

**Peanut Shell Ash as a Partial Cement Replacement
in Making Concrete Hollow Block**

**A Research Study Presented to Faculty of
College of Engineering, Architecture and Technology
De La Salle University – Dasmariñas
Dasmariñas City**

**In Partial Fulfilment of the Requirements for the Course
Bachelor of Science in Civil Engineering**



Bedua, Reginald M.

Imperial, Ian Kirby B.

Obina, Angela Jhin R.

March 2012

Table of Contents

Title Page	
Table of Contents	i
Abstract	iv
Acknowledgments	v
Chapter 1: The Problem and Its Background	
1.1. Introduction	1
1.2. Statement of the Problem	3
1.3. Research Objectives	4
1.4. Significance of the Study	4
1.5. Scope and Limitations	7
1.6. Conceptual Framework	8
1.7. Definition of Terms	10
Chapter 2: Review of Related Literature	
2.1 Peanut	12
2.2 Peanut Shell	13
2.3 Concrete Hollow Blocks	14
2.3.1 Load Bearing Hollow Blocks	15
2.3.2 Non-Load Bearing Hollow Blocks	15
2.4 Portland Cement	16
2.5 Alternatives to Portland Cement	16
2.6 Pozzolana	17
2.6.1 Category of Pozzolana	19

2.6.2 Particle Size and Carbon Content	20
2.6.3 Benefits of Pozzolan	21
2.7 Concrete Hollow Blocks Manufactured in Ilocos Sur	23
2.8 Supplies and Demand of Cement	24
2.9 Physical Properties	24
Chapter 3: Methodology	
3.1 Materials and Equipment	26
3.2 Data Gathering	26
3.3 Procedure	27
3.4 Determination of Density of PSA	28
3.5 Moisture Content of fine Aggregates	29
3.6 Compressive Strength Test	29
Chapter 4: Presentation, Analysis and Interpretation of data	
4.1 Test Results	30
Chapter 5: Summary of Findings, Conclusions, and Recommendations	
5.1 Summary of Findings	38
5.1.1 Test Results	38
5.2 Conclusion	39
5.3 Recommendation	40
Bibliography	
Appendices	
Appendix A: Proportioning of Concrete blocks Mixture	
Appendix B: Design Mix for Concrete Blocks	

Appendix C: Design Mix Computation per Cube

Appendix D: Amount of Materials on Individual Concrete Hollow Block

Appendix E: Determination of Density of a Mixture

Appendix F: Chemical Analysis of Peanut Shell Ash

Appendix G: Compressive Strength Result

Appendix H: Photos Taken from the Conduction of the Experiment

Appendix I: Reference Tables



ABSTRACT

An experimental research was conducted to improve the use of agricultural waste for the booming construction as a pozzolana. The study investigated the physical and chemical property of the Peanut Shell Ash (PSA) and the use of PSA as a partial cement replacement in making a mix design for concrete hollow blocks. Chemical test were performed to verify the chemical composition of PSA and has been compared to cement. It resulted positively that it contains Alumina and Silica which are ingredients for a good mixture.

The results revealed the PSA can be utilized as a cement replacement up to 30%, based on the prescribed compressive strength of the Philippine National Standard for concrete hollow blocks and that the 20% PSA replacement possessed a higher compressive strength than the 0% PSA. Moreover, it is the ideal PSA-Cement ratio that the researcher recommend to the concrete hollow block producer for passing the compressive strength requirement of Philippine National Standard.