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An Experimental Study of Coconut Shell with Sugarcane Bagasse Ash as Partial Replacement of Coarse Aggregates and Cement to Concrete

A Research Proposal Presented to
The Faculty of the Civil Engineering Department
Don Honorio Ventura State University

In partial fulfillment of the requirement for the Degree of
Bachelor of Science in Civil Engineering

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APPROVAL SHEET

This research entitled **"An Experimental Study of Coconut Shell with Sugarcane Bagasse Ash as Partial Replacement of Coarse Aggregates and Cement"** prepared and submitted by Banting, Emel P., Franche, Mark David A., Gamboa, Richard S., Mendiola, Elizabeth Aliana, Paras, Trixia L., Tantamco, Joseph P. in partial fulfillment of the requirements for the Degree Bachelor of Science in Civil Engineering has been examined and is recommended for acceptance and approval of **PROPOSAL DEFENSE.**

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ABSTRACT

High building material costs and demand can be a significant disadvantage for builders and contractors. The cost of raw materials such as wood, steel, and concrete is always growing, increasing the cost of projects. Due to the high demand for certain materials, they can be difficult to get on time, causing project delays. This is especially true when working on large-scale projects with short deadlines. This research presents an idea to minimize the problem by partially replacing the cement and coarse aggregates with sugarcane bagasse ash and coconut shell. The study has 3 main objectives: (1) To determine the effects of workability (slump cone test) and durability (water absorption test) of concrete when Coconut Shell and Sugarcane Bagasse Ash are used as partial replacements of cement and coarse aggregates after 7, 14, and 28 days of curing. (2) To identify which of the following percentage: 5%, 10%, and 15% are a suitable percentage when partiallly replaced the cement and coarse aggregates by SCBA and CS on the concrete. (3) Determining the the concrete's compressive strength after 7, 14, and 28 days when coconut shell and sugarcane bagasse ash are used on partially replacing the total weight of cement and coarse aggregates by 5%, 10%, and 15%. It contains three testing: slump cone test, compressive strength test and water absorption test. To achieve the result of compressive test and water absorption test, the researchers made a cylindrical sample consiting of twelve cylindrical sample (0%, 5%, 10%, and 15% partial replacement of SCBA and CS) with a different curing age (7 days, 14, days and 28 days). The samples were tested using a Universal Testing Machine (UTM) and the outcomes of the experiment revealed that CS and SCBA have a positive result on the properties of standard concrete.

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CHAPTER ONE

THE PROBLEM AND A REVIEW OF RELATED LITERATURES AND STUDIES

A. Introduction

Concrete is a building material made of cement, sand, gravel, and water. It is one of the most widely used building materials in the world and is used to create foundations, walls, and other structural elements in buildings, bridges, and other infrastructure projects; however, it has a disadvantage, it consumes a lot of natural materials such as natural aggregate and fresh water. (Baker, 2018) As the country's population is quickly growing, and with it, the demand for natural resources for building projects is also growing. And with that, the higher production of concrete for future usage will lead to significant depletion of these natural resources and contamination of the environment. (Ekberg, n.d).

Green concrete is an eco-friendly concrete that is made from adding a solid waste to the concrete mixture that was first invented in Denmark in 1998 (Concrete Concept, 2019). The need to have green concrete is essential so as to meet future demands of concrete while conserving natural resources. (Sivakrishna, 2019) Green concrete is created using repurposed or abandoned natural materials. It is created using industrial waste as a partial replacement for other concrete components, like cement or aggregate, whose production has a greater negative impact on the environment (Mohammad, 2017).

Solid or industrial waste is one of the problems that many countries have. Additionally, poor solid waste management can have a negative impact on a person's quality of life in many ways, including their health, the environment, and their economy. Given that both the population and the amount of rubbish are rising, it is clear that the world will not function smoothly without a good disaggregate. One of the burdens associated with addressing these concerns is being reduced, so the researchers are trying to figure out how they might drastically lessen this societal issue. Coconut shell (CS) and sugarcane bagasse ash (SCBA) are not commonly use in the construction industry but are often dumped as agricultural wastes (Ajala, 2021).

Coconut shell has qualities that make it a desirable component for making concrete, and using it in concrete could help with the problem of disposing of it. (kanojia, 2017) Coconut shells are used to make activated carbon because of their hardness and high carbon concentration. These are sustainable alternative to traditional coarse aggregates such as gravel and sand, and they offer many distinct advantages over these materials. It is strong, lightweight, and naturally resistant to weathering, making them an ideal aggregate for a variety of construction applications (Prakash, 2019).

According to Rao (2015), substituting coconut shells for aggregates will only slightly reduce the strength properties of concrete when compared to regular concrete by 10% and 20%, respectively. Therefore, this study suggested that using fly ash as a cement substitute would improve the workability of concrete made from coconut shells and increase its strength properties in comparison to regular concrete. Hence, the researcher will combine sugarcane bagasse ash (SCBA) as partial replacement for cement to coconut shell as partial replacement to coarse aggregates.

