

UTILIZATION OF BUILDING DEBRIS AS AGGREGATES  
IN STONE COLUMN CONSTRUCTION  
IN SRI LANKA

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requirements for the Degree of Master of Engineering in Foundation  
Engineering and Earth Retaining Systems

by

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February 2017

## DECLARATION

I declare that this is my own work and this thesis does not incorporate without acknowledgement of any material previously submitted for a Degree or Diploma in any University or other institute of higher learning and to the best of my knowledge and believe it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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## ABSTRACT

Due to rapid development and population growth, construction industry has emerged with few recent problems. The major problem faced by the construction industry is the scarcity of construction material and disposal of construction waste because of high disposal cost and inadequate land fill area.

Due to the remnants of 30 year civil war happened in Sri Lanka, huge amount of building debris are to be disposed during new infrastructure constructions. To curtail the amount of building debris, the possibility of using them (concrete, brick and plaster) for civil engineering applications can provide an attractive way to reduce the wastes to be disposed of and it may also provide fiscal benefits. In this study, the scope for using building debris as the traditional rock aggregate for stone columns was investigated.

Experiments were conducted using building debris(concrete, brick and plaster)and stone aggregate passing through a 14 mm and retained on a 10mm British standard (BS) sieves. Where experimental studies were carried out to determine the engineering properties (Durability, Shear strength & Compressive strength) of the recycled construction material and compared with conventional road construction material (aggregates).

AIV, ACV and LAAV tests and slake durability index test were carried on selected building debris to find out the suitability to be used in stone columns construction.And uniaxial compressive strength testwas carried out to find the resistance to impact and crushing under loads. Improvement in shear strength was tested using vane shear in radially as well as with depth in several laboratory models with a centred stone column made up of different building debris.

It was observed that the model done using concrete wastes exhibited a similar capacity of traditional rock aggregates of same size. Other materials did exhibit the same behavior though their results from slake durability tests were relatively low.

# CONTENTS

Declaration of the candidates & Supervisor.....	i
Acknowledgement.....	ii
Abstract.....	iii
Contents.....	iv-vi
List of Tables.....	vii-ix
List of Figures.....	x-xi
Notations.....	xii
Appendices.....	xiii
CHAPTER 1: INTRODUCTION.....	1-2
CHAPTER 2: LITERATURE REVIEW	
2.1 Introduction.....	3
2.2 Stone Columns.....	4
2.2.1 Load Carrying Mechanism of Stone Column.....	5
2.2.2 Estimation of Load Carrying Capacity of Stone Column.....	6
2.2.3 Failure Mechanisms of Stone Columns.....	6-7
2.2.4 Stone Column Construction.....	7
2.3 Previous Studies Related to The Use of Alternative Material for Stone Column Construction.....	8-9
CHAPTER 3: METHODOLOGY.....	10-11

## CHAPTER 4: EXPERIMENTAL PROGRAM

4.1 Characterization of Materials.....	12
4.1.1 Clay.....	12
4.1.2 Building debris.....	12
4.1.3 Stone aggregates.....	12
4.2 Tests on Clay Sample.....	12
4.3 Tests on Building Debris Samples.....	13
4.3.1 Aggregate Impact value (AIV).....	13
4.3.2 Aggregate Crushing Value (ACV).....	13
4.3.3 Los Angeles Abrasion Value Test (LAAV).....	13
4.3.4 Slake Durability Index Test and Test Procedure.....	13-14
4.4 Tests on Stone Column Models .....	15
4.4.1 Test set-up and Loading Arrangement.....	15
4.4.2 Preparation of the Clay Bed.....	16
4.4.3 Construction of the Stone Column and Compressive Strength Test Procedure.....	16-18
4.4.4. Vane Shear Test and Test Procedure.....	18-19

## CHAPTER 5: RESULTS

5.1 Results of Clay Sample Tests .....	20
5.1.1 Results of Specific Gravity (G) of the Clayey Soil .....	20
5.1.2 Results of Atterberg Limit Test.....	20
5.1.3 Results of Moisture Content Test.....	20
5.1.4 Results of Hydrometer Analysis Test.....	20
5.1.5 Results of Standard Proctor Compaction Test.....	21
5.1.6 Results of Consolidation Test.....	21 -22
5.1.7 Results of Organic Content Test.....	22

5.2 Results of Building Debris Tests.....	23
5.2.1 Results of Aggregate Impact Value Test.....	23
5.2.2 Results of Aggregate Crushing Value Test.....	23
5.2.3 Results of Los Angeles Abrasion Value Test.....	23
5.2.4 Results of Slake Durability Test.....	24
5.3 Results of Stone Column Model Tests.....	24
5.3.1 Results of Compressive Strength Test.....	24
5.3.2 Results of Vane Shear Test.....	25
CHAPTER 6: ANALYSIS	
6.1 Analysis of Clay Sample.....	26
6.2 Analysis of Building Debris Tests.....	27
6.2.1 Slake Durability Test.....	27
6.2.2 AIV, ACV & LAAV Tests.....	27-28
6.3 Analysis of Stone Column Model Tests.....	29
6.3.1 Compressive Strength Test.....	29-30
6.3.2 Vane Shear Test.....	30-34
CHAPTER 5: CONCLUSION.....	35-36

