CASE STUDY REF: 024

SHEK WU HUI EFFLUENT POLISHING PLANT – MAIN WORKS STAGE 1, HONGKONG

Location of Primary sedimentation Tanks (PST)

Project Details	
Project	SHEK WU HUI Effluent Polishing Plant - Main Works- Stage 1 - E&M Works for Sewage Treatment Facilities
Owner	Drainage Services Department (DSD)
Engineering Contractor	Best wise Envirotech Limited
Contract No.	DE/2018/04
Consultant	AECOM Asia Company Limited

Primary Sedimentation tank scrapper details	
Tank Size	26.9m Dia x 1.925M SWD + 0.675M FB
Quantity	2 Nos (Tank 4 & 6)
Manufacturer	JASH Engineering Ltd.
Type	Peripheral driven SPC-B Type
MOC	Stainless Steel AISI 316

Polishing plant Development		
Year of Commissioning	**Population**	**Treatment Capacity in m3 per Day**
1974	12,500	1,700
1984	200,000	60,000
2001	300,000	80,000
2009	510,000	93,000
By 2034	850,000*	190,000

Location:

Sheung Shui is an area in the New Territories, Hong Kong. Sheung Shui Town is a part of the Fanling–Sheung Shui New Town in the North District of Hong Kong.

Purpose of Polishing Plant Project Expansion:

The Drainage Services Department, Hong Kong is upgrading Shek Wu Hui Sewage Treatment Works (SWHSTW) built in way back 1974 to become the largest tertiary sewage treatment works in Hong Kong. The conventionally function-driven plant will install state-of-the-art treatment technologies to double its treatment capacity while producing high quality effluent for discharge and reuse.

Reconstruction of the existing Shek Wu Hui Sewage Treatment Works to increase the treatment capacity to 190, 000 m3 per day and to upgrade the sewage treatment level to tertiary standard for conversion into a "Shek Wu Hui Effluent Polishing Plant". The outlet of the polishing plant is disposed to Ng Tung River

Role of JASH:

Shek Wu Hui had entrusted JASH to study and replace the Scrapper exactly to suit the existing tank to get the desired output parameter. JASH had taken this challenging job and accomplished the same to the entire satisfaction of the customer.

JASH had offered peripheral driven collection scrappers with bridge & accessories as per the DSD specification requirement, these Scrappers were designed to tailor suit the existing sedimentation tanks.

PST after installation at site.

Feasibility Study:

During Engineering Stage, the feasibility of replacement & suitability of the scraper to the existing tank was thoroughly analyzed with respect to the technical requirements of DSD, one to one fitment & site study.

All the engineering documentation were reviewed & approved by DSD & consultant. The documentation submittals were

a) *Technical compliance to the specification.*
b) *Outline suitability Drawing for the existing tank.*
c) *Structural analysis of the scrapper bridge for deflection.*
d) *Torque, Speed reduction, Geared motor selection, overload protection calculations.*

Engineered Scrapper Bridge:

*JASH **Scrapper bridge** was specially designed with Deflection in any direction not to exceed 0.005 of its spans with a superimposed uniformly distributed load of 3000 Pa addition to the structural load. The same was tested at our works successfully.*

***The Scrapers** were so designed to scrap and give a positive movement of the thickened activated sludge towards the central draw off hopper of the tank with the help of helix shaped non-continuous blades.*

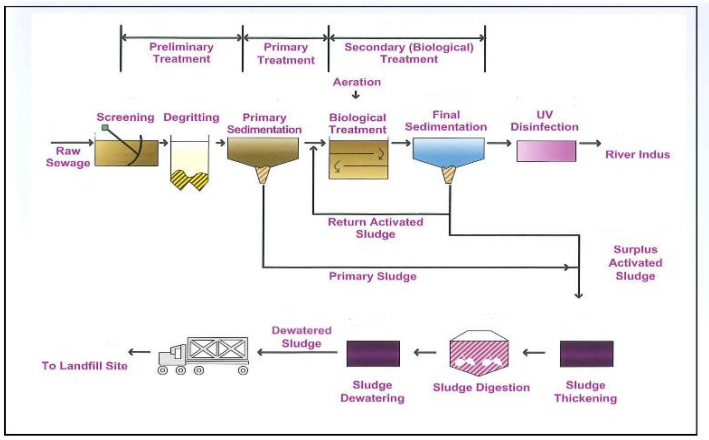
***Safety of the Machine**: The Geared motor was provided with overload protection arrangement and emergency braking system with a control panel. This overload & braking arrangement are given to protect the drives in the event of the excessive sludge loading or by any external objects.*

In order to achieve longer life for traction wheels, JASH had offered traction wheels in cast iron lined with temperature molded polyurethane tyre. These wheels provide better abrasive resistance and the most suitable to run on RCC surface.

***Hinge pin Assembly** was provided in the bridge structure to absorb the shocks generated due to any undulation on RCC surface.*

The supplied equipment was erected & precisely fitted on the existing tank. The contractor & owner were fully satisfied about the suitability of the equipment & overall support viz. detailed engineering, documentation, product quality, delivery & post supply support for installation of the scrappers.

Flow Chart in Shek Wu Hui Effluent Polishing Plant Project



In primary sedimentation tank, about 50% of the suspended solids are settled out & removed as primary sludge by sludge scrapper mechanisms. There are 8 existing primary sedimentation tanks in which tank 4 & 6 were set for refurbishment due to aging of mechanisms.

Deflection test on the scrapper bridge.

The supplied PST scrappers were instrumental in delivering overall output characteristics stratifying to the stipulated conditions

Key Parameters of Treated Effluent	
Design flow	93,000 m3/day
Total Suspended Solids	<30 mg/l
5 Day Biological oxygen Demand	<20 mg/l
Ammonia & Nitrogen	<2 mg/l
Nitrite + Nitrogen	<12 mg/l
E-Coli	< 1500 (Count/100ml)

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