Sugarcane baggase ash is a waste product of the sugar industry that is high in amorphous silica, giving it good pozzolanic properties and the potential to be used in concrete as a cement replacement (Mangi, 2017). According to Berenguer (2020), it is possible to use SCBA as a partial replacement up to 15-20% of the total cement content in concrete that using SCBA can reduce the total cement content, leading to a decrease in the amount of cement used in the concrete mixture and thus reducing the cost of production (Berenguer, 2020) Additionally, SCBA can improve the workability and strength of concrete, while also providing better durability and resistance to acid attack. Another advantage of using SCBA in concrete is that it can help reduce the carbon footprint of concrete. The partial replacement of cement with SCBA can reduce the amount of CO2 emissions released during the production of concrete, leading to an overall reduction in the environmental impact of the construction process. (Prabhath et al., 2022).

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As a result, including effectiveness use of leftover coconut shells and sugarcane bagasse ash, and a decrease in natural resource usage, and cost efficients. the utilization of coconut shell and sugarcane bagasse ash in concrete appears to be a practical choice. The researchers developed this study in the hope that thorough assessment and testing with these two combined environmental wastes, coconut shell (CS) mixing with sugarcane bagasse ash (SCBA), as a partial replacement for cement and coarse aggregate, will significantly have a great impact not only in the construction field but also in the environmental issue.

B. Review of Related Studies

- *Solid-waste management*

The Philippines is one of the countries that generate the most solid waste. Construction projects in the Philippines contribute significantly to the country's overall solid waste management problem. The rapid urbanization and industrialization due to the country's economic growth over the past decade has resulted in a significant increase in the amount of construction waste (Domingo, 2021). It has as a government has taken several steps in recent years to address this issue. The National Solid Waste Management Commission (NSWMC) was created in 2006 to develop and implement a national solid waste management strategy. This strategy focuses on reducing, reusing, and recycling solid waste, as well as promoting public awareness and education on proper waste disposal (Yliopisto, 2017). Poor Management of disposal could cause a social and financial issue. One way to deal with agricultural waste is to recycle the things you've already thrown away. Coconut fiber and shell could be an excellent replacement in the creation of composite materials that can be used to build homes, such as concrete. (Ganiron, 2017)

Luzon, Visayas, and Mindanao make up the three principal geographical regions of the Philippines. The three agricultural products that are taken into consideration are coconut, rice, and sugarcane (Flores, 2019). In order to properly manage solid wastes like coconut shells and sugarcane bagasse, it is important to have a comprehensive waste management plan in place. This plan should include strategies for collecting, storing, treating, and disposing of the waste. It is also important to ensure that the waste is properly treated and disposed of in a way that will not harm the environment.

- *Sugarcane Bagasse*

Sugarcane is the primary food crop in tropical and subtropical regions. It is the primary source of sugar production. When the sugarcane is shredded, and the juice is extracted using heavy rollers; the fibrous material that remains after the juice is known as bagasse. Sugarcane bagasse ash is a cellulosic material made from sugarcane. (Mahmud, 2021) Due to sugarcane being the major supplier of sugar (approximately 80% of the global sugar consumption), sugarcane has been an important crop, and its cultivation is one of the most important activities in the world. It is estimated that producing 1 tonne of sugarcane generates approximately 140 to 280 kg of bagasse, which is a fibrous waste product of sugarcane once sugar is extracted (Melati et al., 2017).

The burning of bagasse generates 3% residual ash known as sugarcane bagasse ash (SCBA). Based upon this, it can be said that approximately 15.20 million tonnes of SCBA are being generated. (Alouw, 2019) SCBA has high amount of silica oxide, thus making it a pozzolanic material, and due to this, it has been studied and used as supplementary cementitious material (Berenguer et al., 2020; Zareei et al., 2018). Furthermore, as mentioned earlier, SCBA has also been utilized as substituting material (Modani and Vyawahare, 2013).

Over the years, the generation of sugarcane has increased due to increase in human population and sugar consumption. Therefore, it is expected that the production of sugarcane will keep on increasing, and subsequently so will the generation of its by-product SCBA (Alouw, 2019).

- *Coconut Shell*

Globally, more than 55 million tons of coconuts are produced annually, in the year 2019, according to FAOSTAT (2021); 62.46 million tonnes of coconuts were produced. The copra and coconut oil are the only beneficial products of the coconut, while the remaining such as coconut shell and fibers are of no use. Approximately 15% of the weight of an average coconut is occupied by the coconut shell (Bellow et al., 2018) which means an approximate 9.37 million tons of the coconut shells were discarded globally in year 2019. With the increase in coconut production, the coconut shell waste generation will also increase. Since coconut shells, an agricultural solid waste, have no economic value, they will eventually be disposed of in a environment that poses a safety and aesthetic threat to the environment. The ill management of solid waste and proper treatment disposal of agricultural wastes have not only caused environmental menace that has affected the health of the surrounding people but also increased land consumption for open-air landfills (Ikumapayi et al. 2020).

