

THESIS

NUMERICAL SIMULATIONS OF TSUNAMI SURGE FOCUSING ALONG A VALLEY USING DualSPHysics

A thesis submitted in partial fulfilment of the requirements for the degree of
Master of Engineering

Civil Engineering Graduate Program



Submitted by:

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UNIVERSITAS GADJAH MADA

YOGYAKARTA

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Approval Sheet

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This thesis has been approved in partial fulfillment of requirement
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DEDICATION

Alhamdulillah, I dedicate this thesis to my parents, Hasballah Wahab and Rosmiana Nurdin, as well as my brothers, Fikri Aslami, Abdul Aziz and Muhammad Haris. Without their du'aa, patience, understanding, support and most of all love, the completion of this work would not have been possible.

“And whosoever putteth his trust in Allah, He will suffice him” [At-Talaq:3]

“Allah will vouchsafe, after hardship, ease” [At-Talaq:7]

“Lo! with hardship goeth ease” [Al-Sharh:6]

DECLARATION

I hereby declare that this thesis does not contain work that has previously been submitted to obtain any degree at any higher educational establishment, and to the best of my knowledge does not contain the previously published work nor opinion of other person, with the exception of those cited written in this paper and acknowledge in the reference.

Yogyakarta, January 2016



Muhammad Hafiz Aslami

PREFACE

This Thesis is the final work of my Master study at Universitas Gadjah Mada. It serves information about entire process of my research during the study, which has been made since November 2013 until January 2016. *Alhamdulillah*, this thesis has been completed with much ease.


Tsunami is one of the biggest natural disasters which has caused a lot of losses, structures destruction and loss of life, as happened in Aceh in 2004, Pangandaran in 2006, and Samoa in 2009. This study is expected to reduce the risk of the tsunami. This research was conducted to asses the performance of DualSPHysics in simulating 3D tsunami surge propagating along a focusing valley. The result of simulation has been compared with both analytical solution and experimental data. The case of tsunami surge propagating along a real 3D geometry of Kota Agung, Lampung has also been simulated using a relatively large number of particles.

My deep gratitude for all people who have encouraged me in completing this thesis. Particularly, I would like to thank the following persons:

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6. My family and friends for every *Du’aa*, love, patience and support.

Finally, I accept responsibility for all mistakes and lacks in this report. Please send me your comments and suggestions for improvement.

Yogyakarta, January 2016



Muhammad Hafiz Aslami