

# Treatment performance verification of commercial wastewater treatment tank

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# Background

Various types of commercial wastewater treatment tanks are sold in markets



**BUT**

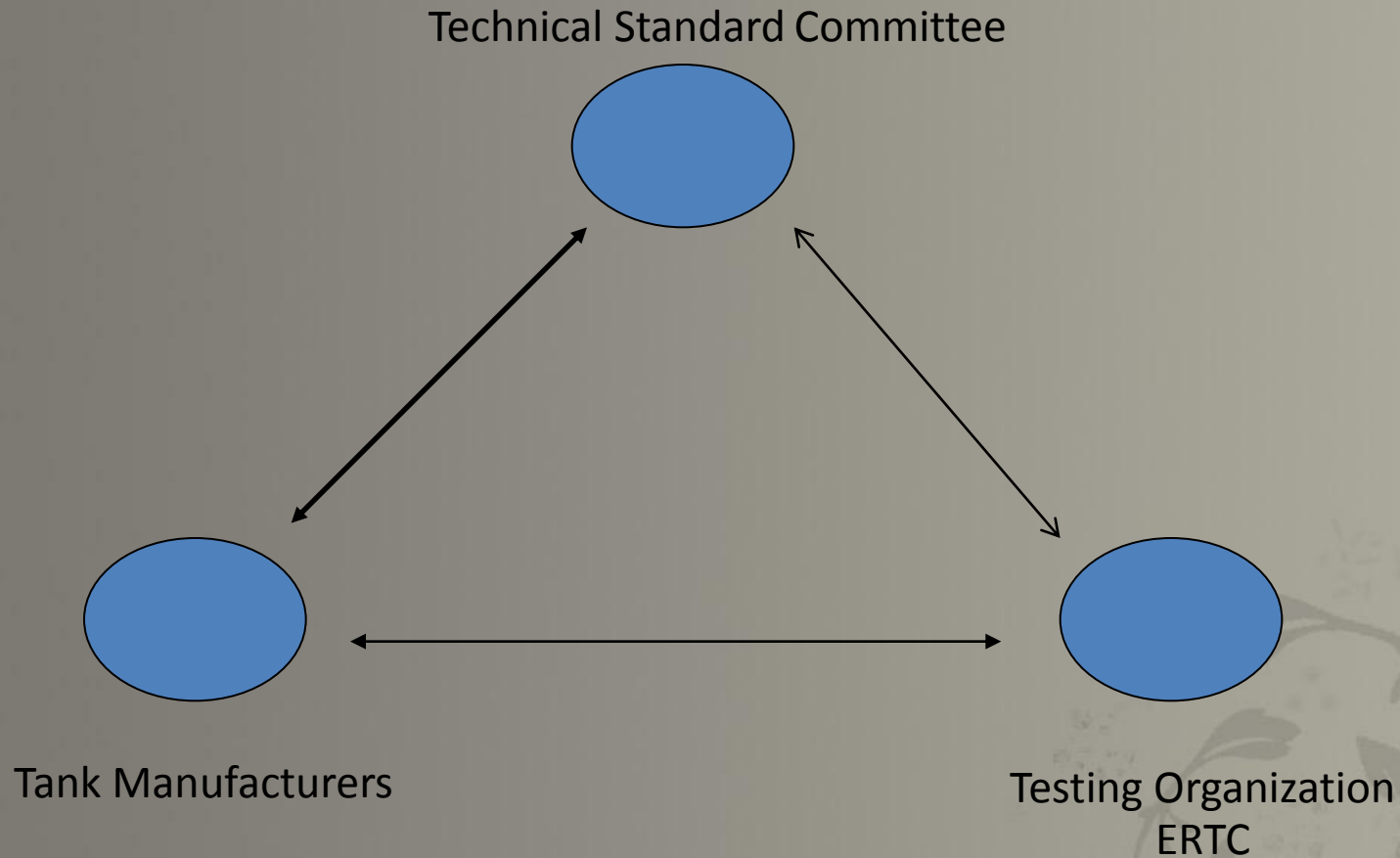
No is passing efficiency tests by government authority.

Because of the lack of technical data to support a verification system

# Objectives

- To conduct the tests of commercial wastewater treatment tanks at a test site and real applications to verify their efficiencies in removal contaminants specified by effluent standards.
- To obtain technical information to support Office of Industrial Standardization for setting up standard testing guidelines.

# Relationship between parties participating in the verification program



# Commercial wastewater treatment tank selection

- **Commercial anaerobic wastewater treatment tanks**
- **Designed to treat sewage of a family of 5 persons**
- **Most widely use in the markets.**
- Volume capacity 1.6 cubic meters
- **HRT 1.5 days**
- 9 Manufacturing joined the test.

