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Study of Wastewater Treatment from Ecologic Storage Yard

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Abstract

The present paper study the wastewaters quality resulted from an ecologic storage yard in Prahova. To achieve the proposed goal, that of obtaining treated water, with parameters within the limits of Directive 91/271/EEC UWWTD for discharges in sensitive waters, the storage yard's wastewater treatment plant was monitored for a period of 6 months. The paper presents the time variation of the wastewater's quality indicators at both entrance and exit from the plant. The next 16 quality indicators of wastewater was studied at entrance and exit of wastewater treatment station: pH, suspension substances, biochemical use of oxygen at 5 days (CBO_5), NH_4^+ , NO_3^- , NO_2^- etc; the analyses was weekly for 3 months. Also, the activated sludge's quality, from the biological phase, has been monitored.

Key words: *wastewater treatment, storage yard, wastewater quality indicators.*

Introduction

Treatment of leachate from storage yard is a necessity in the durable development context.. Quality of wastewater treatment plant at the entrance shows large variations of physical and chemical parameters in a short time. This paper presents the experimental study of the waste waters treatment process in the storage yard.

Experimental

The experimental study consisted by established wastewater quality by sample five months. In paper was presented only medium value. The sample was tacked from inlet and outlet wastewater treatment plant.

Key parameters / indicators of quality that must characterize the wastewater treatment plant into the normative incorporating NTPA 002 [1]. Maximum allowable limits for pollutants are momentary concentration, expressed in mg/dm^3, and are measured in monitoring points established through the initial sampling [1]. The wastewater indicators are presented in table 1. The samples collected respect SR-ISO 5667. All the analyses were done in laboratory and respected standard analysis [4] (table 1,2).

Table 1. Analysis for inlet wastewater treatment plant monthly average value for six months.

No	Parameter	Meter units	Value	Maximum
1	pH	pH units	7.3	6.5-8.5
2	COD	mg O_2/l	1110.0	500.0
3	BOD	mg O_2/l	1098.0	300.0
4	Nitrogen	mg/l	29	30.0
5	Nitrites	mg/l	7.3	1.00
6	Detergents	mg/l	549.4	25.0
7	SS - suspended	mg/l	44.6	350.0
8	Residuu fix	mg/l	1260.4	2000.0
9	Nitrates	mg/l	44.1	25.0
10	H_2S	mg/l	0.58	1.0
11	Conductivity	mS	12,9	-
12	NaCl	%	25.0	-
13	Zn	mg/l	0.64	1.0
14	Cu	mg/l	2.5	0.2
15	Mn	mg/l	1.7	2.0
16	TDS	g/l	3.24	-

Table 2. Analysis for outlet wastewater treatment plant monthly average value for six months.

No	Parameter	Meter units	Value	Maximum
1	pH		7.3	6.5-8.5
2	COD	mg O_2/l	511.0	125
3	BOD	mg O_2/l	430.0	25
4	Nitrogen	mg/l	5.0	2.0
5	Nitrites	mg/l	1.4	1
6	Detergents	mg/l	114.3	0.5
7	SS - suspended	mg/l	21.3	35
8	Residuu fix	mg/l	344.1	2000
9	Nitrates	mg/l	10.6	25
10	H_2S	mg/l	0.1	0.5
11	Conductivity	mS	12.1	-
12	NaCl	%	11.0	-
13	Zn	mg/l	0.2	
14	Cu	mg/l	0.1	
15	Mn	mg/l	1.1	
16	TDS	g/l	0.2	-

Results and discussion

Lowering the pH leads to an increase in solubility of heavy metals, toxic for further development of all life. The pH of water depends on the choice of chemical precipitation conditions in the countries analyzed, which is not the case because there is no physico-chemical step. The content of total dissolved solids (TDS) is not governed by legislation for industrial wastewater. But because it is important to determine in conjunction with the materials in suspension show how easy or difficult it can be purified wastewater due to its contamination.

