

STUDY OF THE WASTEWATER TREATMENT PLANT ON INDUSTRIAL ESTATE RUNGKUT SURABAYA (SIER), EAST JAVA, INDONESIA

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ABSTRACT

Evaluation of wastewater treatment plants (WWTPs) of the domestic and non domestic was developed by Surabaya Industrial Estate Rungkut (SIER). The purpose of this study to determine three aspects were followed by technical aspect, institutional aspect and environment aspect. This methods such as physical methods (*primary treatment*), biological methods (*secondary treatment*) without using or adding chemicals method. Another method was conducted by management human resources installation at PT. SIER. In addition, monitoring plan to anticipate the impact in the wastewater treatment plant (WWTPs) in SIER.

The results has shown that debit maximum is equal 10.000 m³/day, recommendation of technical management and non technical amangement to maintainance wastewater treatment plant in advance.

Keywords : *Aspects, Discharge, Maintenance, Methods, SIER, WWTP*

1. INTRODUCTION

Industrial wastewater treatment has become a current issues in the era industrialization. Therefore, Environment Law Regulations for industry to be important issues [1]. The evaluation of wastewater treatment plant (WWTPs) for domestic wastewater and non domestic wastewater was develop by Surabaya Industrial Estate Rungkut (SIER) Since

1974. Wastewater can contain of variety constituents and many of it can adverse impact to the environment [2]. This concepts using three aspects has given are the technical aspect discuss about the design capacity of each WWTP building unit in according the existing of criteria design and based on standard method [3]. Environmental aspect that will be seen in the condition of the amount of pollution load from each concentration parameter of the *influent* and *effluent* unit, the results of which will be compared with existing quality standards and based on Minister Law Regulation No. 05/2012. The institutional aspect is seen from the workload that exists in the SIER WWTP as well as from the operational procedure system [4]. Physical processing of WWTP is used to deposit, screen and remove particles of sand or discrete particles, and also larger objects that float or sink which can inhibit and even damage the pump's performance in further processing, [5].

2. METHODOLOGY

Pre-eliminary Observation

a. Samples Preparation

This method of this research is grab samples, used wastewater from SIER Plant. Moreover, measured power of hydrogen (pH). Collected efficiency day work WWTPs SIER.

b. Analysis Quantity of Wastewater

Analysis data using samples of wastewater treatment plant in SIER. Parameter of WWTPs followed by Government Law Regulations and Environment Law Regulations in Country Indonesia.

c. Researched Preparation

- Samples wastewater in SIER was taken in the 4 point such as *Primary Settling Tank, Oxydation Ditch, Secondary Settling Tank* and *Effluent*.
- Samples of WWTPs was taken 100 litre
- $COD = \left(\frac{mg}{L} O_2\right) \frac{(a-b) \times N \times 8000}{vol\ sample} \times f \times p$
- $TSS (mg/L) = \frac{(f-e)}{g} \times 1000 \times 1000$
- Determine $BOD = DO_0 - DO_5$
 $\frac{V Na_2S_2O_3 \times N Na_2S_2O_3 \times BE O_2 \times 1000}{Volume Sample}$

3. RESULTS AND CONCLUSIONS

Table 1. Has represented that, If reviewed technically, the value of *overflow rate(OFR)* unequal than the criteria design that was setting. Moreover, it has not dangerous to the efficiency of eliminating pollutant parameters. However, if viewed economically, this condition occurs uneconomically because the actual dimation was need are smaller than existing. Therefore storage facilities of it, capable to released more than 10.000 m³/day into *primary settling tank*

Table 1. Result of *Primary Settling Tank*

Parameter	Standard*	Result	Given Information
HRT (hour)*	1,5 – 2,5	1,5	Equal
OFR Qave* (m ³ /m ² .day)	30 – 50	14	unequal
OFR Qpeak* (m ³ /m ² .day)	80 – 120	25	unequal
Nre*	< 2000	10.075	Equal
NFr*	> 10 ⁻⁵	1,95 x 10 ⁻⁶	Equal
Vsc (m/second)*	> 3 x 10 ⁻⁵	0,2141	Equal
pH	6 – 9	6,8	Equal
Parameter effiency removal**	Standard	Result	Result
TSS %	50 – 65	54	Equal
BOD %	30 – 40	43	unequal
COD %	30 – 40	49	unequal

This institutional study aims to explain the institutions involved in the WWTP industrial estate in SIER, the institutional structure of human resources in the management of waste water management at SIER.

Based on environment aspect is guided by Government Law Regulation No. 68th 2016, is conducting parametric analysis and conducting regular.

4. CONCLUSION

Technical aspect determine that the characteristic of wastewater treatment plant able to supply more than 10.000 m³/day into the primary settling tank Institutional Aspect has shown that the Company SIER (Surabaya Industrial Estate Rungkut) must need more personil to handling wastewater treatment and Based on the Environment aspect concerning about the Government Law Regulations and Environment Law Regulations.

5. REFERENCES

[1]Basaran, 2013; dan Wilson, et al., 2012 *Regulasi tentang limbah hasil industri*

[2] Xue et al., 2013; and Mohanty, 2012. *Pengolahan Limbah dari Hulu sampai Hilir*

[3] Effendi, Hefni, Telaah Kualitas Air Bagi Pengelolaan Sumber Daya dan Lingkungan Perairan, Penerbit Kanisius, 2003, Yogyakarta.

[4] Andhika, L. 2015. *Efektifitas Unit Primary Treatment di Instalasi Pengolahan Air Limbah PT. Suarabya Industri Estate Rungkut – Management Of Pasuruan Industrial Estate Rembang (PT. SIER-PIER) dalam Penurunan Padatan Total. Malang : Universitas Brawijaya Malang*

[5] Metcalf & Eddy, 1991. *Watewater Engineerng Treatment, Disposal, Reuse.* McGraw-Hill Book Company. New Delhi.

[6] Peraturan Gubernur Jawa Timur No. 72 Tahun

-
- 2013 tentang *Baku Mutu Air Limbah Industri dan/atau Kegiatan Usaha Lainnya*.
- [7] Peraturan Menteri Negara Lingkungan Hidup Nomor 5 Tahun 2012 Tentang Jenis Rencana Usaha dan/atau Kegiatan yang Wajib Dilengkapi dengan Analisis Mengenai Dampak Lingkungan Hidup
- [8] Peraturan MENLH No.05/2012. Kegiatan berdampak penting terhadap lingkungan hidup
- [9] Peraturan MENLH, Pasal 34 UU 32/2009 tentang Usaha dan/atau kegiatan wajib UKL/UPL
- [10] Peraturan Presiden Republik Indonesia Nomor 9 Tahun 2005 tentang Kedudukan Tugas, Fungsi, Susunan Organisasi, dan Tata Kerja Kementerian Negara Republik Indonesia sebagaimana telah diubah dengan Peraturan Presiden Republik Indonesia Nomor 62 Tahun 2005

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