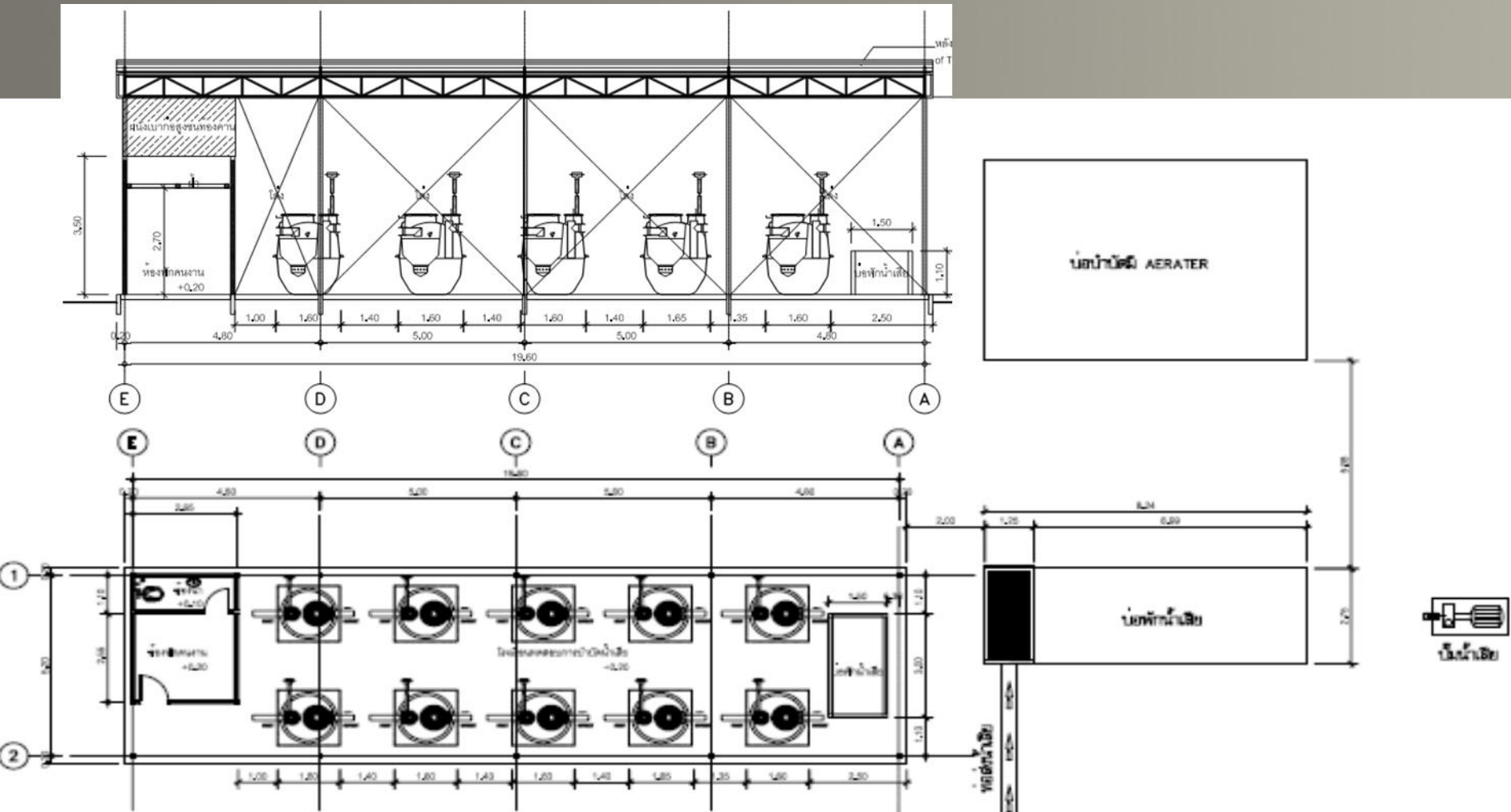


# Characteristics of commercial anaerobic wastewater treatment tank (cont.)



There are 2 parts: septic zone and filter zone (filter zone contains media)

- Layout of tested tanks at the test site





# A test site



- ❑ A test plant was constructed at backyard of a prison in order to get wastewater from the prison.

