Construction Wastewater Treatment System

HKPC TechDive - Environment Technology
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Water Pollution Control Ordinance (WPCO) in Hong Kong

Environmental Protection Department

HK$200,000 + 6 Months
Water Pollution Control Ordinance (WPCO) in Hong Kong

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

<table>
<thead>
<tr>
<th>Parameters to be controlled</th>
<th>Discharge Guideline</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>6 ~ 9</td>
</tr>
<tr>
<td>Suspended Solids</td>
<td>30 mg/L</td>
</tr>
<tr>
<td>Chemical Oxygen Demand</td>
<td>80 mg/L</td>
</tr>
</tbody>
</table>

and more ............
Sources of Wastewater

- Wastewater from construction activities
- 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
- Range from 10m$^3$/day to 100m$^3$/hr

**Quality**

- Depends on work
- 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.

Not effective due to:

- Poor design of sedimentation tank
- Insufficient hydraulic retention time (HRT)
- Difficulties in separating those silt-clay from wastewater effectively even for long HRT
Appropriate Treatment Method

1. Apply effective chemical agent to enhance sedimentation

2. Use tilted plates sedimentation tank to increase sedimentation efficiency, thereby minimising the size of the system
AquaSed
Wastewater Treatment System
Developed by HKPC

Tackle the highly turbid wastewater discharged from the construction site

Employ advanced proportional dosing technology to adjust the effluent pH value

Fully automatic
**AquaSed**

**Wastewater Treatment System**

**Developed by HKPC**

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**The preliminary sedimentation pit is to...**

- Settle the large and heavy solids
- Reduce the loading of the *AquaSed* and chemical consumption

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**Fully automatic**

- To be turned on automatically when wastewater is pumped into the system
- Automatic operations, including mixer, chemical dosing and even the discharge of concentrated sludge from the bottom of the sedimentation tank

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**Your operator only needs to...**

- Re-fill the chemical
- Monitor the treatment performance
AquaSed
Wastewater Treatment System
Developed by HKPC

Four standard models to suit different inflow rate and different sizes of construction site

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Capacity</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS-10</td>
<td>10m³/hr</td>
<td>2.1 X 2.1 X 3.2 m</td>
</tr>
<tr>
<td>AS-20</td>
<td>20m³/hr</td>
<td>2.3 X 3.3 X 3.3 m</td>
</tr>
<tr>
<td>AS-40</td>
<td>40m³/hr</td>
<td>2.3 X 5.2 X 3.6 m</td>
</tr>
<tr>
<td>AS-80</td>
<td>80m³/hr</td>
<td>2.3 X 7.5 X 3.7 m</td>
</tr>
</tbody>
</table>
# AquaSed
Wastewater Treatment System Developed by HKPC

## Treatment Performance

<table>
<thead>
<tr>
<th>Influent SS concentration (mg/L)</th>
<th>Effluent SS concentration (mg/L)</th>
<th>Sludge SS concentration (mg/L)</th>
<th>Removal Efficiency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>210</td>
<td><strong>9</strong></td>
<td>3,300</td>
<td><strong>95.71</strong></td>
</tr>
<tr>
<td>1,800</td>
<td><strong>10</strong></td>
<td>43,000</td>
<td><strong>99.44</strong></td>
</tr>
<tr>
<td>15,000</td>
<td><strong>13</strong></td>
<td>120,000</td>
<td><strong>99.91</strong></td>
</tr>
<tr>
<td>40,000</td>
<td><strong>12</strong></td>
<td>120,000</td>
<td><strong>99.97</strong></td>
</tr>
</tbody>
</table>
AquaSed Treatment Process

1. Pump wastewater into the Reaction Tank
2. Reaction Tank
3. Sedimentation Tank
4. Treated Effluent
5. Sludge Discharge
**AquaSed**
Wastewater Treatment System
Developed by HKPC

Before

After

Wastewater Samples
AquaSed Professional Recognitions
Wastewater Treatment System Developed by HKPC

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

Patents in Hong Kong, Mainland China, Singapore and Malaysia
EnviroWash
Automatic Truck Wheel Washing Machine Developed by HKPC

From...
EnviroWash
Automatic Truck Wheel Washing Machine
Developed by HKPC

To...
EnviroWash Innovative Features
Automatic Truck Wheel Washing Machine Developed by HKPC

Smart indication lamps
• Provide user friendly instruction of operation

Specially designed mechanical sensor
• Safeguard transit personnel from high pressure jet
EnviroWash Innovative Features
Automatic Truck Wheel Washing Machine
Developed by HKPC

Debris removal scrapper
• Can be installed on either side of the machine

Low water consumption
• Collect and reuse the cleaning water

Use of proprietary chemical in the coagulation unit
• Maintain good quality recycled clear water easily
EnviroWash Treatment Process

After
EnviroWash Treatment Process
EnviroWash
Automatic Truck Wheel Washing Machine
Developed by HKPC

Support different kinds of vehicles
EnviroWash Professional Recognitions

Automatic Truck Wheel Washing Machine
Developed by HKPC

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

Patents in Hong Kong and Mainland China