PHYSICAL CHARACTERIZATION OF DEEP BED COLUMN FILTRATION USING EMPTY FRUIT BUNCHES (EFB) TO TREAT URBAN STORMWATER

NANCY CHUA YIN YEE

FEEPUSTAKAAN IINIVERSITI MALAYSIA SABAH

THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF BACHELOR OF CIVIL ENGINEERING

FACULTY OF ENGINEERING UNIVERSITI MALAYSIA SABAH

2014



۲

ABSTRACT

Oil palm empty fruit bunches (OPEFB) as filter medium is recommended in this study due to its fiber characteristic. Several research has used OPEFB in various applications in improving water guality by reducing the concentration of turbidity and suspended solid, as well as removal phenol, 2,4-Dichlorophenol (2,4-DCP) and dyes. This work utilised OPEFB to treat urban stormwater for reuse purpose by capitalizing on the deep bed filter column. The urban stormwater samples were collected from Sembulan River, which flows through the Kota Kinabalu city area. The investigation found that the sample is classified under Class III in Interim National Water Quality Standard (INWQS). The stormwater is then filtered through combination design of OPEFB and river sand (RS) and their performance are evaluated in terms of Total Suspended Solid (TSS), turbidity, colour and temperature. Different mix-ratio combination in river sand (RS) and OPEFB were conducted and indicated that the optimum mix design abilities to reduce 44.0% TSS, decrease 48.6% turbidity and remove 52.2% colour at mix ratio of 50% OPEFB and 50% RS deep filter column design. This study also reveals that with water wash treatment, better result was gained with TSS removal up to 58.4%, turbidity of 62.7%, and colour of 64.8%. The optimum mix-ratio filtration media also able to produce effluent filtration of stormwater sample to be classified as Class I.

