ABSTRAK

Perencanaan Pemanfaatan Rainwater Harvesting sebagai Alternatif Sumber Air Bersih (Studi Kasus: Universitas Mercu Buana). Sonia 41117110134, Pembimbing : Hadi Susilo, Ir., MT.

Seiring dengan pertumbuhan penduduk yang terus meningkat, permintaan air bersih akan terus bertambah. Sejauh ini sumber air bersih berasal dari air tanah. Rainwater Harvesting (RWH) menjadi salah satu alternatif untuk permasalahan kelangkaan air tersebut. Tujuan penelitian ini adalah mengetahui curah hujan andalan, kebutuhan air bersih, kapasitas tangki RWH, pengaruh penggunaan RWH, kualitas air hujan, serta pengolahan air hujan yang efektif untuk memperbaiki kualitas air hujan yang belum memenuhi standar air bersih dengan menggunakan media filter modifikasi zeolit dan karbon aktif.

Penelitian ini dilakukan dengan metode Deskriptif Kuantitatif, dengan mengumpulkan data kemudian menganalisis dan menyimpulkan hasil penelitian. Objek penelitian adalah Gedung D dan Gedung E Universitas Mercu Buana. Pengujian Kualitas air hujan berdasarkan parameter Suhu, TDS, pH, $KMnO_4$ dan Koliform. Modifikasi media filter direncanakan terdiri dari campuran volume zeolit dan karbon aktif dengan 100% karbon aktif, 50% karbon aktif 50% zeolit, dan 100% zeolit.

Hasil penelitian ini didapatkan curah hujan andalan dari 3 stasiun hujan yang di tinjau, kebutuhan air bersih sebesar 18,12 m^3/hari untuk kebutuhan air murid dan pegawai, kapasitas tangki RWH berdasarkan kondisi eksisting adalah 180 m^3. Penggunaan RWH dapat mereduksi penggunaan air sumur galian sebesar 35,82%. Kualitas air hujan pada Gedung D dan Gedung E Unoversitas Mercu Buana setelah mengalami pengolahan sudah memenuhi Standar Baku Muu Air Keperluan Higiee Sanitasi Permenkes RI.No.32 Tahun 2017. Media filter yang efektif sebagai saringan air hujan adalah media filter dengan 100% zeolit. Kualitas air hujan setelah pengolahan adalah suhu (26 ˚C), TDS (168 mg/L), pH (7,61), KMnO4 (5,2 mg/L), dan Koliform (4,5 MPN/100 ml). Sistem RWH terdiri dari daerah tangkapan air hujan (atap), pipa distribusi berdiameter 8"/216 mm, bak filtrasi berukuran panjang 2 m, lebar 1,6 m dan tinggi 0,8 m, dan bak RWH direncanakan dengan kapasitas 180 m^3. Peletakan RWH pada 3 lokasi yaitu pada bagian depan Graha Rektorat sisi kanan, tengah dan kiri dimana masing – masing RWH memiliki kapasitas 60 m^3. Ukuran RWH adalah panjang 10 m, lebar 3 m dan tinggi 2 m. Bak filtrasi dan RWH direncanakan terbuat dari beton.

Kata kunci: Kapasitas Tangki, Kualitas Air Hujan, Rainwater Harvesting.

ABSTRACT

The Planning of Rainwater Harvesting Utilization as an Alternative Source for Clean Water (Case study: Mercu Buana University). Sonia 41117110134, Supervisors: Hadi Susilo, Ir., MT.

Due to the increase of the population, demand for clean water keeps on increasing. Up to this time, the source for clean water comes from ground water. Rainwater Harvesting becomes one of the alternatives to deal with problems of water scarcity. This research aims to investigate reliable rainfall, clean water necessities, the tank capacity of RWH, the impact of RWH uses, quality of rainwater, and effective rainwater treatment to improve the quality of rainwater that has not fulfilled the standard of clean water by using modified filter media activated carbon and zeolite.

This research uses the quantitative descriptive method by collecting data, analyzing data and concluding the result of the research. The object of the research is Building D and E of Mercu Buana University. The rainwater was tested based on parameters including Temperature, TDS, pH, KMnO4, and Coliform. The filter media used to treat the rainwater is composed of zeolite and activated carbon (AC). The combination of the filter was 100% AC, 50% AC: 50% zeolite, and 100% zeolite.

The results from rainwater analysis showed that the reliable rainwater from three water stations that has been reviewed, there is a need of 18,12m3 clean water per day for employee water needs, RWH tank capacity based on existing condition is 180m3. The use of RWH is capable of reducing well water use up to 35.82%. After processing, the quality of rain water in Building D and Building E of Mercu Buana University has already met the water quality standards for the purposes of sanitation hygiene, Permenkes Republic of Indonesia no. 32 2017. Media filter that is effective as rainwater filter is filter media with 100% zeolite. The quality of rainwater after processing was 26 ˚C (Temperature), 168 mg/L (TDS), 7,61 (pH), 5,2 mg/L (KMnO4), and 4,5 MPN/100 ml (Coliform). The system of RWH consisted of rainwater catch, distribution pipe with a diameter of 8"/216 mm, filtration tub measuring 2m in length, 1,6 in width, 0,8 in height, and RWH tub planned with a capacity of 180 m3. The RWH will be located in three locations in the back of Building D, the right side, the middle, and the left side of Building E in which each RWH will have a capacity of 60 m3. The size of RWH is 10m in length, 3m in width, and 2m in height. Filtration tub and RWH are planned to be made of concrete.

Keywords: Water Tank Capacity, Rainwater Quality, Rainwater Harvesting.