Coconut shells are derived from the husks of mature coconuts and are composed of a hard outer shell and a soft inner core. The hard outer shell is composed of lignin, hemicellulose, and cellulose, while the inner core is composed of a light, spongy material. The shell and core are typically ground into small particles that are suitable for use in construction materials. Coconut shells are an excellent aggregate material for use in concrete and asphalt, as they are lightweight and resistant to weathering (Prakash, 2019). They are also highly water-resistant, making them a great choice for driveways and other outdoor structures.

Coconut shell filler is a potential candidate for the development of new composites due to its high strength and modulus properties, as well as its high lignin content. Because of the high lignin content, the composites made with these fillers are more weather resistant and thus more suitable for use as construction materials (Kirti, 2015).

- *About Concrete*

Concrete is made by combining cement or lime, aggregates, water, admixtures, and other components. Concrete is necessary for all types of construction, including residential projects, multi-story commercial structures, and public works projects like bridges and roads. Concrete is also the foundation of all contemporary construction sector improvements, providing the nation with the homes, schools, hospitals, and other structures required for everyone to live in (Pro Crew Software, 2021).

According to Nagrochine et al., (2017), the most crucial component of concrete for constructions is its compressive strength. The process and results of adding some minerals to the materials as partial replacement in cement, sand, and gravel are being is discussed. When 10% more extra minerals are added to the materials compared to the initial combinations, the compressive strength of the concrete increases to 0.99%.

Accroding in Civil Concept (2021), it stated that aggregates is a representation of sand, crushed stones, gravel, etc., is one of the materials used in concrete that has been used for different purposes such as cement concrete, asphalt concrete, and other composite building materials. Aggregates are a huge benefit to concrete because it can fill at least 60 to 75 percent of the volume of the components. (Parasher, 2022), stated that the characteristics of aggregates are important because they influence the sort of aggregates to be utilized in concrete. The substance used in concrete to increase volume and serve as a filler for strengthening the materials is the aggregates.

Since the primary purpose of aggregates in concrete is to fill gaps in the mix, their amount can rise to 90–95 percent asphalt and 70–80 percent concrete. In addition, aggregates play more than only the role of filler; due to their surface textures, they can also boost the resistance of asphalt pavements, while their big particle size increases ultimate strength. Aggregates aid in the flow of concrete into tight spaces and can withstand forces up to a specific strength (Backus, 2022).

- *About cement*

A cement is powdery substance and binding material that holds and hardened other materials together to make concrete. It is produced out of calcining lime and clay. Because it is often combined with water before usage, hydraulic cement is the common form of cement used in the construction industry, while Portland cement is the common type that is being used in construction industry (Corrosion Pedia, 2017).

According to Patel (2019), stated that tons of cement are being made yearly because it is the most demanded construction materials around the world out of all the materials of concrete because of its durability. Because of the fast urbanization and ongoing global building construction, the need for cement is rising every year. it is also the primary material of concrete or mortar for hardening and long-lasting durability of the structures.

The growing demand for cement globally poses a serious danger to the environment since it produces a significant quantity of carbon dioxide and other chemicals that are extremely hazardous to the environment. Moreover, sugarcane is also causing serious issues to the environment because of the difficulties of disposing it. The Sugarcane bagasse ash is composed of silica that respond to the hydration of cement and adding properties to the concrete such as chloride resistance and corrosion resistance which is enhancing the properties that can strengthen and reduce the permeability of concrete.

- *Application of additives*

Concrete consumes massive amounts of natural raw materials while emitting massive amounts of CO2. Alternative materials will be employed to cut CO2 emissions and avoid the rapid depletion of natural raw materials (Sohu et al., 2022). Different additives are utilized to influence the qualities of concrete mixtures as well as the physical and mechanical properties of cured concrete. (Girskas et al., 2016). A top-quality ready-mixed concrete that contains water-cement mixture to extend the life of the concrete, regulate setting and hardening, and correct the overall behavior of concrete. The usage of additive concrete mixtures is frequently used to enhance the quality of concrete mixtures, decrease hydration, decrease shrinkage cracks, raise shear stress, and other things (Limantara, 2020). Two organic compounds were used by the researcher as a form of admixture. The use of additives will be defined by the goal and specifications of the contractor. Chemical additives are used to improve product performance, stability, and longevity, as well as to modify the qualities of hardened concrete. Mineral additives can be utilized to modify cementation processes as well. It is used to improve the density and compressive strength of concrete (Girskas et al., 2016).

Rapid agricultural development has resulted in a large number of waste by-products. Because agricultural wastes are not properly disposed of, they are becoming a severe environmental hazard (Jhatial et al., 2021). Conserving resources and reusing waste materials as partial replacements and additives in construction was a reasonable way to address the ongoing health dangers. The researcher recycled agricultural waste, which can be used as a substitute material for various concrete materials.