NaCl content in water is not limited by legislation, but the presence of significant quantities of this compound in water provides a particular character.

Synthetic biodegradable detergent concentration was determined at entry into the treatment plant as having a maximum of 549.44 mg / l to maximum permissible value of 25 mg/l which leads to dispersion and colloidal substances causing serious matter in sedimentation suspended solids.

Sulphides are the result of decomposition of organic or inorganic substances. The samples analyzed were small and specific values exceeding 0.58 mg/l.

Biochemical oxygen demand is the degree of contamination in the wastewater. High values recorded at the entrance to the sewage plant that is 1098 mg / l indicates a high degree of pollution of wastewater to be treated.

The total closure of the water circulation system (without contact with fresh water) let to accumulate in the waters the mineral salts. This leads to the necessity of determining a quantity of water to be added to the circulating water so that the average content of salt to maintain the constant levels (no more than 2g/l).

Conductivity of water aeration tank has maximum values 12,19 mS. Typically conductivity must be of the order μS. These values are due to circulating water supply.

The indicator material in suspension is a very rough method of activated sludge concentration in the tank, because the concentration of suspended solids decanted aeration basin has been variable. In its analysis BOD_5 value of 930 mg / l indicates a high organic load of biological treatment step. Water from the settling compartments would be oxygenated through fine bubble air diffusers supplied and trained in a stream, are controlled so that optimum conditions for aerobic digestion. The biological treatment was incomplete because the aeration system is defective and the amount of air introduced into the aeration basin is not monitored in any way. Foam arise during the operation shows that the aeration time is insufficient. Sludge produced in this compartment after bacterial biodegradation, would be recycled through sedimentation basin. Treated water in contact with aeration compartment is transferred to gravitational settling in the final section. Water analysis in this section was not relevant because links between the two compartments were not made for a long time gained as little water and no relevant quantitative value relative to the total amount of steps needed to be purified. In case of disappearance of oxygen source organisms will cease to be biodegradable, and water became dirty and sometimes smelly. Taking into account the overall effectiveness of the treatment plant, each unit must allocate an appropriate charge, which amounts to at least one of the normal average.

Because the occurrence of protozoa active biomass is evidence of aerobic living conditions, these organisms have become indicators of sewage. The existing biological stages of these microorganisms are poorly developed according to the observations made.

The sludge index should range between 100 and 150 ml/g. Higher sludge indices point to an increased creation of filiform bacteria which negatively influence the settling of the activated sludge. Sludge indices < 100 ml/g must also be avoided since such a sludge strongly tends to a sedimentation in the activated sludge tank and cannot be kept floating. Reasons for a too low

sludge index may be a too high addition of coagulation aids or a proceeding mineralisation of the sludge.

Conclusions

Physic-chemical parameters determined for the water treatment plant into conditions beyond the maximum allowable.
Very high values of ammonia indicate contamination by faces of domestic sewage. They manifest themselves immediately upon entry into the treatment plant.
Biochemical oxygen demand is the degree of contamination in the wastewater. High values recorded at the entrance to the sewage plant that is 1098 mg / l indicates a high degree of pollution of wastewater to be treated.
Water from the settling compartments would be oxygenated through fine bubble air diffusers supplied and trained in a stream are controlled so that optimum conditions for aerobic digestion.

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Studiul epurarii apelor uzate provenite dintr-un depozit ecologic

Rezumat

Lucrarea de faţă studiază calitatea apei uzate provenite dintr-un depozit ecologic situat în Prahova. Pentru a se atinge obiectivul propus, şi anume acela de a obţine apă epurată în limitele maxim admise descărcărilor în apele de suprafaţă -Directiva 91/271/EEC- staţia de epurare a depozitului ecologic a fost monitorizată pe o perioadă de şase luni. Lucrarea prezintă variaţia parametrilor fizico-chimici în timp atât la intrare cât şi la ieşire din treapta de epurare. De asemenea a fost monitorizată calitatea nămolului activ.