

\emptyset
 / \dot{U} : \dot{U}
 \dot{O} \dot{O}
 \dot{O} \dot{O} \dot{U}
 \dot{O} \dot{U}
 / 10000 (COD) \dot{O} / 1800
 (COD) \dot{O} \dot{U} \dot{U}
 \dot{O} \dot{O} / \dot{O} 80 110 \dot{U} (SS) \dot{O} / 50
 \dot{O} \dot{U}
 \dot{O} \dot{O} \dot{O} \dot{O} \dot{U} \dot{U} \dot{U} 3000 \dot{O}
 \dot{O} \dot{O} \dot{O} 60 (DT)
 \dot{O}

Key words: industrial wastewater, assessment, reuse, cooling water, cement factories

Study of the Nature of Industrial Effluent From Hammam Al-Alil Cement Factory And Evaluate Its Reuse Ability

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Abstract

Cement industry consumes a big amount of water, which is used in both of the industrial processing and in the cooling system. In this paper, an industrial surveying was carried out to evaluate the condition of industrial wastewater produced in Hammam Al-Alil cement factory and to investigate the ability to reuse the cooling water, which was used one time in this factory, in other locations. The results of the study showed that industrial wastewater contain a high concentration of oil and grease (reached to 1800 mg/L) which caused a great concentration of COD (up to 10000 mg/L) in raw samples. The separation of the oil and grease was very effective in reducing the pollutants concentration. After separation, the COD value of the samples was about 50 mg/L. and the values of (SS) and the oil and grease concentration were about 110 and 80 mg/L respectively. The result of the study also showed that the cooling water can be reused in both of material mill and in the clay washing units. Both the quantity and quality of the cooling water are compatible to be reused in these units after separating the oil layer. An detention time of not less than 60 min. was necessary to adjust the SS concentration to be compatible with Iraqi water sources standards.

(5) %66
 (9,3)
 (8,1)
 (2)
 1400 Õ

(Lime)
(10)

(Iron oxide)
()

(Silica)

(Alumina)

(10)

(Wet Process)

(1)

