CAPACITY OF SEDIMENT CONTROL STRUCTURE IN GENDOL RIVER

Final Project Report

As one of the requirement to obtain S1 degree of

Universitas Atma Jaya Yogyakarta

By:

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INTERNATIONAL CIVIL ENGINEERING PROGRAM

DEPARTMENT OF CIVIL ENGINEERING

FACULTY OF ENGINEERING

UNIVERSITAS ATMA JAYA YOGYAKARTA

YOGYAKARTA

MAY 2016

STATEMENT

I, the undersigned below, truly state that final project titled:

"CAPACITY OF SEDIMENT CONTROL STRUCTURE IN GENDOL RIVER"

Is really my own work and not a result of plagiarism from other person work, the idea, data of research's result as well as direct or indirect quotation from other person's writing or idea are written in the most proper way in this final project. If in the future time, this final project is proven to be result of plagiarism then the undergraduate certificate that I obtained will be canceled and returned to the rector of Universitas Atma Jaya Yogyakarta.

Yogyakarta, May 12, 2016

Markista Wikan Danastya

APPROVAL

Final Project

CAPACITY OF SEDIMENT CONTROL STRUCTURE IN GENDOL RIVER

By:

Markista Wikan Danastya

12 13 14187

Has been evaluated and approved

Yogyakarta, May 27, 2016

Supervisor,

Agatha Padma L, M.Eng

Approved by:

Final Project Coordinator,

Johanes Januar Sudjati, S.T., M.T.

APPROVAL

Final Project

CAPACITY OF SEDIMENT CONTROL STRUCTURE IN GENDOL RIVER

By:

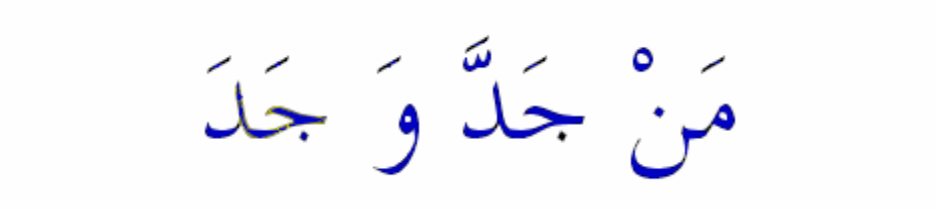
MARKISTA WIKAN DANASTYA

121314187

Has been examined and approved by the examination committee

		Name	Signature	Date
Chairman	:	Agatha Padma L, M.Eng		May 30, 16
Member	:	Ir. John Tri Hatmoko, M.Sc.		
Member	:	Ir. Y. Lulie, M.T.		May, 30 2016

Better late rather than never graduated at all.



Man Jadda Wajada (Whoever is serious, then he will get).

I dedicate this final project for my lovely family.

PREFACE

First and foremost, the author like to thanks to Allah SWT for blessing, so the author can prepare and finish this final project without any serious problem. The purpose of this final project with title "Capacity of Sediment Control Structure In Gendol River" is to complete the requirement of undergraduate program (S-1) in International civil engineering program Department of civil engineering Faculty of engineering Universitas atma jaya yogyakarta For the completion of this final project, I would like to express my gratitude towards:

1. Agatha Padma L, M.Eng. as my advisor for her advice and counseling. Her constant support and advice have been invaluable.
2. Dr.Eng Luky Handoko. as Coordinator of International Civil Engineering.
3. J. Januar Sudjati, ST., MT. as the head of Civil Engineering Department of Universitas Atma Jaya Yogyakarta.
4. All the lecturers in the civil engineering program, especially the International program.
5. My Lovely family especially my father and my mother, my brothers for their love, affection, orison and support.
6. My friends, seniors and juniors in the international civil engineering program

I realize, this report may be flawed. Therefore, related with that the author accept any form of suggestion for further improvement. Thank you

Yogyakarta, May 2016

Markista Wikan Danastya

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R_{24} = *Maximum rainfall in the return period*

A = *Catchment area*

λ = *Coefficient void ratio (0,4)*

fr = *coefficient run off (based on graph)*

ρ_d = *density of sediment*

θ = *slope*

φ = *sliding angle in the sediment (30°)*

Io = *slope of the river.*

I2 = *slope of the balanced kinetic.*

I1 = *slope of the balanced static.*

V = *the storage capacity of sediment (m^3)*

H = *High of Dam (m)*

B = *The width of the river where the position of the building (m)*

Q = *sediment discharge.*

E = *allowable sediment discharge.*

C = *sediment retained.*

D = *sediment deposit.*

B = *controlled sediment.*

ABSTRACT

CAPACITY OF SEDIMENT CONTROL STRUCTURE IN GENDOL RIVER, Markista Wikan Danastya Student number 121314187, year of 2016, Hydraulic Engineering, Civil Engineering International Program, Faculty of Engineering, Universitas Atma Jaya Yogyakarta.

Eruption of Merapi mountain regularly occur in last twenty years. The eruptions caused pyroclastic flows, huge sediment and debris flows, threatening people live and assets in downstream area. Therefore, disaster management of debris flow will be easy to plan by conducting the research about capacity of sediment control structure in Gendol river. The research is based on sediment balance with transportable sediment volume analysis (V_S) from empirical formula of Takahashi (1991) and Mizuyama (1977). Sediment balance was investigated based on maximum daily rainfall with minimum 10 years return period or known as (R_{24}). At fact Gendol river has 22 km of river length and 14.86 km^2 of catchment area. In 2016 there are 22 sabo dams have been built on Gendol river in order to anticipate the debris disaster and control the sediment. Based on the result of the research shows that the sabo dam can accommodate around 1165838.60 m^3 of sediment. Compared with the estimation of debris flow volume about 1547899.16 m^3. As the consequence there are around 382060.56 m^3 sediment cannot be accommodate by the sediment control structure (sabo) in Gendol river. In conclusion sabo in Gendol river ineffective to mitigate the losses during debris flow. Therefore, in order to minimize the losses of sediment disaster the author recommend to build six sabo dams. The suggested sabo dam located on six different place along Gendol river.

Key Word: Sediment Management, Sabo Dam, Sediment Control Structure, Sedimet Balance.