

**STUDY ON THE EFFECT OF DREDGING ON  
EXISTING SHEET PILE RETAINING STRUCTURES**

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March 2017

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Thesis submitted in partial fulfillment of the requirements for the degree Master of  
Science in Foundation Engineering and Earth Retaining Systems

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## **DECLARATION**

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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The above candidate has carried out research for the Masters under my supervision.

Signature of the supervisor:

Date:

## ACKNOWLEDGEMENT

Accomplishment of this study was possible due to numerous supports which I received during my study. I feel highly indebted to those who supported for my thesis study in numerous ways.

My deepest gratitude is offered to my advisor **Dr. L.I.N De Silva** for his guidance, valuable suggestion and encouragements provided throughout the research work.

My deepest gratitude and gratefulness also extended to Prof U.G.A. Puswewala, Prof S.A.S. Kulathilaka, Prof H.S. Thilakasiri, Dr.U.P. Nawagamuwa and Dr. A.M.K.B. Abeysinghe, for their supports, guidance and kind assistance throughout the research work as well as during the course work.

My special thanks and gratitude is conveyed to Mr. Nissanka Perera (CEO) , Dr. K. Raveenthiran and other staff members from Lanka Hydraulic Institute for their support during thesis work as well as course work period.

I would like to thank the academic and non academic staff in Department of Civil Engineering, University of Moratuwa for their support during the study period.

Furthermore, I would like to express my sincere thanks to all who helped me to discuss the difficulties during the thesis study.

Finally, I would like to my heartfelt thank to my family members and friends for their continuous encouragements, motivations and supports throughout my study.

## ABSTRACT

Sheet pile retaining structures are widely used in many purposes in engineering designs. Most common applications are shoring, stabilize excavations, harbor quay wall structures, canal bank protection structures.. etc. This research is mainly focused on the issue of stability of harbor quay wall structure when deepening the harbor basin to cater larger vessels.

Most of the quay wall structures in Srilanka are anchored sheet pile walls. So the effect of dredging on the sheet pile structure is studied. If the same method can be applied for the cantilever sheet pile walls which could be used in drainage improving projects. The study is extended to both anchored and cantilever sheet pile structures to increase the stability while reducing the depth of embedment.

Another improvement sheet pile wall is proposed from the passive side of the existing sheet pile structure to provide an additional support to the main structure. The finite element analysis is used to estimate the effect of the improvement wall on the stability and the deflection of the wall in cohesion less soils. The effect of the distance between the existing structure and the improvement wall and the effect of increasing the depth of embedment of the improvement structure are analyzed through the finite element models. The models are tested for 22 to 38 degrees wide range of friction angles of cohesion less soils

The results of the finite element model are verified by a physical model conducted in a laboratory. The results of the analysis shows that the improvement wall can significantly increase the stability of the existing structure. Compared to anchored sheet pile walls higher improvement can be achieved for cantilever sheet pile walls from this method. Rather than replacing the entire structure , applying a this sort of improvement method will be highly economical as well as less damages to the other structures close to the existing sheet pile wall.

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