Managing Beyond Stormwater Treatment A New Approach By Ecoclean Technology Using CDS Technology

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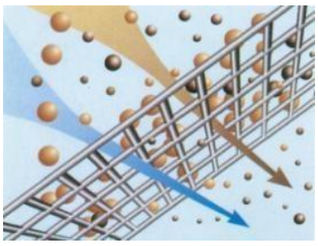
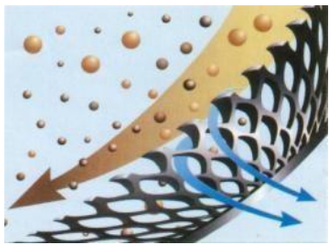




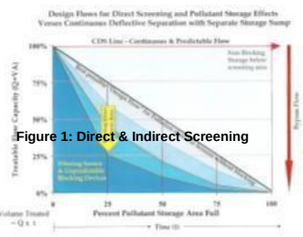


Figure 1: Direct & Indirect Screening

Introduction

Continuous Deflective Separation (CDS) is an innovative screening technology for the separation of solids from liquid streams. Unlike direct screening, which operates by impinging particles in the flow directly onto the screen, CDS utilizes the principle of indirect screening where the particles are carried by the flow across the face of the screen (Fig. 1). This, in conjunction with hydraulic balancing across the screen, delivers a process capable of removing solids from high flows of water and wastewater.

The technology utilizes a cylindrical screen with tangential inlet for the fluid above the screen and a sump below the screen. The tangentially introduced flow rotates inside the screen, keeping the screen surface free of solids while a small proportion of the fluid passes through each of the apertures in the screen. Solids are retained inside the screen on the rotating column of fluid if neutral density, sink into the sump of settleable, or float to the surface of the fluid in the unit

Characteristics of the technology include non-blinding operation, high loading rates (up to 32 m^3/s), capture performance that is independent of flowrate, and low operation and maintenance requirements.

This technology has found use in several applications; however the most prolific use of the technology is in stormwater remediation. The technology has also been adapted to operate in raw sewage, and is currently installed for CSO/SSO abatement in the USA, UK and Australia. There are also units in use for screening of coolant, food processing, potable water intakes, coal fines separation and washdown yards; to name a few. Today, the range of product include surface and rainwater treatment device, sewer mining process for water re-use, SMART water plant to class A re-use water etc.

Over 5000 CDS Gross Pollutant Traps (GPTs) are now installed worldwide for the remediation of stormwater. These units remove solids including man made litter, organic material (leaves, twigs and grass), and sediments from the influent. These units handle flows from less than 30 l/s to in excess of $5m^3/s$ and operate solely on the available head through the drainage system, which does not need to be large.

Today, the range of products include surface / rainwater treatment device, sewer mining process for water re-use, smart water plant (class A re-use water).

Monitoring and Performance

10 years of experience in the design, construction, performance and operation of a proprietary licensed, non-blocking screening technology referred to as Continuous Deflective Separation (CDS) in Malaysia is reported. Application of this technology to the management of wet weather flows in stormwater, sullage and sewage discharges resulting from Combined Sewer Overflow unit (CSO) or Fine Solid Separation (FSS) unit is discussed. Past performance directed at the high rate separation of flocs from chemically treated raw sewage is also described and typical results presented. Independent monitoring has shown this technology to be highly effective in removing gross solids along with high levels of grits, sediments and the pollutants associated with these from wet weather flows. The addition of a flocculation step following the basic screening process has shown promising results in pilot plant operation and provides an effective pre-treatment prior to disinfection for CSO/SSO abatement. Our recent experiment using non-chemical flocculation agent from several countries followed by trapping the fine flocs using CDS-FSS unit offers a promising real time quick treatment of combined sewage / stormwater and sullage water treatment in seconds which can result in our clean river in the making and provide potential of water re-use from our stormwater run off.

Other important results include a reported overall TSS removal of 70% and Phosphorus removal of 30% during storm event (Wong et. Al., 1999). As a large proportion of the solids removed from the unit is typically organic, the unit also effectively reduces the BOD and Phosphorus, regular cleaning of the units is recommended as studies have also suggested the potential for leaching of these pollutants in to the downstream system over longer period of time

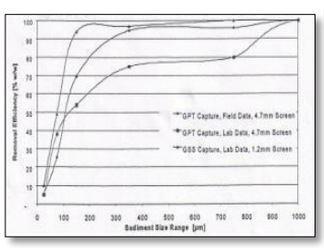
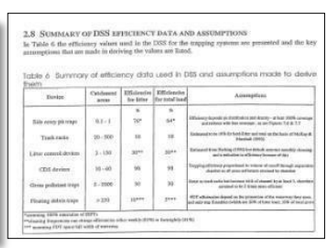


Figure 2 – Sediment Capture Date for CDS GPT and GSS units



2.8 SUMMARY OF DSS EFFICIENCY DATA AND ASSUMPTIONS

In Table 6 the efficiency values used in the DSS for the trapping systems are presented and the key assumptions that are made in deriving the values are listed.

Table 6 Summary of efficiency data used in DSS and assumptions made to derive them

Device	Catchment areas	Efficiencies for litter	Efficiencies for total load	Assumptions
Side entry pit traps	0.1 - 1	70*	64*	
Trash racks	10 - 500	50	50	
Litter control devices	5 - 150	80**	30**	
CDS devices	10 - 40	90	50	
Gross pollutant traps	5 - 1000	90	30	
Floating debris traps	> 100	100***	5***	

Figure 3: Pg 21, Allison RA, Chiew FHS McMahon TA "A Decision-Support-System for "Determining Effective Trapping Strategies for

CDS has performed cleaning of installed units and has collected considerable data over a 3-year period. The data shows that the amount of trash and debris collected by units installed in urban catchments ranges from 0.64 – 1.36 m^3/ha/yr, depending on rainfall and catchment type. This is much higher than previously reported (0.23 – 0.4m^3/ha/yr) and is probably due to the increased sediment capture efficiency of these units. The proportion of man-made; organic, and sediment removed by the units varies widely for different catchments but typically sediments comprise around 35% of the load, with man-made materials totaling only about 15%. Our experience in maintain some CDS units for over a year show that we have doubling amounting of floatables as well as sediment load probably amounting to 2 to $3m^3$/ha/year in Malaysia urban area.

Conclusions

Continuous Deflective Separation (CDS) is a screening technology capable of removing solids from liquid streams at high flows. Its utilization in the remediation of wet weather flows, in particular stormwater, has been extensively monitored and it has been shown to be highly effective (Figure 3). In the field, the units achieve 98% capture of gross pollutants and significant capture of TSS and associated pollutants.

Reference

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