The primary goal of this research is to examine the fresh and mechanical characteristics of concrete with varying amounts of combine CS and SCBA as partial replacement of coarse aggregates and cement in concrete.

- *Concretes Design Mixture Proportion*

Concrete is a composite material that consists of aggregate, a binder, and water. Gravel is the most common type of aggregate used in concrete, but sand is also widely used. The binder is typically cement, which is a powdered limestone and other minerals mixture. Water is also added to the mixture to help the cement enable and develop a strong bond with the aggregate (BN Products, 2017). This study is a Class B concrete mix with a proportions of 1:2.5:5 ratio, which uses one part cement, two and half parts sand, and five parts coarse aggregates. This mixture is intended to produce concrete with high compressive strength, workability, and economy. The water-to-cement ratio should be between 0.4 and 0.5. (Gupta, 2022).

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C. Statement of the Problem

The high cost and demand for construction materials can be a significant disadvantage for builders and contractors. The cost of raw materials like wood, steel, and concrete are constantly rising, making projects more and more expensive. The high demand for these materials means that they can be difficult to get in a timely manner, leading to delays in projects. This can be especially problematic when working on large-scale projects with tight timelines. Furthermore, the high demand for these materials can lead to shortages, which could further drive up the cost and make it more difficult to get the materials needed.

According to the ICR Newsroom (2019), the Philippines has experienced a shortage of cement in 2019 due to an increase in the demand for construction materials. With the country's booming economy, demand for cement has outpaced production capabilities, resulting in shortages and higher prices. Several factors, including an increase in the number of projects in the country and the construction of new infrastructure, have been linked to the shortage. Additionally, the government of the Philippines recently increased the price of imported cement due to a weaker peso. This has a further impact on the country's cement availability and it is causing delays in construction projects.

According to Senate of the Phillipines (2019), Because of the country's shortage of construction materials, the demand for gravel and sand is increasing. Most provinces are short on gravel, cementc and sand, causing construction costs to rise and government projects to be delayed. It is mentioned that 15000 kilometers of road project have been delayed due to a lack of gravel, while 2.4 trillion projects in the construction industry have been delayed due to a lack of sand, cement, and aggregates.

Coconut shell (CS) and sugarcane bagasse ash (SCBA) are not commonly use in the construction industry but are often dumped as agricultural wastes (Ajala, 2021). This study aims to produce an alternative source of concrete mixture by partially replacing the coarse aggregates and cement with coconut shell and sugarcane bagasse ash.

Specifically, it seeks to answer the following:

1. How can the production of coconut shell and sugarcane bagasse ash concrete be described in terms of:
   a. Compressive strength of concrete
   b. Durability of concrete
   c. Workability of concrete

2. Does the properties of coconut shell and sugarcane bagasse ash affected by:
   a. Water/cement/aggregates/sand ratio
   b. Strength of concrete
   c. Ingredients of concrete
   - Types and quantity of cement and aggregates (insert SCBA and CS)
   - Types and quantity of aggregates (insert CS)
   d. Curing of concrete

D. Objectives of the Study

➢ *General Objective*

The general objective of this research is to investigate the effects of combining sugarcane bagasse ash and coconut shell as partial replacements to cement and coarse aggregates for class B concrete.

➢ *Specific Objective*

Specifically, this research sought to determine the following:

- To determine the effects of workability (slump cone test) and durability (water absorption test) of concrete when Coconut Shell and Sugarcane Bagasse Ash are used as partial replacements of cement and coarse aggregates after 7, 14, and 28 days of curing.
- To identify which of the following percentage: 5%, 10%, and 15% are a suitable percentage when partiallly replaced the cement and coarse aggregates by SCBA and CS on the concrete.

➢ *Controlled sample*

- 0% SCBA and 0% CS

➢ *Experimental sample*

- Cylindrical 1 with 5% CS and 5% SCBA
- Cylindrical 2 with 10% CS and 10% SCBA
- Cylindrical 3 with 15% CS and 15% SCBA

Determining the the concrete's compressive strength after 7, 14, and 28 days when coconut shell and sugarcane bagasse ash are used on partially replacing the total weight of cement and coarse aggregates by 5%, 10%, and 15%.

E. Significance of the Study

This study significantly contributes and is beneficial to the following stakeholders:

- Construction industry, this study will benefit those in the construction and related industries, particularly those who sell and produce coconut shell and sugar cane.
- Enviromental and Locality, this study benefits the community in terms of environmental concerns for discarding waste products such as SCBA from the ambulant and public market. As a replacement for cement these two waste products are eco-friendlier and cheaper.
- Economy, this study will help the construction industry to have a low-cost material so that every structure will be design as economical structure.
- This research enables them to use innovated concrete mixture related to the study.
- Farmer, this study will help them to sell more coconut shell and sugarcane which will aid in their daily income by providing products to construction industries.
- Future researchers, this study can serve as a basis or source of literature for future research whereby they can expound this study to make more innovative cement.

