

CHAPTER 7

SEWAGE CHARACTERISTICS

In planning and design of sewerage works, it is necessary to determine the characteristics of the sewage, namely its volume, its strength, and its composition. The volume would comprise hourly, daily and seasonal variations in flow, and are important in that they determine the capacities of collection sewers, pumping stations, treatment unit and outfalls. The strength and composition, primarily as measured by the suspended solids and biochemical oxygen demand (BOD) determinations, are important in that they exert a controlling influence on the degree of treatment. However in Bangkok-Thonburi concerning with sewerage system has not been practically worked beforehand consequently no results was illustrated into consideration in development.

SEWAGE VOLUME

Sewage can be considered to have two components. The first consists of sanitary sewage and industrial wastes. While the second consists of underground and surface water which enters sewers through joints and other openings.

Ground water infiltration varies seasonally with ground water levels; some company can recommend the efficiency of sewers by expressing as per cent of infiltration. But for Bangkok-Thonburi would have to carefully consider the amount of infiltration due to high water table level which is average about 1.5 metres from the ground surface. In the foreign

country there is a meter installed of a gas bubbler and sensitive pressure recorder to determine the depth of flow.

The rate of flow can record by utilizing radioactive isotope. In Bangkok-Thonburi is very difficult to determine the volume at various junctions of sewers because waste waters cannot be drained. The only way to determine the sewage quantity by getting the information from water treatment plant, and using 70 % of the water consumption.

SEWAGE STRENGTH AND COMPOSITION

Because of no data on sewage strength and composition, it was necessary to undertake an extensive programme of sampling and analysis. In conducting the sampling programme, one of the problems was that of collecting composite samples which could be properly representative of the varying conditions which occur in the course of a 24-hours period. BOD is the most significant indicating the pollution of receiving waters. Consequently the BOD requirement in Klongs, Chao Phraya River, have to begin in earnest. The data in Table 11, 12, 13, show the composition of waste water in Klong Lod. The characteristics septic tank sludge and night soil sludge which took from the composting plant and Phrameru Ground respectively are shown in Table 14, 15.

Table II COMPOSITION OF WASTE WATER IN KLONG LOD

AT MINISTRY OF INTERIOR

DATE	TEMP. °C	P.H.	TURBIDITY	TOTAL SOLID ppm	SUSPENDED SOLID ppm	DISSOLVED SOLID ppm	ALKALINITY ppm as CaCO ₃	ACIDITY ppm as CaCO ₃	CHLORIDE	NITRATE as N	D.O
Aug. 29, 1965	29	7.6	200	292	138	154	60	5	18	0.24	
Sep. 6, 1965	29.5	6.5	390	592	448	144	205	2	59	0.08	0.6
Sep. 19, 1965	30	6.7	220	358	120	238	71	16	21	0.08	1.4
Sep. 26, 1965	29	6.9	110	284	88	196	75	16	19.5	>1.6	0.8
Oct. 3, 1965	28.3	6.9	330	688	402	286	90	5	17	0.08	0.6
Oct. 10, 1965	30	7.6	85	202	82	120	73	16	20	0.04	0.6
Oct. 24, 1965	27.8	6.6	60	201	120	81	70	19	15	0.24	0.9
Nov. 7, 1965	28.9	6.8	30	211	81	130	70	9	21	0.08	0.7

SOURCE : FROM TEAM PAPER "CHARACTERISTICS OF WASTE WATER IN BANGKOK" BY TAM BARAMI, UTHENTHAWAI SCHOOL OF BUILDING CONSTRUCTION

Table 12 COMPOSITION OF WASTE WATER IN KLONG LOD

AT ROYAL HOTEL

DATE	TEMP. °C	P.H	TURBIDITY	TOTAL SOLID ppm	SUSPENDED SOLID ppm	DISSOLVED SOLID ppm	ALKALINITY ppm as CaCO ₃	ACIDITY ppm as CaCO ₃	CHLORIDE	NITRATE as N	D.O ppm
Aug, 29, 1965	29	7.4	60	276	26	220	110	5	36	2	1.8
Sep, 6, 1965	30	6.7	1500	3023	2412	611	260	1	62	0.08	4.2
Sep, 19, 1965	30	6.7	170	342	92	250	61	4	31	0.12	1.4
Sep, 26, 1965	29	6.7	110	288	76	210	71	8	11.5	0.6	3.6
Oct, 3, 1965	28.9	7.7	190	204	116	88	66	5	2.5	0.16	1.0
Oct, 10, 1965	30	7.1	70	189	62	147	75	5	30	0.12	0.6
Oct, 24, 1965	27.6	6.7	70	236	135	103	76	6	22	0.08	0.4
Nov, 7, 1965	27.6	6.6	40	200	57	143	95	5	28	0.06	0.6

