Analisa Debit Resirkulasi Lumpur Terhadap Pengaruh MLSS Dan Efisiensi Penyisihan BOD Dan COD Di Unit Instalasi Pengolahan Limbah Cair: Studi Kasus Di Gedung Tcc Batavia Tower One = Analysis of Sludge Recirculation Discharge on The Effect of MLSS and Efficiency of BOD and COD Removal In The Waste Water Treatment Plant: A Case Study In TCC Batavia Tower One Building

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Abstrak

Masalah pencemaran lingkungan sungai di kota DKI Jakarta, telah menunjukkan gejala yang cukup serius. Salah satu penyebab dari pencemaran tersebut adalah air buangan dari limbah perkantoran. Gedung The City Center (TCC),. merupakan gedung perkantoran yang terletak di Jakarta Pusat. Gedung ini telah mempunyai IPAL dengan sistim lumpur aktif dan telah berupaya menjaga kualitas air limbah buangan nya memenuhi baku mutu air limbah sesuai permen LHK RI No. 68/Menlhk/Setjen/kum.1/8/2016. Sejak tahun 2020, telah terjadi pandemi COVID-19 sehingga debit air olahan menurun hingga kurang dari 50% dari total desain kriteria debit. Oleh karena itu, perlu dilakukan pengaturan debit resirkulasi lumpur aktif . Tujuan dari penelitian ini mengevaluasi efisiensi penyisihan BOD dan COD dalam kurun waktu tahun 2017 hingga bulan Maret 2021, mengatur debit resirkulasi lumpur aktif pada masa pandemi COVID-19 dan mengevaluasi efisiensi penyisihan BOD dan COD. Data BOD dan COD pada kurun waktu 2017 hingga bulan Maret 2021 dikumpulkan dari data sekunder. Pengaturan debit resirkulasi lumpur dilakukan dari kondisi maksimum resirkulasi sampai dengan kondisi resirkulasi terendah yaitu pada 176 m3/hari, 206 m3/hari dan 236 m3/hari. Pada tiap variasi debit, dilakukan pengambilan sampel lumpur di tanki pengukuran, sampel air limbah influent di bak grit chamber dan sampel air limbah effluent di bak effluent. Pengambilan sampel dilakukan pada waktu tinggal 24 jam dan 48 jam. Sampel lumpur di tanki pengukuran diukur MLSS, sampel influent dan effluent dikur kadar BOD dan COD. Dari hasil penelitian diperoleh bahwa debit resirkulasi lumpur yang optimum terjadi pada 206 m3/hari dengan waktu tinggal 24 jam. Jumlah MLSS di tangki aerasi sebesar 4435.97 mg/L dan , Nilai Food to mass ratio (F/M ratio) sebesar 0.008374 kg BOD/kg. Pada kondisi optimum, effisiensi penyisihan BOD dan COD masing – masing sebesar 95.60% dan 96.73%. Pada kondisi pandemi COVID-19, dengan mengatur debit resirkulasi lumpur, efisiensi penyisihan BOD dan COD lebih tinggi dibanding tanpa pengaturan debit resirkulasi dengan efisiensi penyisihan rata –rata BOD dan COD masing masing 94% dan 93%

.....The problem of river environmental pollution in the city of DKI Jakarta, has shown quite serious symptoms. One of the causes of this pollution is wastewater from office waste. The City Center (TCC) building. is an office building located in Central Jakarta. This building already has an WWTP with an activated sludge system and has made efforts to maintain the quality of its wastewater discharge to meet the wastewater quality standards according to the Indonesian LHK Regulation No. 68/Menlhk/Setjen/kum.1/8/2016. Since 2020, there has been a COVID-19 pandemic so that the treated water discharge has decreased to less than 50% of the total design discharge criteria. Therefore, it is necessary to regulate the activated sludge recirculation discharge. The purpose of this study were evaluate the efficiency of BOD and COD removal from 2017 to March 2021, setting the activated sludge

recirculation discharge during the COVID-19 pandemic and evaluate of removal efficiency of BOD and COD . BOD and COD data for the period of 2017 up to March 2021 were collected from secondary data. Sludge recirculation discharge settings are carried out from the maximum recirculation conditions to the lowest recirculation conditions at 176 m3/day, 206 m3/day and 236 m3/day. For each discharge variation, a sample of sludge was taken in the measurement tank, a sample of the influent wastewater taken in the grit chamber and a sample of the effluent wastewater taken in the effluent tank. Sampling were carried out at detention time of 24 hours and 48 hours. Sludge samples in the measurement tank were measured MLSS, influent and effluent samples measured oncentration of BOD and COD. The results of the study showed that the optimum sludge recirculation discharge occurred at 206 m3/day with detention time of 24 hours. The amount of MLSS in the aeration tank is 4435.97 mg/L and the value of Food to mass ratio (F/M ratio) is 0.008374 kg BOD/kg. Under optimal conditions, the removal efficiency of BOD and COD is 95.60% and 96.73%, respectively. In the COVID-19 pandemic conditions, by setting the sludge recirculation discharge, the removal efficiency of BOD and COD were higher than without the setting of recirculation discharge with an average removal efficiency of 94% for BOD and 93% for COD respectively.