

Construction Wastewater Treatment System

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Water Pollution Control Ordinance in Hong Kong

- Water Pollution Control Ordinance (WPCO) provides the main statutory framework for the declaration of Water Control Zones (WCZ)
- Discharge of effluent in WCZ is controlled by licence
- The Environmental Protection Department (EPD) is responsible for issuing licenses and enforcing the licence conditions
- EPD set limits that make effluents acceptable into foul sewers, storm water drains, inland and coastal waters
- In case of non-compliance, the maximum penalty for the first offence of illegal discharge is a fine of HK\$200,000 and imprisonment of 6 months



Water Pollution Control Ordinance

Effluent from construction sites normally discharges to storm drain, inland water, etc.

Parameters to be controlled	Discharge Guideline
рН	6 ~ 9
Suspended Solids	30 mg/L
Chemical Oxygen Demand	80 mg/L
and more	and more





Sources of Wastewater

- Wastewater from construction activities, e.g. bore piling, cleaning of external wall, etc.
- Truck / Concrete loader cleaning water
- Site cleaning water
- Ground water collected inside the construction site
- Rain water
- Water spray for dust removal
- Sewage (includes toilet and kitchen wastes)



Wastewater Characteristics - Silty Water

- Quantity
 - depends on uncovered areas, rain water amount, ground water amount and site work nature
 - discharge quantities can be ranged from 10m³/day to 100m³/hr



Wastewater Characteristics

• Quality

- depends on work nature e.g. foundation process has large amount of suspended solids, work on superstructure has comparatively less amount of suspended solids, pH value will be extremely high for concreting process
- Contains a large amount of mud, sand, mortar, concreting agent, etc.
- Suspended solids concentration normally ranged from 100-40,000 mg/L
- pH value can be as high as 13



Traditional Treatment Method

- Collect wastewater from several low points of the site and treated by plain sedimentation tanks
- Some of the construction sites may add gravity sand filter to increase the solids removal efficiency
- However, those treatment methods are not effective due to:
 - Poor design of sedimentation tank
 - ↗ Not sufficient hydraulic retention time (HRT)
 - The wastewater is usually silt-clay laden and cannot be separated effectively even for long HRT



Appropriate Treatment Method

- Apply effective chemical agent to enhance sedimentation
- Use tilted plates sedimentation tank to increase sedimentation efficiency, thereby minimizing the size of the system



AquaSed Wastewater Treatment System

- HKPC developed proprietary wastewater treatment for tackling the highly turbid wastewater discharged from the construction site
- HKPC also employs advanced proportional dosing technology to adjust the effluent pH value





Flow schematic of AquaSed







AquaSed

- The purpose of the preliminary sedimentation pit is to settle the large and heavy solids, thereby reducing the loading of the *AquaSed* and chemical consumption
- AquaSed will be turned on automatically when wastewater is pumped into the system
- All the operation of the *AquaSed* is fully automatic, including mixer, chemical dosing and even the discharge of concentrated sludge from the bottom of the sedimentation tank
- All your operator needs to do is to re-fill the chemical and monitor the treatment performance





AquaSed

The **AquaSed** has four standard models to suit different inflow rate and different sizes of construction site:

Model No	Capacity	Dimensions
AS-10	10m ³ /hr	2.1 X 2.1 X 3.2 m
AS-20	20m ³ /hr	2.3 X 3.3 X 3.3 m
AS-40	40m ³ /hr	2.3 X 5.2 X 3.6 m
AS-80	80m ³ /hr	2.3 X 7.5 X 3.7 m





HKPC

Treatment Performance

Influent SS concentration (mg/L)	Effluent SS concentration (mg/L)	Sludge SS concentration (mg/L)	Removal Efficiency (%)
210	9	3,300	95.71
1,800	10	43,000	99.44
15,000	13	120,000	99.91
40,000	12	120,000	99.97

Wastewater Samples

Treatment Process Wastewater pump into the Reaction Tank **Reaction Tank** Sedimentation Tank Sludge Discharge Treated Effluent HKPC°

 Awarded with CMA Certificate of Merit in Machinery and Equipment Design in the 2000 Hong Kong Awards for Industry

 Obtained Patents in Hong Kong, Mainland China, Singapore & Malaysia

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Traditional way to clean truck wheels

EnviroWash Automatic Truck Wheel Washing Machine

HKPC developed a high performance automatic vehicle wheel washing machine

Innovative Features

 Equipped with smart indication lamps to provide user friendly instruction of operation

 Specially designed mechanical sensor safeguard transit personnel from high pressure jet

Innovative Features

- Equipped with debris removal scrapper that can be installed on either side of the machine
- Low water consumption by collecting and reusing the cleaning water
- Good quality recycled clear water can be easily maintained by adding a proprietary chemical from the coagulation unit

Treatment Process (1/3)

ISUZL

· EA 3732

HKPC®

Treatment Process (2/3)

After

Treatment Process (3/3)

Different kind of vehicles

Professional Recognition

 Awarded with CMA Certificate of Merit in Machinery and Equipment Design in the 2001 Hong Kong Awards for Industry

 Obtained Patents in Hong Kong and Mainland China

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