UNIVERSITI TEKNOLOGI MARA

PROFILE OF BANK EROSION AT RIVER BEND WITH DIFFERENT SOIL STRATIFICATION

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Thesis submitted in fulfillment
of the requirements for the degree of
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Faculty of Civil Engineering

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

River bank erosion is an important process of river channel system. This is because of its contribution to the river sedimentation, the damage of floodplain land and also to the change of river width and adjustment in river system. Bank erosion can be categorized as mass failure and fluvial erosion. Previous studies on bank erosion were mainly focusing on homogenous material either cohesive or non-cohesive material but there have been limited study on stratified material. In view of the above, there is a need to increase the understanding of stratified river bank with respect to hydrodynamic force. This study aims to investigate the behaviour of bank erosion process at river bend of stratified soils with different sediment characteristics. Large scale of flume was designed with a total area of 6 m width x 7 m length and with fix bend R/W ratio 2.5 together with relocatable profiler equipment to measure the erosion profile. Nine (9) laboratory experiment simulations were conducted. Six of them required the installation of 2 layers of bank material. The upper layer contained cohesive material and the lower layer contained non-cohesive material. The other experiment was contained homogeneous cohesive material and was used to validate stratified cases. The results exhibited stratified bank erosion location which could be separated into two quadrants with dead zone at the middle part of bend. This phenomenon resulted from the magnitude of the reflection flows in bend channel. The other parameters that has significantly influenced the bank erosion were bank angle, flow velocity and also flow rate. Thus, the experiment proved that stratified bank material mechanism had followed slump block phenomenon which was found by previous researcher. This experiment result was compared to BSTEM analysis and showed disagreement between both methods. This is due to different concepts of channel geometry of BSTEM. However, BSTEM can be used as a crude result with this specific condition.

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