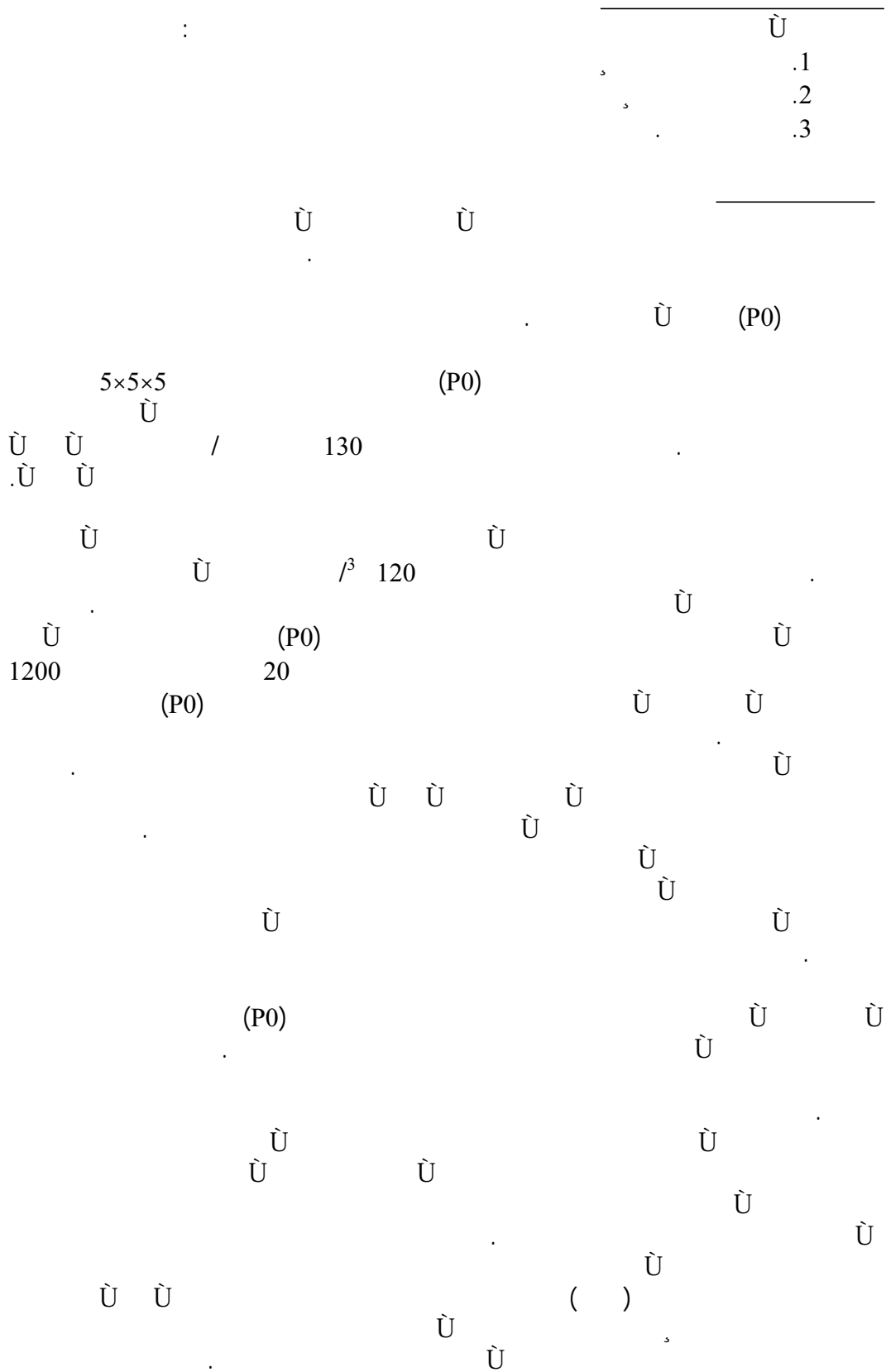
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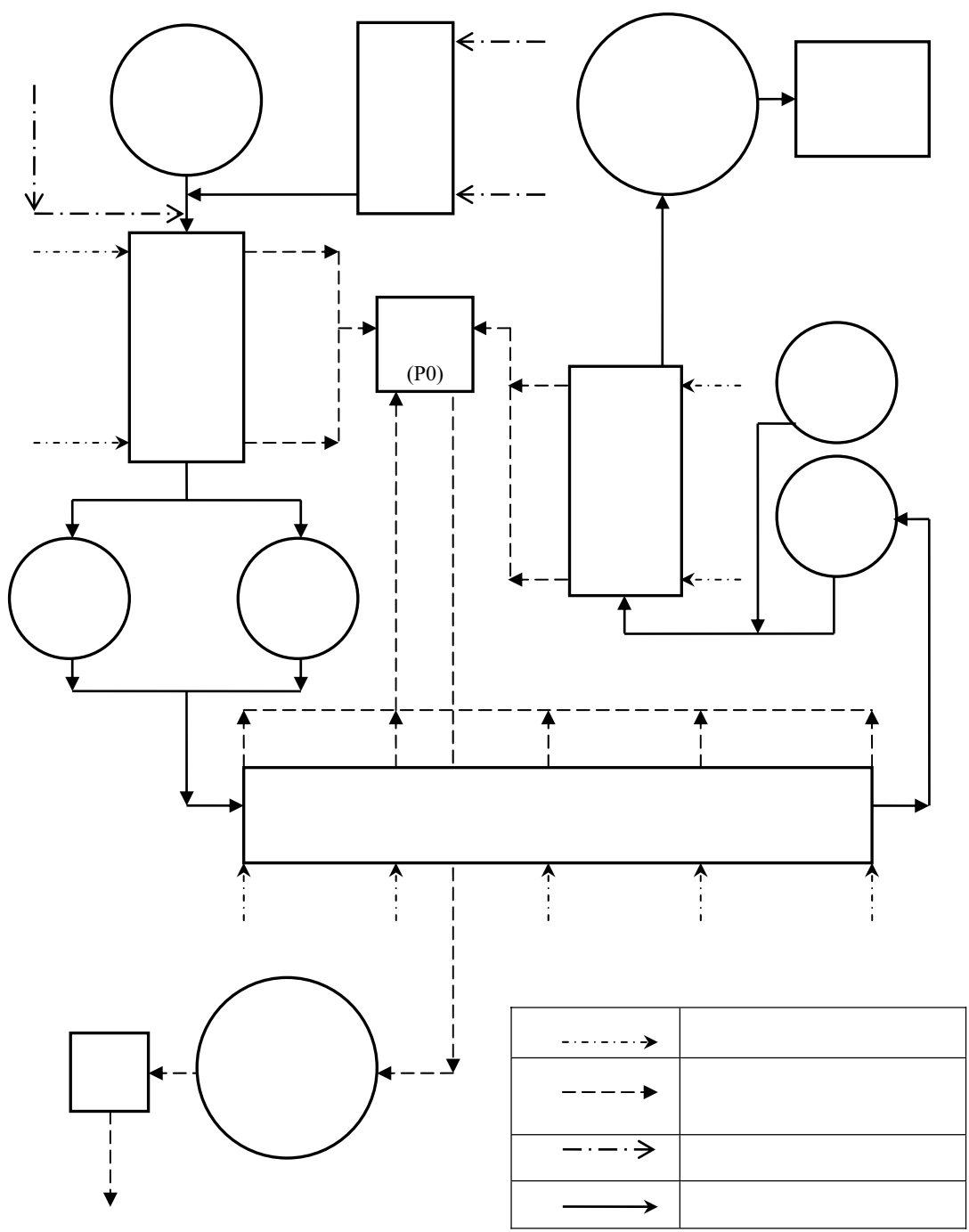
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3000