CHAPTER 6: REFERENCES



## LIST OF TABLES

Table 3.1	Standard Tests
Table 5.1	Results of Consolidation Test of Clay Sample
Table 5.2	Coefficient of Permeability with $m_v$ and $C_v$
Table 5.3	Results of Aggregate Impact Value Test of different type of debris
Table 5.4	Results of Aggregate Crushing Value Test of different type of debris
Table 5.5	Results of Los Angeles Abrasion Value Test of different type of debris
Table 5.6	Results of Vane Shear Test of clay sample at a radial distance of 80 mm from the Centre of Model
Table 5.7	Results of Vane Shear Test of clay sample at a radial distance of 35 mm from the Centre of Model
Table 6.1	Slake Durability Index Groups of Different Types of Debris
Table 6.2	Summary of AIV, ACV & LAAV Tests
Table 6.3	RDA Criteria for Stone Column Material
Table 6.4	Ultimate Load Efficiency of Building Debris Related to Aggregate
Table A1.1	Specific Gravity Test of Clayey Sample
Table A2.1	Liquid Limit Test (Penetration method) of Clayey Sample
Table A2.2	Plastic Limit Test of Clayey Sample
Table A2.3	Moisture Content Results of Liquid Limit Test
Table A2.4	Moisture Content Results of Plastic Limit Test
Table A3.1	Moisture Content Test of Clayey Model
Table A4.1	Hydrometer Analysis Test of Clayey Sample
Table A4.2	Results of Hydrometer Analysis Test
Table A5.1	Standard Proctor Compaction Test of Clayey Sample
Table A5.2	Dry Density and Moisture Content of Other Samples
Table A5.3	Dry Density Values at 100% Saturation

Table A6.1	Clayey Sample Details
Table A6.2	Consolidation Test of Clayey Sample
Table A6.3	Specimens Calculation
Table A6.4	Consolidation Test Calculation
Table A8.1	Aggregate Impact Value Test of Concrete Debris
Table A8.2	Aggregate Impact Value Test of Aggregates
Table A8.3	Aggregate Crushing Value Test of Concrete Debris
Table A8.4	Aggregate Crushing Value Test of Aggregates
Table A8.5	Los Angeles Abrasive Value Test of Concrete Debris
Table A8.6	Los Angeles Abrasive Value Test of Aggregates
Table A9.1	Slake Durability Test of Brick Debris
Table A9.2	Slake Durability Test of Concrete Debris
Table A9.3	Slake Durability Test of Plaster Debris
Table A9.4	Initial Values of Slake Durability Test of Different Type of Debris
Table A9.5	Values of Slake Durability Test of Different Type of Debris after One Month
Table A9.6	Values of Slake Durability Test of Different Type of Debris after Two Months
Table A10.1	Compressive Strength Test of Concrete
Table A10.2	Compressive Strength Test of Aggregate
Table A10.3	Compressive Strength Test of Brick
Table A10.4	Compressive Strength Test of Plaster
Table A10.5	Compressive Strength Test of Clay
Table A11.1	Compressive Strength Values of Concrete
Table A11.2	Compressive Strength Values of Aggregate
Table A11.3	Compressive Strength Values of Brick
Table A11.4	Compressive Strength Values of Plaster
Table A11.5	Compressive Strength Values of Clay

Table A12.1 Vane Shear Test at 80 mm Distance from Center of Model Initially

Table A12.2 Vane Shear Test at 35 mm Distance from Center of Model Initially

Table A12.3 Vane Shear Test at 80 mm Distance from Center of Model with Load after 07 Days Soaked Period

Table A12.4 Vane Shear Test at 35 mm Distance from Center of Model with Load after 07 Days Soaked Period

Table A12.5 Vane Shear Test at 80 mm Distance from Center of Model with Load after One Month Soaked Period

Table A12.6 Vane Shear Test at 35 mm Distance from Center of Model with Load after One Month Soaked Period

Table A13.1 Shear Strength Values at 80 mm Distance from Center of Model Initially

Table A13.2 Shear Strength Values at 35 mm Distance from Center of Model Initially

Table A13.3 Shear Strength Values at 80 mm Distance from Center of Model with Load after 07 Days Soaked Period

Table A13.4 Shear Strength Values at 35 mm Distance from Center of Model with Load after 07 Days Soaked Period

Table A13.5 Shear Strength Values at 80 mm Distance from Center of Model with Load after One Month Soaked Period

Table A13.6 Shear Strength Values at 35 mm Distance from Center of Model with Load after One Month Soaked Period