SOURCE : FROM TEAM PAPER "CHARACTERISTICS OF WASTE WATER IN BANGKOK" BY TAN BARANI, UTHENTHAWAI SCHOOL OF BUILDING CONSTRUCTION

SOURCE:

Table 13 COMPOSITION OF WASTE WATER IN KLONG LOD

AT PAKKLONGTALAT.

DATE	TEMP. °C	P.H	TURBIDITY	TOTAL SOLID ppm	SUSPENDED SOLID ppm	DISSOLVED SOLID ppm	ALKALINITY ppm as CaCO ₃	ACIDITY ppm as CaCO ₃	CHLORIDE	NITRATE	D.O
										as N	ppm
Aug, 29, 1965	28.4	7.6	310	297	145	152	66	1	15	0.08	
Sep, 5, 1965	29	7.8	90	853	90	763	170	2	52	2	1.2
Sep, 19, 1965	30	6.7	220	329	180	169	89	6	10.5	0.08	4
Sep, 26, 1965	29.3	6.9	140	257	122	135	85	4	6	0.6	3.2
Oct, 3, 1965	28.3	7.5	155	229	128	101	65	2	10	0.08	1.4
Oct, 10, 1965	30	7.8	48	227	66	161	60	5	9	0.08	0.6
Oct, 24, 1965	28.9	7.0	70	59	31	26	58	7	9	0.08	2.6
Nov, 7, 1965	28.9	6.6	35	250	70	180	60	5	12	0.08	2.6

SOURCE: FROM TEAM PAPER "CHARACTERISTICS OF WASTE WATER IN BANGKOK" BY TAM BARANI, UTHENTHAWAI SCHOOL OF BUILDING CONSTRUCTION

Table 14 GENERAL CHARACTERISTICS OF SLUDGE

(Night soil Sludge)

DESCRIPTIONS	RUN 1	RUN 2	RUN 3
COD in mg/l	9560	2910	847
BOD ₅ in mg/l	1305	405	320
NH - N in mg/l	1460	1400	616
ORGANIC - N in mg/l	1170	2300	336
TOTAL - N in mg/l	2630	3700	952
TOTAL SOLIDS in%	6.40	4.165	7.23
VOLATILE SOLIDS in%	70.2	68.1	70.9
GREASE CONTENT in mg/l	6370	3150	9575
GREASE CONTENT in% of solids	10.4	7.57	13.24
VOLATILE ACID in mg/l	980	1055	1677
PH	7.4	—	6.9
ALKALINITY in mg/l	6700	—	2775
BOD / COD ratio	.1727	.139	.378

AVERAGE H₂S CONTENT = 1.665 mg/l

E. coli count (fresh nightsoil) = 110,000,000 colonics / ml

Table 15 GENERAL CHARACTERISTICS OF SLUDGE

(Septic Tank Sludge)

DESCRIPTIONS	RUN 1	RUN 2	RUN 3
COD in mg/l	5520	4350	2178
BOD ₅ in mg/l	1180	336	319
NH ₃ - N in mg/l	665	543	448
ORGANIC - N in mg/l	1260	1404	799
TOTAL - N in mg/l	1925	2447	1247
TOTAL SOLIDS in %	3.482	2.22	2.64
VOLATILE SOLIDS in %	79.53	75.2	69.40
GREASE CONTENT in mg/l	2515	1305	959
GREASE CONTENT in % of solids	7.26	5.88	2.64
VOLATILE ACID in mg/l	170	292	455
PH	7.6	7.3	8.1
ALKALINITY in mg/l	2450	2278	1450
BOD / COD ratio	.214	.0773	0.147

AVERAGE H₂S CONTENT = 0.872 mg/l

NOTE run sample collected Nov, 8, 1965

" " " " Nov, 28, 1965

" " " " Dec, 21, 1965

SOURCE: FROM THESIS OF "CHARACTERISTICS AND TREATMENT OF SLUDGE FROM BANGKOK SEPTIC TANK" BY SUCHINT PHANAPAYUDHIKUL, SEATO GRADUATE SCHOOL OF ENGINEERING.