5000

ä





∅ ∅ ∅ : (1) ∅

(1) Ø

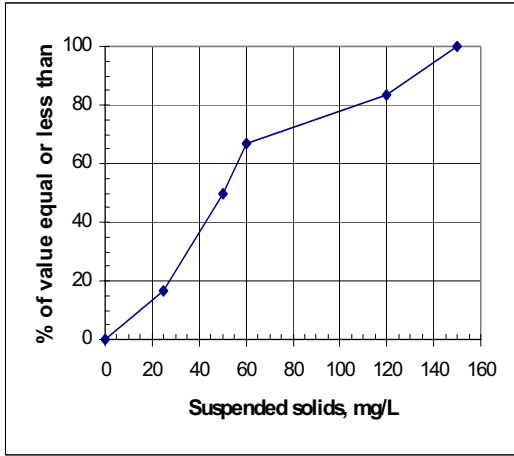
		(COD)	(S.S)	mg/L	EC	pH
		mg/L	mg/L			
1	Bearing gearbox (mill of material)	30-50	12-50	10-20	390-450	8.1-8.4
2	Bearing overflow (mill of material)	10-30	20-60	10-60	383-420	8.05-8.4
3	Bearing gear box (mill of cement)	15-40	10-50	15-50	391-455	8.0-8.2
4	Boiler outlet	12-30	25-50	10-30	500-1190	8 - 9.31
5	Collection and pumping pit (P0)	30-50	50-120	15-80	-	-
6	Compressor	15-50	10-50	8-30	390-500	7.9-8.5
7	Furnaces bearings	12-50	25-150	-	380-550	8.0-8.5
8	Composite sample without removing oil	10600	3200	1800	-	8 -8.5

Ö , Û Û (7-1) Û : _____
 Û (8)
 Û

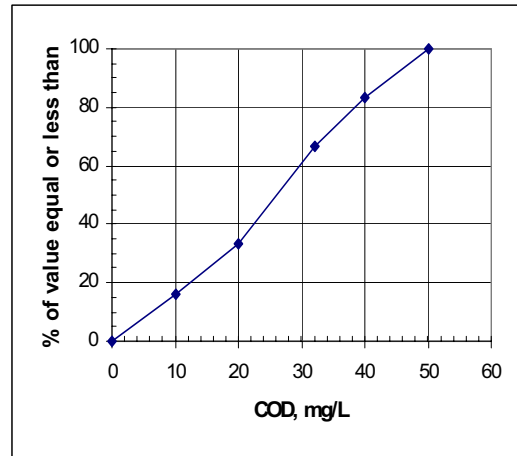
(COD) %100 (2) Û
 Û (COD) % 50 , / 50
 Û) . / 25
 Û (2) Û (1
 Û (COD)Ö