Table A14.1 Shear Strength Calibration Chart for the 33 mm Blade

## LIST OF FIGURES

- Figure 1.1      Aggregates Usage in Stone Columns In Road Construction
- Figure 1.2      Building Debris (Kankesanthurai, Jaffna)
- Figure 2.1      Construction Procedure of Stone Column
- Figure 2.2 Installation Patterns of Stone Columns
- Figure 2.3      Load Carrying Mechanism of a Single Stone Column
- Figure 2.4      Failure of a Single Stone Column
- Figure 4.1 Slake Durability Test Procedure
- Figure 4.2      Typical Loading Arrangement of Stone Column: (a) Sketch; (b) Sample within the test machine
- Figure 4.3      Construction process of the Stone Column
- Figure 4.4 Arrangement of the Stone Column Prior to Compressive Test
- Figure 4.5 Testing Locations of Vane Shear Test
- Figure 4.6 Testing Arrangement of Vane Shear Test
- Figure 5.1      Results of Standard Proctor Compaction Test with Zero Air Void Line
- Figure 5.2      Graph of Load Vs. Volume of Compressibility and Coefficient of Consolidation
- Figure 5.3      Results of Slake Durability Test for Different Types of Building Debris with Time
- Figure 5.4      Results of Compressive Strength Test for Different Type of Building Debris
- Figure 6.1      Plasticity Chart
- Figure 6.2 Comparison of AIV, ACV & LAAV Tests
- Figure 6.3      Variation Between Compressive Load and Penetration for Different Type of Building Debris
- Figure 6.4      Graphical representation of undrained shear strength in clay surrounding of different stone column models and time relationship at 80 mm distance from the centre of stone column
- Figure 6.5      Graphical representation of undrained shear strength in clay surrounding of different stone column models and time relationship at 35 mm distance from the centre of stone column

Figure 6.6 Graphical representation of percentage of shear strength gain in clay surrounding of stonecolumn models made with different building debris compared to shear strength in clay without stone column Vs. time at same distance from the centre of made stone column models: (a) From 80 mm Distance; (b) From 35 mm Distance

Figure 6.7 Graphical representation of percentage of shear strength gain in clay surrounding of stonecolumn models made with different building debris compared to shear strength in clay without stone column Vs. time at same depth level from the surface of made stone column models: (a) From 33 mm Depth; (b) From 80 mm Depth

Figure A2.1 Graph of Moisture Content vs. Penetration

Figure A4.1 Graph of Percentage of Finer vs. Particle Size (Diameter of particle)

Figure A6.1 Consolidation Graph for 25 kPa Load

Figure A6.2 Consolidation Graph for 50 kPa Load

Figure A6.3 Consolidation Graph for 75 kPa Load

Figure A6.4 Consolidation Graph for 100 kPa Load

Figure A9.1 Initial Slake Index Values of Different Type of Debris

Figure A9.2 Slake Index Values of Different Type of Debris after One Month

Figure A9.3 Slake Index Values of Different Type of Debris after Two Months

Figure A15.1 Construction Debris

Figure A15.2 Concrete Debris

Figure A15.3 Brick Debris

Figure A15.4 Cement Plaster Debris

## NOTATIONS

LL	-	Liquid Limit
PL	-	Plastic Limit
PI	-	Plastic Index
MDD	-	Maximum Dry Density
OMC	-	Optimum Moisture Content
SSCM	-	Standard Specification of Construction & Maintenance of Roads & Bridges
BS	-	British Standards
ASTM	-	American Standards for Testing and Materials
AASHTO	-	American Association of State Highways and Technical Official
GOSL	-	Government of Sri Lanka
RDA	-	Road Development Authority
ICTAD	-	Institute of Construction Training and Development
AIV	-	Aggregate Impact Value
ACV	-	Aggregate Crushing Value
LAAV	-	Los Angeles Abrasive Value

## **APPENDICES**

- Appendix 1 Observations and Calculations of Specific Gravity Test
- Appendix 2 Observations and Calculations of Atterberg Limit Test
- Appendix 3 Observations and Calculations of Moisture Content Test
- Appendix 4 Observations and Calculations of Hydrometer Analysis Test
- Appendix 5 Observations and Calculations of Proctor Compaction Test
- Appendix 6 Observations and Calculations of Consolidation Test
- Appendix 7 Observations and Calculations of Organic Content Test
- Appendix 8 Observations and Calculations of AIV, ACV and LAAV Tests
- Appendix 9 Observations and Calculations of Slake Durability Test
- Appendix 10 Observations of Compressive Strength Test
- Appendix 11 Values of Compressive Strength Test
- Appendix 12 Observations of Vane Shear Test
- Appendix 13 Shear Strength Values of Clay Surrounding
- Appendix 14 Shear Strength Calibration Chart
- Appendix 15 Images of Building Debris