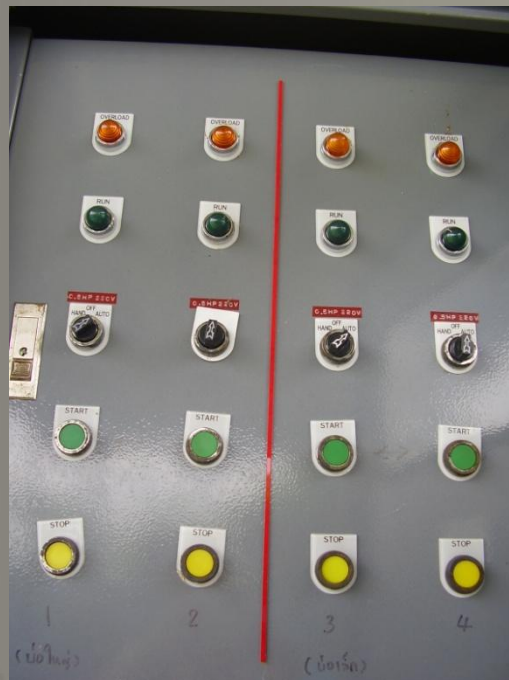


# A test site



# Method

- ❑ To give a code to the onsite treatment tank of 9 companies
- ❑ Use a timer to control wastewater feed to the tanks
- ❑ Use water counter to recheck wastewater volume at the outlets of the tanks



# Recheck wastewater volume

A volume counter was installed at the outlet of the tank.






# Characteristics of wastewater

- BOD 100 - 450 mg/L
- TSS 150 - 500 mg/L
- TKN 25 - 70 mg/L
- TP 3 - 20 mg/L
- pH 6 - 9
- alkalinity > 60 mg/L
- temperature 20-30 °C

# Time table shows sequence of operation

	Testting plan in 1 year			
start up the system	normal condition test	stress conditiion test 2 time of normal flow rate (5 consecutive day )	stress conditiion test a half of normal flow rate (5 consecutive day)	stress condition test no flow rate  (5 consecutive day)
3 months	3 months	The system will be stable within 2 months		
				
month 1-3	month 4-6	month 6-8	month 8-10	month 10-12



# Water Sampling Method

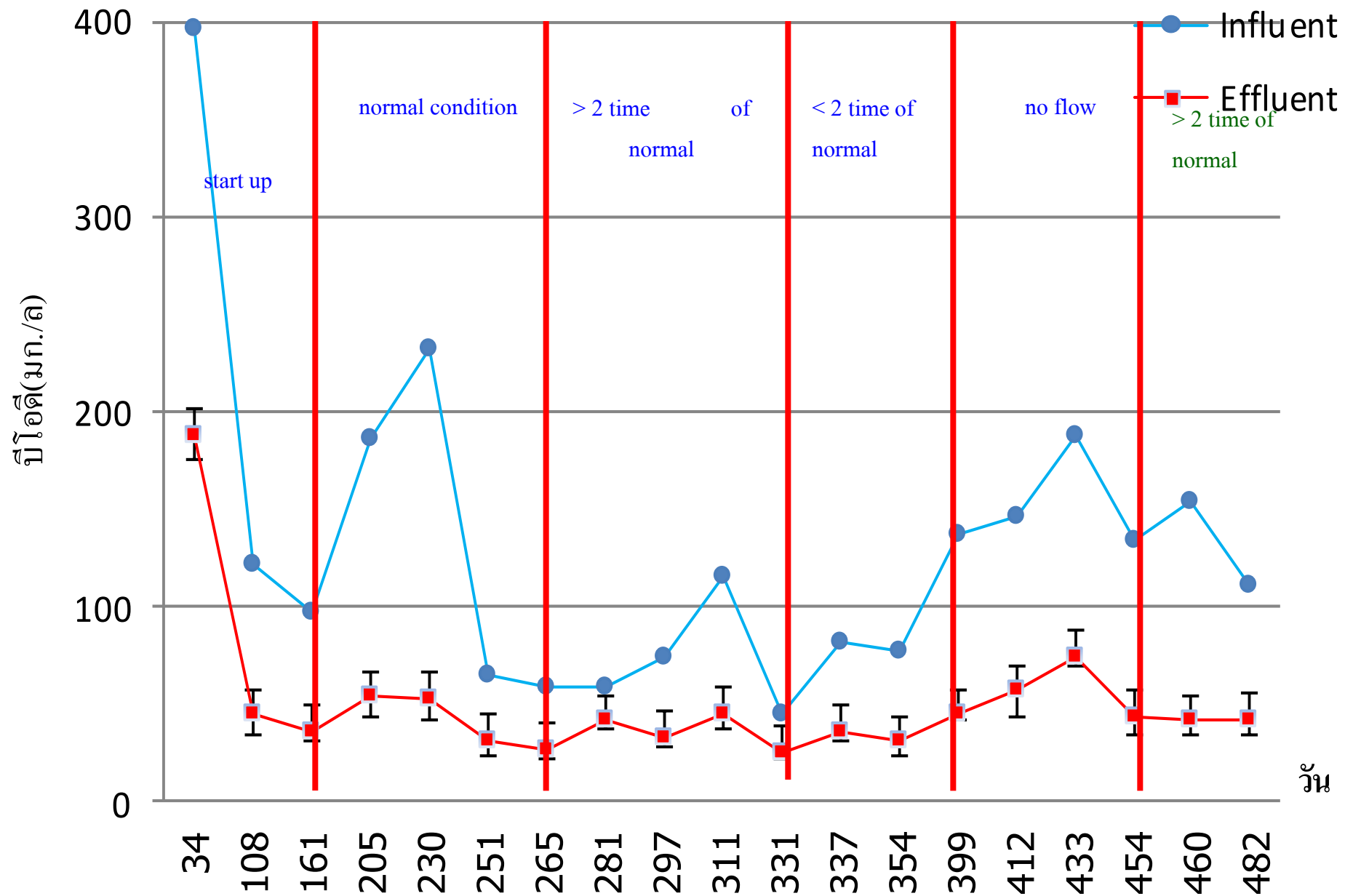
❖ composite sampling every  
1 hour for 4 hours



