



**Report for Talk on Sewerage Services in Malaysia**

by Ir. Dr Lee Yun Fook

Ir. Dr Lee Yun Fook is currently a co-opted member in the Civil and Structural Engineering Technical Division (CSETD).

The Civil and Structural Engineering Technical Division (CSETD) invited Ir. Dr. Lee Yun Fook, the head of Waste and Environment Team of Sepakat Setia Perunding Sdn Bhd (SSP), to deliver a talk on “Sewerage Services in Malaysia” on 9<sup>th</sup> November 2017 at Tan Sri Prof. Chin Fung Kee Auditorium, Wisma IEM. Total of 90 participants attended the talk.

Ir. Dr. Lee started his talk with an introduction on the revolution of sewage treatment system in Malaysia from primitive system to mechanized/ advance treatment system. Ir. Dr. Lee also shared the national sewerage policy whereby the country is moving towards centralized (bigger capacity) sewerage system by decommissioning multi-points STP (7000 numbers) into CSTP; the authorities involve in sewerage submission; the relevant Acts, Regulations and guidelines governing the sewerage industry in Malaysia.

After the introduction, Ir. Dr. Lee presented the three main elements of sewerage services in line with the Country’s National Sewerage Policy of moving towards Centralised system i.e. Centralised Sewage Treatment Plants (CSTP), Centralised Sewerage network and Network Pumping Stations.

Under the CSTP section, Ir. Dr. Lee shared that the four largest CSTP in Malaysia are Pantai 2 CSTP, Jelutong CSTP, Langat CSTP and Bunus 2 CSTP with population equivalent (P.E.) of 1.4 million, 1.2 million, 920,000 and 750,000 respectively. Ir. Dr. Lee further elaborated on two major CSTP projects completed by SSP i.e. the Jelutong CSTP (Malaysia) and Yen So Wastewater Treatment Plant (WWTP) located at Hanoi, Vietnam with the details as shown in **Table 1** below.

**Table 1: Summary of project details for Jelutong CSTP and Yen So WWTP**

Project Title	Jelutong CSTP	Yen So WWTP
Location	Penang, Malaysia	Hanoi Vietnam
Capacity	Ultimate: 1.2 million PE Mechanical & Electrical Equipment installation: 800,000 PE	200,000m3/day
Type of wastewater	Domestic sewage (conveyed in separate sewer)	Untreated sewage & storm water runoff (conveyed in Combined sewer)
Source of Wastewater	From piped sewer (gravity/ force main) : separate system	Collected from existing canals i.e. Kim Nguu River and Set River, dammed with Radial Gates
Year of Completion	2008	2012
Land Area	12 Ha	7.5 Ha

Challenges at Site	Built on reclamation land of ex landfill land and swamp land (see <b>Figure 1 &amp; Figure 2</b> )	Built on soft ground
Technology	Sequential Batch Reactors (SBR)	SBR
Environment Challenges Addressed in project	120,000 m <sup>3</sup> /day raw sewage being discharge to the sea prior to the project, causing severe sea water pollution	Untreated sewage being discharged in the combined sewer (main drain/ river), floating debris in canals/ rivers/ lakes, difficulties to lay sewer at Old & congested city of Hanoi (1000 years old city). Septic water in drainage is being extracted for irrigation and fish farming, causing serious health hazard to the farmer and environment.
Solution	CSTP to treat sewage to Standard A effluent standard prior to discharge to sea.	Introduced radial gate complete with fully mechanized debris removal system at strategic locations (see <b>Figure 3</b> ), Construct Yen So WWTP to treat the wastewater and discharge high quality effluent back to the downstream river system.
Component of CSTP	<b>Liquid treatment line</b> (Inlet Pumping Station, Preliminary Treatment Works, SBR, reclaimed water filtration) , <b>solid treatment line</b> (mechanized Sludge thickening, digestion and dewatering), <b>gas treatment line</b> (Methane gas storage and Co-generator)	Similar to Jelutong STP but added with Ultraviolet (UV) disinfection system and Membrane filtration system to produce higher quality effluent for downstream river and internal plant usage.