Û (SS) % 100 (COD) Ö (3) Û
 / 100 %68 , / 150 (SS)
 Û (SS) / 60
 Û %22

80 Û (4) Û
 / 50 Û % 100 Û
 Û % 66 , /
 Û
 %97 Û
 Û
 Û Û Û

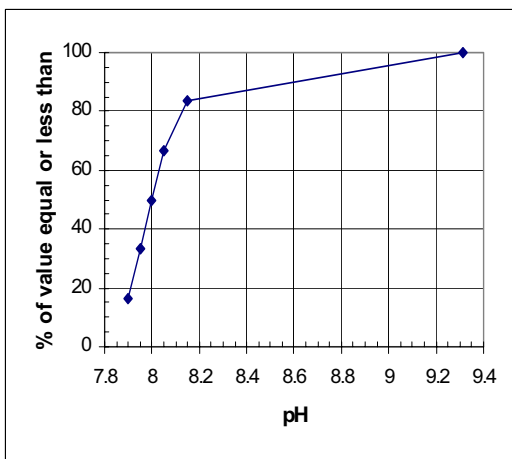


(SS) : (3)

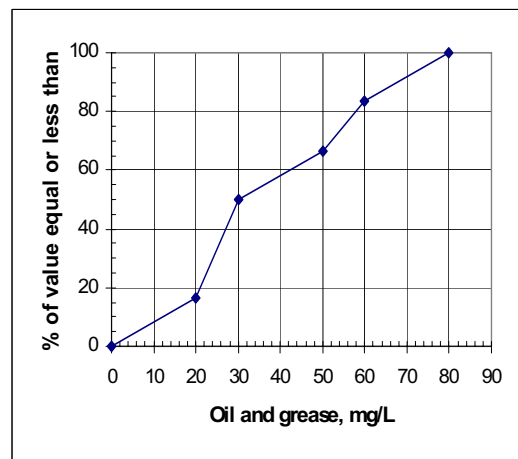


(COD) : (2)

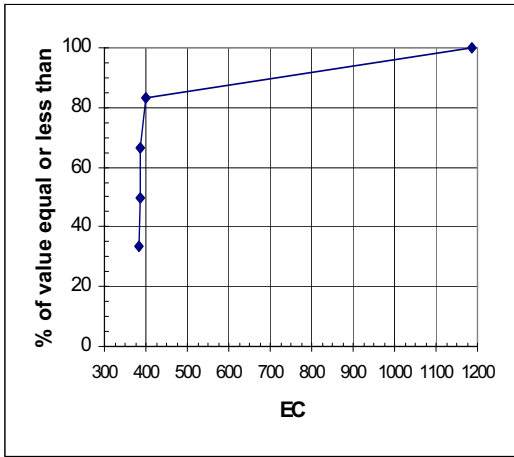
(pH) (5) % 90
 . (8.4-7.8) (pH)
 85 (EC) (6) %
 %15 / 400-370 (EC) %
 . / 1180



(pH) : (5)



: (4)