F. Scope and Limitations

The researchers mainly focus on the suitability of combining Coconut Shell (CS) and Sugarcane Bagasse Ash (SCBA) as partial replacement of aggregates and cement to the concrete. The researcher aims to accomplish the three (3) objectives in the set time frame school year 2022-2023.

The researcher chose the size of Coconut Shell (CS) to be used in samples as ½" (12.5mm). The researchers will use 6" (150mm) in diameter by 12" (300mm) in length cylindrical pipe as mold for the samples weighs of Compressive Strength Test . For Slump Cone Test, the researcher will use 12" (300mm) in Length, 8" (200mm) in diameter at the bottom and 4" (100mm). For Water Absorption Test, the researcher will use 4" (100mm) in diameter by 2" (50mm) in length cylyndrical pipe for the sample weighs.

The reseachers set the limit of the experiment to four (4) arrangements and will start without 0% additives and then begin the experimental sample of combining 5%, 10%, 15% weigh of the coarse aggregates and cement by Coconut Shell(CS) and pulverized Sugarcane Bagasse Ash. It is also limited to accomplish the experiment on the 7th, 14th, and 28th day of curing in determining the sample weights. The researchers will use Universal Testing Machine (USTM) in determining and testing the compressive strength , durability, and workability of the four (4) sample arrangements at City of San Fernando.

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The researchers set limit that the concrete in this experiment will only be used in a Class B concrete mixture. The researchers will only do the three testing mentioned above and not all type of concrete testing; Tensile Strength, Compaction Factor Test, Penetration Test, Initial Surface Absorption Test, In Situ Test, Modulus of Elasticity Test for concrete will not be used in this study.

Then the researchers will set the limit of collecting the Sugarcane Bagasse Ash (SCBA) from Central Azucarera de Tarlac a Sugarcane Plantation in Tarlac City, Tarlac, while the Coconut Shell (CS) will be collected from the Public Market in each member's Municipality. This study does not cover all parts of coconut and mainly focus on the Coconut Shells (CS), while Sugarcane is set to limit on using only the Sugarcane Waste.

