



CONTENTS

Title	i
Approval Page	ii
Preface	iv
Contents	v
List of Figures	viii
List of Tables	x
Glossaries	xii
Abstract	xiii
Chapter I. Introduction	1
1.1. Situation Review.....	1
1.2. Objectives.....	3
1.3. Research Benefits.....	3
1.4. Research Scope.....	4
Chapter II. Literature Review	5
2.1. Bamboo.....	5
2.2. Bamboo in Building Structure.....	7
2.2.1. Environmental Aspect.....	8
2.2.2. Cultural Aspect.....	8
2.2.3. Engineering Aspect.....	9
2.2.4. Future Prospect of Bamboo.....	14
2.3. Bamboo in Indonesia.....	15
2.3.1. Potential.....	15
2.3.2. Peoples perception of Bamboo Building.....	16
2.3.3. Bamboo as School Building.....	17
Chapter III. Theoretical Approach	20
3.1. Material.....	20
3.2. Loadings.....	21
3.2.1. Dead Load (DL).....	21
3.2.2. Live Load (La).....	21
3.2.3. Rain Load (RL).....	22



3.2.4. Wind Load (WL).....	22
3.2.5. Quake Load (QL).....	22
3.2.6. Loading Combination.....	24
3.3. Bamboo Design.....	25
3.3.1. Resistance Factor.....	25
3.3.2. Tension Members.....	26
3.3.3. Compression Members (Column).....	26
3.3.4. Flexural Members.....	28
3.3.5. Members under Combined Force (Beam-Column).....	30
3.3.6. Moment of Inertia and Static Moment.....	31
3.4. Connections Design.....	33
3.5. Foundations Design.....	34
3.5.1. Allowable Stress of Soil.....	34
3.5.2. Foundation Design.....	35
Chapter IV. Research Methodology	37
4.1. Structural Design.....	37
4.1.1. Design Criteria.....	37
4.1.2. Design Procedure.....	38
4.2. Construction Cost Estimation.....	40
4.2.1. Work Breakdown Structure.....	40
4.2.2. Calculation Procedure (Flowchart).....	42
4.3. Research Guidenaces.....	43
Chapter V. Structural Design	45
5.1. Material.....	45
5.2. Purlin Design.....	45
5.2.1. Purlin Loadings.....	46
5.2.2. Internal Forces.....	47
5.2.3. Elements Capacities Control.....	48
5.3. Frames Design.....	52
5.3.1. Structure Modelling.....	52
5.3.2. Assigned Loads.....	54
5.3.3. Elements Capacities Control.....	55



5.4. Connections Design.....	67
5.5. Foundations Design.....	69
5.5.1. Data.....	69
5.5.2. Design and Checking Example.....	69
5.5.3. Design Result.....	71
Chapter VI. Specification and Construction Cost Estimation	73
6.1. Resources.....	73
6.2. Specification.....	76
6.3. Construction Cost Estiamtion.....	77
6.4. Material Take Off.....	78
Chapter VII. Result and Discussion	80
7.1. Proposed School Design.....	80
7.2. Construction Cost Estimation.....	84
Chapter VIII. Conclusions and Recommendations	88
8.1. Conclusions.....	88
8.2. Recommendations.....	88
Bibliography	89
Appendices	
Appendix 1. Detailed Engineering Drawing	
Appendix 2. Construction Cost Estimation	
Appendix 3. Loadings	
Appendix 4. Bolt Connection Experiment Data	