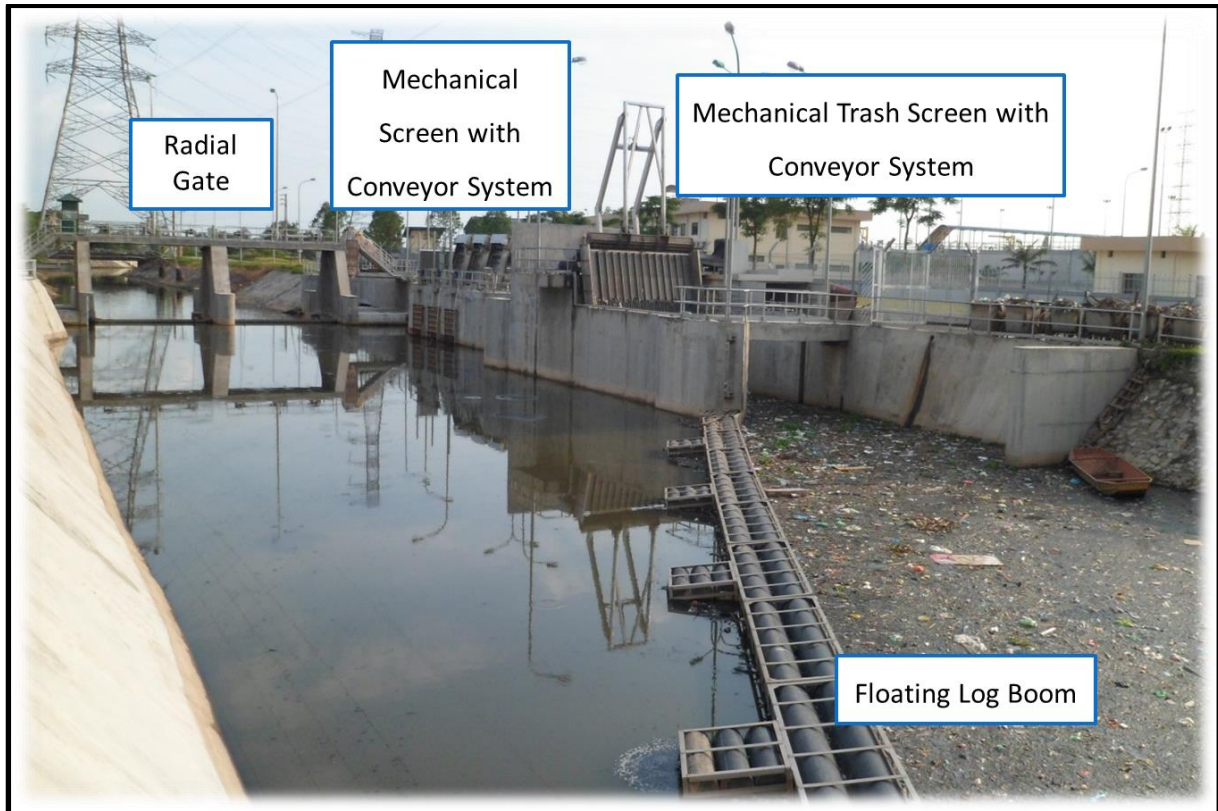
Ir. Dr. Lee highlighted that from the experience gained from the success of Jelutong CSTP, Malaysian experts (Consultant, Contractor and suppliers) had exported the SBR technology to Hanoi Vietnam and managed to complete the first CSTP in Vietnam to address the immediate environmental needs of wastewater and debris pollutions.



**Figure 1: Aerial Photograph showing Jelutong CSTP site (red boundary) on existing landfill and swampy land**



**Figure 2: Aerial Photograph showing Jelutong CSTP**



**Figure 3: Typical Radial Gates/ Water intake structures complete with fully automated debris removal system at Yen So WWTW project (Technology from Malaysia)**

After the CSTP, Ir. Dr. Lee talked about sewerage network projects, started with the design criteria for hydraulic (pipe sizing), pipe selection, method of pipe laying (pipe jacking or conventional open cut method) etc, followed by several real projects with catchment size range from 60,000 to 550,000 PE with length of trunk sewer varies from 10 km to 40 km. Ir. Dr. Lee had further demonstrated the centralized sewerage network project comprises gravity sewer, force main and network pumping stations (NPS). NPS is an important element in the centralized sewerage project to lift up the sewage when the sewer reaches certain depth (due to difficulty of construction and authority requirement). Besides NPS is common used to cross rivers, localized hill, railway, highway etc. Before he ended his presentation, Ir. Dr. Lee highlighted the challenges in laying trunk sewer in city area due to congested underground utilities and shared two depth sewer project i.e. Kuching sewerage and Singapore sewerage with maximum depth of 27m and 50m below ground respectively.

Ir. Dr. Lee concluded his talk by reiterating the latest sewerage strategy of implementing centralized sewerage system due to economy of scale and better treatability.

IEM's Vice President, Ir. Prof. Dr. Jeffery Chiang Choong Luin presented Ir. Dr. Lee a memento and certificate of appreciation in the presence of CSETD's Chairman Ir. Dr. Ng Soon Ching.