

ABSTRAK

Sungai Gajah Putih terletak di Kota Surakarta, Jawa Tengah merupakan salah satu sungai yang menjadi sumber kehidupan. Kawasan sungai ini dilindungi dengan dinding penahan tanah untuk menjaga kekuatan lereng sungai. Kegagalan dinding penahan tanah salah satunya disebabkan oleh pergerakan tanah. Penyebab terjadinya pergerakan tanah diantaranya keadaan tanah, pengaruh muka air tanah, beban luar dan beban gempa. Selain dinding penahan tanah, *sheet pile* (turap) juga bisa digunakan untuk menahan tanah. Oleh karena itu, dinding penahan tanah dan *sheet pile* perlu diteliti lebih jauh mengenai kondisi pergerakan tanah.

Penelitian ini didahului dengan pengambilan data sekunder. Analisis penelitian ini dimulai dengan analisis stabilitas dinding penahan tanah pada Sungai Gajah Putih dan perencanaan *sheet pile*. Analisis dilanjutkan dengan pemodelan konstruksi bangunan menggunakan program *Plaxis*. Dari hasil pemodelan tersebut, dibandingkan pergerakan dinding penahan tanah pada Sungai Gajah Putih dengan *sheet pile* yang dipengaruhi oleh beban luar dan beban gempa dengan variasi muka air tanah.

Dari penelitian ini diperoleh stabilitas dinding penahan tanah telah memenuhi faktor aman terhadap penggeseran, penggulingan dan kuat dukung tanah, saat kondisi muka air normal diperoleh masing-masing sebesar 3,864, 9,992, 3,322 yang nilainya lebih besar dari kondisi muka air banjir sebesar 3,417, 8,584, 3,001. Hasil analisis menggunakan *Plaxis* diperoleh besarnya pergerakan dinding penahan tanah dengan beban luar dan beban gempa kondisi muka air normal dan muka air banjir masing-masing sebesar 0,0776 cm, 0,0767 cm, 2,823 cm dan 2,817 cm lebih kecil dari *sheet pile* dengan beban luar dan beban gempa kondisi yang sama masing-masing sebesar 2,674 cm, 2,656 cm, 6,653 cm dan 6,570 cm. Pergerakan dinding penahan tanah juga lebih kecil dari *sheet pile* diangkur kondisi yang sama dengan beban luar dan beban gempa masing-masing sebesar 2,599 cm, 2,283 cm, 6,096 cm dan 6,085 cm. Hasil tersebut relatif aman terhadap bahaya longsor.

Kata kunci : Stabilitas, pergerakan, dinding penahan tanah, *sheet pile*, *Plaxis*

ABSTRACT

Gajah Putih River which is located in Surakarta City, Central Java is one of the rivers that become the source of life. This river area is protected by a retaining wall to maintain the strength of the river slope. The failure of the retaining wall is one of the reasons that is caused by the movement of the soil. Causes of soil movement include soil condition, groundwater influence, external load and earthquake load. Beside the retaining wall, sheet pile can also be used to hold the ground. Therefore, retaining wall and sheet pile are needed to be investigated further about soil movement conditions.

This study was preceded by secondary data retrieval. The analysis of this study began with stability analysis of retaining wall in Gajah Putih River and planning of sheet pile. The analysis continued with modeling building construction using Plaxis program. From the results of the modeling, there was a comparison between the movement of retaining wall and sheet pile which was influenced by outside load and earthquake load with variation of ground water level.

From this study, the stability of retaining wall had fulfilled the safety factor of shifting, overthrowing and strong soil support. When the water surface condition was normal. the obtained stability values were 3,864, 9,992, 3,322; larger than flood water condition which its stability values were 3,417, 8,584, 3,001. From the result of analysis using Plaxis, it was obtained that the amount of movement of retaining wall with outer load and earthquake load of normal water level condition and flood water level condition respectively were 0,0776 cm, 0,0767 cm, 2,823 cm and 2,817 cm; smaller than the results of sheet pile with same condition which respectively were 2,674 cm, 2,656 cm, 6,653 cm and 6,570 cm. Amount movement of retaining wall smaller too than the results of sheet pile with anchor in same condition which respectively were 2,599 cm, 2,283 cm, 6,096 cm and 6,085 cm. The results were relatively safe of landslide hazards.

Keywords : Sttabilitys, movement, retaining wall, sheet pile, Plaxis