

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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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**

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Has been evaluated and approved

Yogyakarta, May 27, 2016

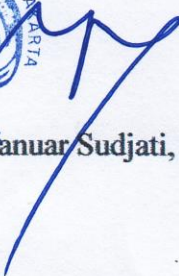
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Final Project


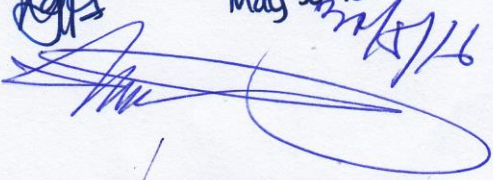

CAPACITY OF SEDIMENT CONTROL STRUCTURE IN GENDOL RIVER

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Better late rather than never graduated at all.

مَنْ جَدَّ وَ جَدَّ

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.
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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

TABLE OF CONTENT

Cover.....	i
Statement.....	ii
Approval.....	iii
Preface.....	vi
Table of Content.....	vii
List of Table	ix
List of Figure.....	x
Notations	xii
Abstract	xiii
CHAPTER I INTRODUCTION	
1.1 Background	1
1.2 Location	2
1.3 Problem Statement	3
1.4 Final Project Originality.....	3
1.5 Scope of Project	4
1.6 Objective of Final Project	4
1.7 Benefit of Final Project	5
1.8 Systematic of Report	5
CHAPTER II LITERATURE REVIEW	
2.1. Sediment Movement	7
2.2. Debris Flow	8
2.3. Sediment Control Structure	9
2.4. Sediment Analysis Principle	10
2.4.1. Area	10
2.4.2. Sediment Estimation on Control Point	10
2.5. Storage Capacity of Sediment Control Structure	11
2.6. Peak Discharge of Debris Flow.....	12
2.7. Building Capacity for Controlling Debris Flow.....	13
CHAPTER III RESEARCH METHODOLOGY	
3.1. General Introduction	14

3.2. Tools and Material	14
3.3. Flow Chart of Research Procedure.....	15
3.4. Schedule of Final Project	17
CHAPTER IV DICUSSION	
4.1. Catchment Area.....	18
4.2. Debris Flow	19
4.3. Sediment Control Structure.....	20
4.3.1. Location	20
4.3.2. Dimension	34
4.3.3. Capacity	36
4.4. Controlled sediment	46
4.5. Allowable Sediment	48
4.6. Sediment Balanced.....	48
CHAPTER V CONCLUSSION	
5.1. Result.....	60
5.2. Recommendation.....	62
References	68
Attachment	70

LIST OF TABLE

Table 4.1 Sediment Control Structure Location.	20
Table 4.2 Sabo Dimension	35
Table 4.3 Static Volume	38
Table 4.4 Dynamic Volume	41
Table 4.5 Total Volume	44
Table 4.6 Controlled Sediment	47
Table 4.6 Balanced Sediment	59

LIST OF FIGURE

Figure 2.1 Correction Factor of Runoff coefficient	11
Figure 2.2 Cross Section of Sabo	12
Figure 2.3 Sabo Dimension	13
Figure 3.1. Flow Chart Procedure	16
Figure 3.2 Schedule of Final Project	17
Figure 4.1 Catchment area	18
Figure 4.2 Scheme of Sediment Control Structure (sabo)	23
Figure 4.3 Sabo GE-C0 (tulung)	24
Figure 4.4 Sabo GE-C (Rogobangsan)	24
Figure 4.5 Sabo GE-C (Jerukan)	25
Figure 4.6 Sabo GE-C (Jambon)	25
Figure 4.7 Sabo GE-C (Tambakan)	26
Figure 4.8 Sabo GE-C7 (Morangan)	26
Figure 4.9 Sabo GE-C9	27
Figure 4.10 Sabo GE-C (Plumbon I)	27
Figure 4.11 Sabo GE-C (Jetis I)	28
Figure 4.12 Sabo GE-C (Bronggang)	28
Figure 4.13 Sabo GE-C (Cangkringan I)	29
Figure 4.14 Sabo GE-C10 (Bakalan)	29
Figure 4.15 Sabo GE-C12 (Ngancar)	30
Figure 4.16 Sabo GE-C13	30
Figure 4.17 Sabo GE-D (Kepuharjo)	31

Figure 4.18 Sabo GE-D2	31
Figure 4.19 Sabo GE-D3	32
Figure 4.20 Sabo GE-D4	32
Figure 4.21 Sabo is GE-D5 (Kaliadem)	33
Figure 4.22 Sabo GE-D7 (Kaliadem)	33
Figure 4.23 Sabo GE-D (Kaliadem)	34
Figure 4.24 Dimension Detail of 1 st Recommendation Sabo	50
Figure 4.25 Dimension Detail of 2 nd Recommendation Sabo	52
Figure 4.26 Dimension Detail of 3 rd Recommendation Sabo	54
Figure 4.27 Dimension Detail of 4 th Recommendation Sabo	56
Figure 4.28 Dimension Detail of 5 th Recommendation Sabo	58
Figure 4.29 Dimension Detail of 6 th Recommendation Sabo	60
Figure 5.1 Suggestion of New Sediment Control Structure Location.	64

NOTATIONS

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°)

I_o = slope of the river.

I_2 = slope of the balanced kinetic.

I_1 = 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 (VS) 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 (R24). At fact Gendol river has 22 km of river length and 14.86 km² 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 m³ of sediment. Compared with the estimation of debris flow volume about 1547899.16 m³. As the consequence there are around 382060.56 m³ 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, Sediment Balance.