

# Co-Incineration of Dewatered Sewage Sludge with Municipal Solid Waste in Bangkok, Thailand

Hideaki Anazawa

*Key Words: Dewatered Sludge, Wastewater Treatment Plant, Mass Balance, Co-incineration*

## 1. RESEARCH BACKGROUND AND OBJECTIVE

In this study, we focused on wastewater treatment plant (WWTP) in Bangkok, the capital city of Thailand. Recently, Bangkok Metropolitan Administration has planned to increase the number of WWTP from 8 to 20 in order to improve wastewater treatment service ratio<sup>1)</sup>. Based on these plans, it can be assumed that wastewater volume and sewage sludge volume would be increased. In this study we clarify specific characteristic of wastewater and sewage sludge of Bangkok, Thailand and create mass balance model of WWTP in Thailand. Second, we compare several dewatered sludge disposal scenarios to clarify the difference of each disposal scenario that included dewatered sludge co-incineration.

## 2. METHODOLOGY

This research started by surveying at Nongkhaem wastewater treatment plant in Bangkok, Thailand between September 2017 to July 2018. Conducted 14 times sampling and sampling 9 samples per time in totally 126 samples are taken. Several parameters are analyzed. Analyzed parameter will comparing between parameter to see characteristics of each parameter in wastewater and sludge. Next, mass balance conducted based on average value from actual surveying to create mass balance model of wastewater and sludge in Thailand. 6 scenarios including co-incineration of dewatering sludge with municipal solid waste are constructed based on mass balance model and literature review. 6 scenarios including co-incineration will be discussed and compared to clarify on running cost and GHG emission volume. At the same time, analyzed the comparing result with another dewatered sludge scenario.

## 3. RESULT AND DISCUSSION

Comparing Between Total Solid (TS) and Suspended Solid (SS) concentration in each sample didn't show any significant difference on seasonal variation. Result showed that the season is not the factor effects on wastewater and sludge characteristic or concentration. On carbon, hydrogen, sulfur and nitrogen in dewatered sludge, results didn't show any significant difference around the year and ratios are rather constant. Mass balance was calculated on average value of each parameters in sampling period. After conducted efficiency inspection, Mass balance efficiency of each parameters is on satisfied level except kind of SS are lower than other parameters but still in acceptable range. 6 scenarios including co-incineration of dewatered sludge are construct based on constructed mass balance and literature review. In the case of pay commission expense for co-incineration became the most expensive running cost from the high commission itself but in the case of calculate running cost based on operation became one of cheapest method but most of the running cost were electricity cost. Compared with another scenario didn't see significant different in total running cost. GHG emission of co-incineration, coal became the biggest factor effect on GHG emission of co-incineration. next is electricity from operation. When compared with other scenario, didn't find any large gap except landfill was has GHG emission higher than co-incineration 10 around times