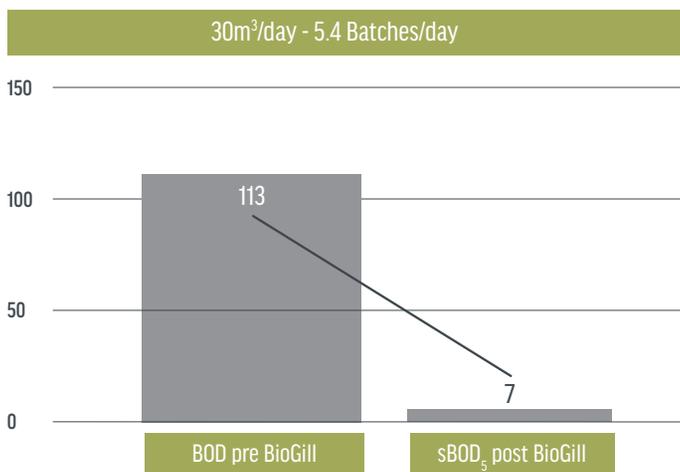


RESULTS

Independent testing showed that the BioGill units achieved BOD reductions well within the client's requirements. The results were achieved after 4.5 hours of treatment, without a settling cycle.

Removal efficiencies of 15g COD/m² per day, 5g BOD/m² per day and 0.5g NH₄-N/m² per day were observed just days after start-up, illustrating how quickly the biomass establishes on the gills. Ultimate removal rates as high as 7g BOD/m² and 1g NH₄-N/m² per day were achieved after complete biomass establishment. In addition, Soluble Biochemical Oxygen Demand (sBOD₅) was reduced to less than 8mg/L after 4.5 hours per day of treatment (15m³/unit per day).

These findings showed that BioGill technology can be effectively used for the upgrade of overloaded STPs to improve capacity and performance.



Successful treatment

15m³ per BioGill/day

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