# Result of inlet wastewater feed

average inlet wastewater fed at normal test condition

	Company tank code/inlet wastewater feed average(L/day)								
	A	B	C	D	E	F	G	H	I
Average	985	985	1051	1082	1041	1014	991	1040	1048
S.D.	74	103	89	124	118	91	69	115	105



Comparison of average BOD in wastewater influents and effluents of 9 test tanks

# BOD Removal Efficiency

Consider inlet wastewater flow to the system more than 100 mg/l

condition test	normal		2 time of normal			no flow			
BOD inlet (mg/l)	186	232	115	154	110	137	146	188	133
BOD outlet (mg/l)	53	52	45	42	42	44	56	74	43
Tank code/Time	21-Nov-08	16-Dec-08	9-Mar-09	5-Aug-09	27-Aug-09	5-Jun-09	18-Jun-09	9-Jul-09	30-Jul-09
A	67	78	58	67	60	66	62	61	59
B	76	78	58	77	49	69	71	62	69
C	66	67	56	67	62	68	64		
D	75	80	53	75	70	64	58	63	69
E	65	82	75	79	72	69	66	64	73
F	76	80	56	74	56	66	45	56	
G	67	78	67	74	66	69	58	61	65
H	76	80	64	70	56	72	56	57	59
I	75	72	59		67	70	73	63	79
% treatment average	72	77	61	73	62	68	61	61	68

# Result of average effluent

parameter (mg/L)	BOD	SS	TKN	TDS	FOG	TP	Sulfide
influent	156	105	66	577	9.8	6.9	1.7
effluent	50	32	62	517	5.8	5.8	8.8
Building Effluents Standard Size D	50	50	40	500	20.0	-	4.0

## Building Effluents Standard Size D

1. Dormitories have number of rooms from 10 to not greater than 50 rooms.
2. Fresh food markets have areas from 500 to not greater than 1,000 m<sup>2</sup>
3. Restaurants and food shops or food centers have areas from 100 to not more than 250 m<sup>2</sup>



# Conclusion

- All test condition do not have effects on removal efficiencies of BOD of all the tested tanks.
- Removal efficiencies of BOD are in the range of 61-77 %.
- BOD in effluents are in the range of 42-74 mg/L.

# Suggestion

- For TKN, Phosphorus and sulfide couldn't treated or slightly treated in anaerobic tank.
- For removal of TKN, Phosphorus and sulfide should add aeration part to the tank for increasing performance of wastewater treatment tank.

# Efficiency testing of commercial wastewater treatment tank used in the household



**Objective:** To study the efficiency of commercial wastewater treatment tanks used in the households of citizens.

# Methods

- 22 candidate houses were selected to test efficiency of pollutants removal by anaerobic tanks.
- But 14 houses had excess FOG deposit in the tanks.



- So 8 houses were used to be the study sites.

# Methods

- Anaerobic commercial wastewater treatment tank widely used in households.
- Cheapest price.
- Volume capacity 1.6 cubic meters
- There are 2 parts: septic zone and filter zone (filter zone contains media)
- Monthly sampling in 8 months.



# Result

Parameters	Influent			Effluent			Building Effluents Standard Size D
	Max Avg.	Min Avg.	Avg.	Max Avg.	Min Avg.	Avg.	
BOD	166	97	129	122	83	103	50
SS	207	36	83	92	23	59	50
TKN	194	32	145	160	35	122	40
TDS	675	496	610	999	516	619	500
FOG	59	8	19	130	5	38	20
Sulfide	27	2	16	25	2	14	4

# Conclusion

- Commercial anaerobic tanks used in household used have low pollutant removal efficiencies because of no proper care and maintenance.
- Uncontrolled installation and performance inspection by environmental officers
- No regulation for commercial wastewater treatment tank.



Thank you  
for  
your attention