G. Conceptual Framework

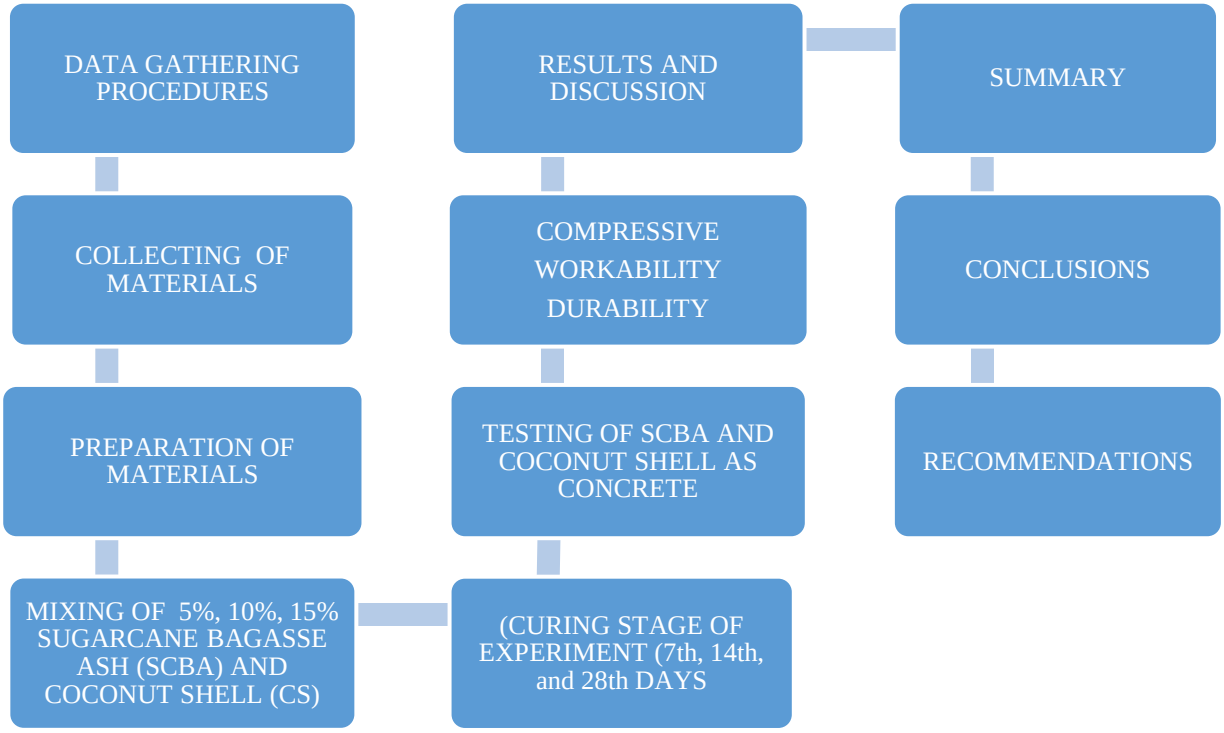

Fig. 1: Conceptual Framework

The researchers were going to show the systematic process of the experiment. First, the researchers collected the sugarcane bagasse (SCB) and coconut shell (CS) as a partial replacement for coarse aggregates and cement. By using a sieve analysis, the fineness modulus of SCB and CS was determined. After preparing the specimen, the researcher make cylindrical concrete by replacing some part of the standard concrete of 5%, 10%, and 15% of sugarcane bagasse (SCB) and 5%, 10%, and 15% of coconut shell (CS). Then, carried out four tests to demonstrate the effectiveness of the cylindrical mixture product by 6” (150mm) in diameter by 12” (300mm) in length in compressive strength, workability, durability test using a universal testing machine, oven and weighing scale, and a slump test then wait for the result of the mixing or finish product.

To show the results, the researchers observed the data experiment and discussed the test results, made recommendations, and a conclusion was reached.

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H. Definition of Terms

- **Additives** - a substance added to something in small quantities to improve or preserve it.
- **Baggase** - is a natural fibre that remains after the sugarcane juice has been removed.
- **Coconut shell** - is the most durable part of the coconut fruit.
- **Compression test** – is to measure the strength of the concrete in order to achieve ideal conditions.
- **Durability** - is the ability of a building to maintain, over its lifetime, the performance for which it was designed. It is a vital part of sustainable construction, as insufficient durability can result in additional unexpected costs due to repair or reconstruction, as well as environmental and social impacts.
- **Lignin** - is a wood waste, which after necessary processing, can be used in the field of building materials and construction as a water-reducing admixture, set retarder, grinding agent in cement production, cement replacement materials, etc.
- **Manufacturing** - is the creation or production of goods with the help of equipment, labor, machines, tools, and chemical or biological processing or formulation.
- **Pozzolanic material** - is a siliceous and aluminous material that in itself possesses little or no cementitious value but will, in finely divided form and in the presence of moisture, chemically react with calcium hydroxide at ordinary temperatures to form compounds having cementitious properties.
- **Shrinkage Shortening** - that is suffered by concrete or other material as a consequence of the chemical reactions produced during setting and hardening. This is mainly influenced by the cement's type and quantity as well as by the atmospheric temperature, by the degree of atmospheric humidity, by the amount of time that has passed since cementing, by the geometrical characteristics of the concreted volume and by the existence and type of additives present.
- **Sieve Analysis** - is a practice or procedure used in civil engineering and chemical engineering to assess the particle size distribution of a granular material by allowing the material to pass through a series of sieves of progressively smaller mesh size and weighing the amount of material that is stopped by each sieve as a fraction of the whole mass.
- **Silica** - is the common name for silicon dioxide, a white or colorless crystalline compound found naturally in sand, granite and many other types of rocks. Concrete and masonry products, the primary materials used in road construction, contain both silica sand and rock containing silica.
- **Slump test** - is the fundamental test for determining the workability and consistency of a concrete mixture.
- **Sugarcane** - is mainly grown for its juice, which is used to produce glucose.
- **Water absorption test** - is to calculate the amount of water absorbed by concrete in a given time period.
- **Water resistance** - is a process that ensures a structure or object is able to keep out 100% of any water that comes into contact with it.
- **Workability** - means the ease of placement and workable concrete means the concrete which can be placed and can be compacted easily without any segregation. Workability is a vital property of concrete and related with compaction as well as strength.

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CHAPTER TWO

METHODOLOGY

This chapter describes the systematic process of using CS and SCBA as concrete additives, as well as the supplies, tools, equipment, study locations, and experimental testing procedures.

A. Phase 1 Research Design Framework

- *Methodological Framework*

Phase 1	Research Design
Phase 2	Research Setting Preparation and collection of raw materials Preparation of tools and equipment Experimental Design ratio and proportion Production of samples Curing of samples Testing of samples
Phase 3	Collection and Data Analysis

Fig. 2: Methodological Framework

The figure above illustrates the methodological framework of the study which consists of four (4) phases namely; Phase 1 - Research Design and data gathering procedure, Phase 2 - Research Methodology, Phase 3 - Result Analysis and Interpretation. Respective phases consist of individual stages which are further discussed in the following sections of this chapter.

This chapter is all about the progress and development of the research, which is gathering all the data needed and preparation of instrument, materials, and additives for the experimentation. Afterwards, this is the start of creating samples for compressive strength test, slump cone test, and water absorption test which will be tested and later compared to each other to determine whether the samples pass the required allowable strength, workability and durability. Later on, 5%, 10%, 15% of coconut shell and sugarcane bagasse ash was added to the concrete mixture as partial replacement of coarse aggregates and cement. Lastly, the samples will have 7, 14, 28 days of curing before testing.