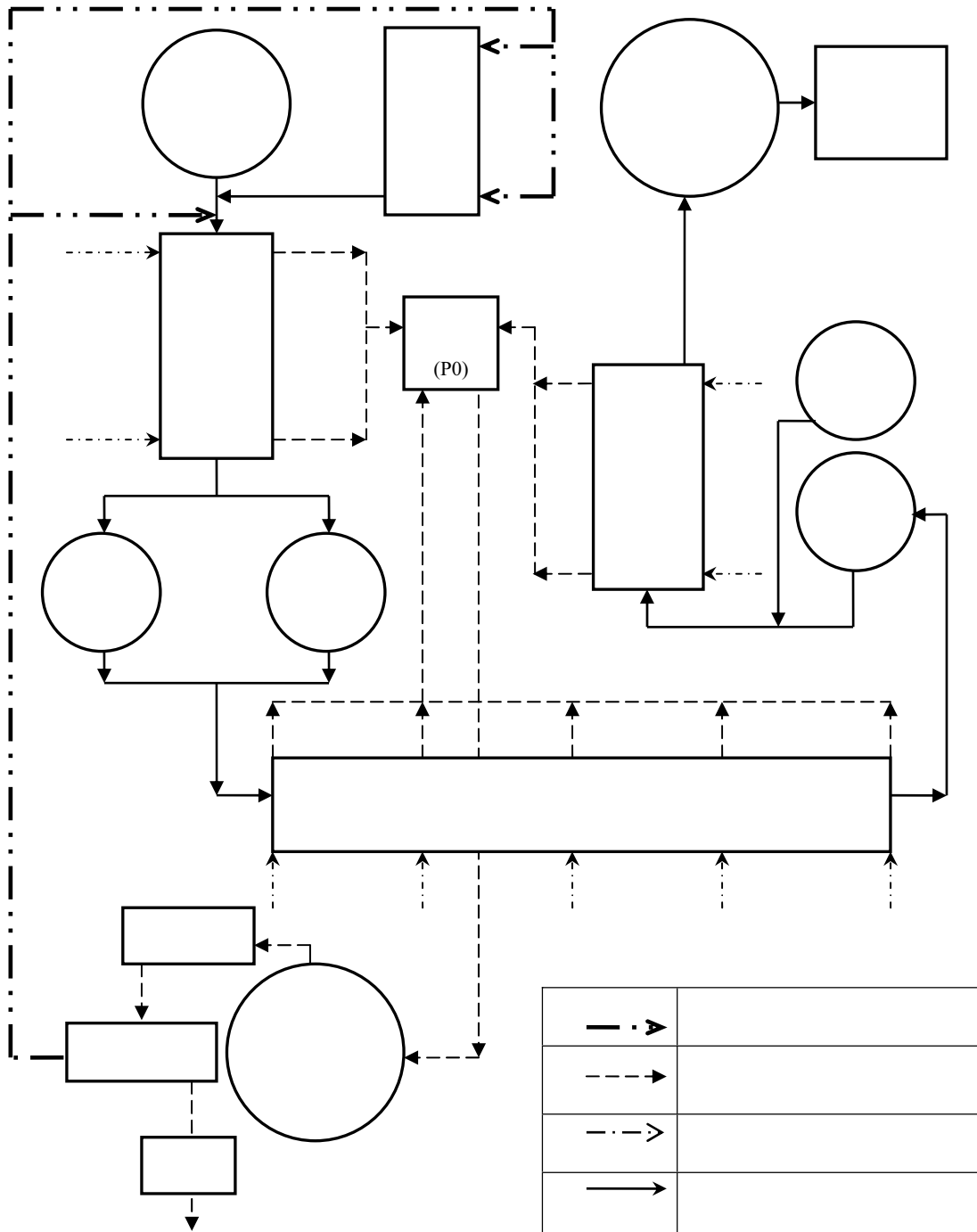


(EC) : (6)
Ø

(Total suspended solids)
 ()
 120 , 90 , 60 , 30 Õ
 (Turbidity)
 60
 (Total suspended solids)
 (10 NTU) (Turbidity)
 : _____ -1
 : _____ -2
 (2)

(7) (1) (flow
 3.3
 Over)
 : (2)

		1
Ø	%25	2
(Fresh water tank)		3
		4
		5



∅ : (7) ∅

8	180 m ³ /hr	1440 m ³ /day			-2
20	80 m ³ /hr	1600 m ³ /day			
				2335	3040
			1800		.1
111	50	3200	10600	(SS) (COD)	
					.2
					.3
					.4
					.5
90					.6

1. Al-Layla, MA; Ahamd, S; Middlebrooks, EJ, "Handbook of Wastewater Collection and Treatment: Principles and Practice", *Garland STPM press*, New York, 1980.
2. Eckenfelder, WW., "Industrial Water Pollution Control", *McGraw-Hill Inc*, New York, 1989.
3. Industrial Waste Committee, "Pretreatment of Industrial Wastes" Manual of Practice FD-3, *Water Environmental Federation.*, 601 Wythe Street, Alexandria Virginia 22314, USA. 1994.
4. Instruction Manual of Hammam Al-Alil Cement Factory.
5. Masters, GM., "Introduction to Environmental Engineering and Science" *Prentice-Hall, Inc. New Jersey 07458*, 1998.
6. Metcalf & Eddy, "Wastewater Engineering" 4th edition, *Tata McGraw Hill Edition, New Delhi*, 2003.
7. Nemerow, NL, "Industrial water pollution: Origin, Characteristics and Treatment", *Addison-Wesley Publishing Company Inc.*, 2nd edition, 1978.
8. U.S. Environmental Protection Agency "Guidance Manual for the Use of Production-Based Standards and the Combined Waste stream Formula. Permits Div. and Indust. Technol. Div.", Washington D.C., 1985.
9. U.S. Environmental Protection Agency "Pretreatment Facility Inspection", *Office of Water Enforcement and Permits*, Washington D.C., 2nd Ed., 1991.
10. Waddell, JJ, "Concrete Construction Handbook" *McGraw-Hill Inc*, New York, 2nd edition, 1974.