

Chapter 1

1 Introduction

1.1 Background

For every student majoring in Civil Engineering, the complex calculation of equations will always be a part of their learning process. More specifically in the class subject Beton 1, many flowcharts, complicated formulas, and strict national standards are used to calculate and design reinforcement bars in concrete beams. Of course learning how to use the previously mentioned tools and how to solve designing situations can be done manually through meticulous and strict observations of lectures and simulations, but it would be easier if there is a program to demonstrate and explain the end result. Manual learning is doable; however complex solutions, processes, and equations can leave students perplexed and at a complete loss causing them to only focus on how to solve the given problem. From past experiences, when students are only focused on how to calculate, important theories are disregarded and solutions are formed through mindless computations.

After learning the theories involved in calculating reinforcements in concrete beams, the knowledge obtained can be put into practice. The designing and analyzing of reinforcements in beams can be well understood if there was a step by step procedure or example that can be demonstrated to the student. The development of technology can help in presenting these steps through multimedia.

1.2 Purpose and Reasoning

The purpose of this project is to enlighten students on how to calculate reinforcement bars in beams. The program created will hopefully help students understand the step by step procedure in designing and analyzing reinforcements in concrete beams.

1.3 Scope of Research

The topics that will be presented in this report are the following:

1. Background description of the characteristics of concrete
2. Background description of the characteristics of steel
3. Definition of beams
4. Types of forces applied to beams in structures
5. Relationship of concrete and steel in structural beams
6. Flowchart of designing longitudinal and shear reinforcements in doubly reinforced beams
7. Flowchart of analyzing longitudinal reinforcements in singly and doubly reinforced beams.
8. Flash Actionsript 3.
9. Flow of program through timeline and storyboard.
10. Using the multimedia

The topics that will not be covered in this report are the following:

1. Reinforcement for torsion in beams.

1.4 Source

Resources of this research are from textbooks, ACI 318-83, and notes taken from lectures. The internet provides with various design ideas of animation and presentation. The validation of the steps in the flowchart formed is tested through solved cases of reinforcement design and analysis.

1.5 Script Arrangement

This report is divided into three parts: beginning, content, and the ending. The beginning consists of the following:

- a. Title page
- b. Legalization page
- c. Preface
- d. Publication Agreement page

- e. Statement of Originality
- f. Abstract
- g. Table of Contents
- h. Appendixes

The content of this report consists of 5 chapters:

Chapter 1 INTRODUCTION

Chapter 1 will cover the introduction of the manuscript, purpose and reasoning, scope of research, and the arrangement of the writing.

Chapter 2 THEORIES

Chapter 2 will explain basic theories of concrete and its applications, designing procedures, and analysis of computation based on the ACI code. This chapter will also explain what a multimedia is, what programming language is used, the use of multimedia, and other basic theories to support this project.

Chapter 3 ANALYSIS AND DESIGN

Chapter 3 is where the program is analyzed and designed.

Chapter 4 IMPLEMENTATION

Chapter 4 will describe the implementation and use of the user interface.

Chapter 5 EVALUATION

Chapter 5 will present test results of the multimedia and the results of the questionnaire.

The last part of this report is the Conclusion.

Chapter 6 CONCLUSION

This chapter consists of conclusions and any criticisms useful for future developments of this project.