- *Research design*

The researchers conducted a true-experimental research to assessed the effectiveness of coconut shell and sugarcane baggase ash as concrete additives. The main subject of the study are coconut shells and sugarcane bagasse ash. Two samples was set up as follows: one controlled, made of the original or the standard concrete mixture, and the other one is experimental, formed of a combination of coconut shells and sugarcane bagasse ash concrete. To achieve the study's goals, data was gathered through testing trials that are carefully examined and analyzed.

B. Phase 2 Research Methodology

- *Research Setting*

This study's necessary collection, creation, and testing were done away from the university's grounds.

- **Material Collection.** The researchers obtained permission to gather by presenting a letter of request for authorization. The following are the locations where the researchers found sugarcane bagasse ash and coconut shell:

✓ Sugarcane Plantation located in Central Azucarera de tarlac. The researcher collected the sugarcane bagasse ash that would serve as the main component of the study.

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✓ Public Market. In each member municipality, the researcher goes around collecting coconut shells from people who throw or sell coconuts.

- **Drying and Cleaning of Coconut Shell.** The coconut shell was cleaned and washed by the researcher at their respective homes. Following that, filtered CS in an open area and placed outside to dry in the sun for preservation purposes.
- **Location Of The Experiment.** The sample material has undergone manufacturing and curing stage at FILMIXCO, which is situated in Sindalan, City of San Fernando.
- **Testing Laboratory.** The compression strength and water absorption test has been tested at Unified Geotest Laboratory, which is located in Brgy. Saguin, San Fernando City, Pampanga.

➢ *Materials, Tools and Equipments used in the study*

- Materials

✓ **Coconut Shell.** Coconut shell is the hard outer shell of a coconut. It is brown, fibrous, and tough, and can be found in Public Market of Sta. Rita, Pampanga.

- **Sugarcane Bagasse.** Sugarcane bagasse ash is a by-product of the sugarcane industry. It is a fine-grained, siliceous material composed primarily of silica.

- **Cement.** For this study, the researcher used Republic type-1P (Ordinary Portland Cement) was conformed to the AASHTO M 85 (ASTM C150 "Standard Specification for portland cement). This will act as a binder, allows easy applications, anchance long concrete durability.

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- **Sand.** Sand is a natural granular material composed of finely divided rock locally available in Sta. rita Pampanga, used as a fine aggregates, and has a fineness modulus responsible for the material's strength.

- **Coarse Aggregates.** Stones are one of the most commonly used coarse aggregates in the construction industry because of its strong, durable, and cost-effective, making them a great option for a variety of this study.

- **Water.** Water is used in concrete to help with the hardening and curing process. Water helps cement particles to hydrate and form a strong interlocking matrix, creating a strong and durable concrete. Shall meet the suggested requirement of AASHTO T26 "Quality of water to be used in concrete" pH value ranges to 4.5 to 8.5.

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➢ *TOOLS AND EQUIPMENTS*

- **SLEDGE HAMMER/HAMMER.** The tool that the researcher used to crush the whole coconut shell into pieces before sizing it.

- **CONTAINER.** The researcher put all the crushed coconut shell to the container after crushing it.

- **SHOVEL.** the researcher used the shovel to get the sugarcane bagasse ash and cement to the concrete mixture.

- **SIEVES.** The researcher used two types of sieve, the first sieve has a size of 12.5 mm for the size of coarse aggregates and the coconut shell and the second one is the no. 8 sieve with a 2.36 mm for the sugarcane bagasse ash. The researcher used the sieve for characterizing the particle size distribution of a sample and separation of unwanted particles.

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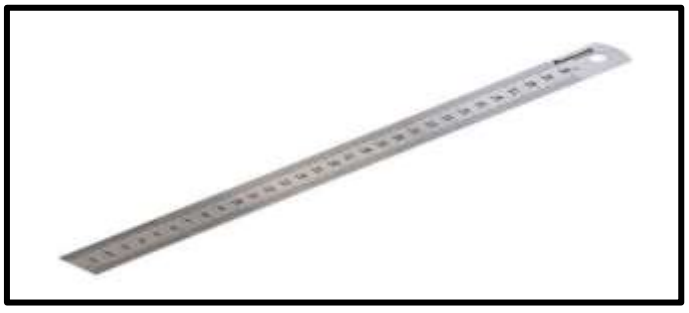
- **SLUMP CONE MADE FROM GALVANIZED SHEET STEEL.** For slump cone test the researcher used the size 300mm in length, 200mm diameter at bottom and 100mm diameter at top mold. The mold will be used to determine the consistency of different concretes.

- **STEEL TAMPING ROD.** The researcher used a size 16mm in diameter and 600mm in length of tamping rod that will be used to eliminate voids in concrete when doing slump test.

- **SLUMP METAL BASE PLATE.** The researcher used a size 450mm x 450mm of slump metal base plate that will be used to test the workability of concrete by measuring the number of concrete collapses when removed from standard mold.

- **STEEL RULER.** The researcher used a size 300mm of stell ruler that will be used to measure the slump.



- **SCOOP.** The resracher used scoop to place the sample concrete inside the slump cone.

- **Molds.** The researcher used a size of 100mm in diameter and 50mm in length of cylindrical mold for the samples of water absorption test and a size of 150mm in diameter and 300mm in length cylindrical mold for the samples of compressive strength test.

- **Weighing Scale.** It is a tool for calculating the weight of additives that needed for each sample. It helps to obtain a specific quantity of sugarcane bagasse ash and coconut shell to ensure the experiment's success.

- **Concrete Mixer.** It is a equipment that is used to combine all the materials needed such as cement, sand, aggregates, and water in order to create a concrete mixture.

➢ *Research Procedures*

- **Preparation of Concrete Mixture**

In this study study, Class B was adapted where it has concrete mixture proportion of 1:2.5:5 (cement, sand, and gravel, respectively) and a compressive strength of 3000 Psi achieved in 28 days. Although this concrete mix is appropriate for all reinforced concrete projects, it performs best when used for standard concrete work like slabs.

Table 1 : Concrete mixture and proportions

Mixture class	Compressive strength	Proportions (cement:sand:gravel)	Generally used for
Class AA	4000 psi	1:1 ½ :3	Retaining walls, concrete under water
Class A	3500 psi	1:2:4	Beams, slabs, footings, cloumns
Class B	3000 psi	1:2 ½ :5	Unreinforced concrete; bedding and backfilling
Class C	2500 psi	1:3:6	Planboxes, non-critical areas

➢ *Preparation of Coconut Shell and Sugarcane bagasse ash*

- **For coconut shell.** Each member gathered a coconut shell and sun dried it for 24 hours in an open space. The members then take all of the extra coconut meat out of the coconut shell.After that, when the coconut shell was thoroughly cleaned, it was hammered into small pieces.
- **For sugarcane bagasse ash**. By using a shovel, the researchers fill a bag with sugarcane bagasse ash.
- **Seive analysis**. The sugarcane bagasse put into a physical test called sieve analysis test that should pass through 2.36mm to achieve the cement fineness while the coconut shell will be 12.5mm or ½ inches sieve. Based on ASTM C 136 "Sieve or Screen Analysis of Fine and Coarse Aggregates.


- Preparation in Creating and Curing The Samples

In this study, three curing durations (7^{th} , 14^{th} , and 28^{th} day) and four sample variations was evaluated. The design and qualities of a concrete with partial replacement of portland cement and coarse aggregates utilizing coconut shell and sugarcane bagasse ash was examined in accordance with the study's goal in amounts of 0%, 5%, 10%, and 15% as partial replacement. The standard ratio for concrete will be 1:2.5:5, and a 0.4:0.5 cement to water ratio was also employed; in this case, the amount of sand and water will be correlated with the total amount of cement, aggregates, SCBA, and CS present in the mixture.

➢ *Manufacturing Process*

- Making of Improvised Cylindrical Molds for Water Absorption Test

The researcher bought a PVP pipe size of 4 inch and cut it into size of 100 mm in diameter and 50 mm in length for all the expiremental sample of water absorption test. Then each molds the researcher put a flat container cap under the molds and stick it to avoid bulking when the concrete mixture is poured.

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- Making of Standard Concrete Sample
  The following are the steps in producing the controlled sample or the standad concrete mixture:

✓ For the control setup, the concrete mix's ingredients were as follows: 1 part cement, 2.5 parts fine aggregates, 5 parts coarse aggregates, and 0.4:0.5 parts water. All the materials are mixed until the correct consistency of the concrete mixture is achieved.

✓ After achieving the correct consistency of the concrete mixture, the researcher filled every 1/3 height of the molds with the concrete mixture, tamp it 25 times, and then tap the outside of the mold with a sledge hammer for 15 times. The procedure was repeated until the molds were fully filled.

✓ After being poured, specimens were kept in the molder at temperatures between 16 and 27 degrees Celsius for up to 48 hours. Then, the samples are removed in the molds and transfer to the water for the concrete setting time.

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✓ Lastly, the molder will be transferred to a location then will proceed to the curing of concrete for 7, 14, and 28 days.

- Creating Partially Replaced Experimental Sample Using Coconut Shell and Sugarcane Bagasse Ash

Three different percentages of CS and SCBA will be used in place of cement and coarse aggregates in the experimental setup: 5%, 10%, and 15%. The concrete component will then be manually blended to the proper consistency. The following are the procedures of making concrete samples using coconut shell and sugarcane bagasse ash as partial replacement of cement and coarse aggregates.

✓ First is use a hammer to crushed the whole coconut shell into pieces and then size it to ½ inch while the sugarcane bagasse ash was already collected.

✓ Then, a physical examination known as a sieve analysis test is performed on the coconut shell and sugarcane bagasse ash. The size of the first sieve is 12.5 mm for coarse aggregates and coconut shell, and the size of sieve no. 8 is 2.36 mm for sugarcane bagasse ash.

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- ✓ The concrete mix for the control setup was composed of 1-part cement, 2.5-parts fine aggregates, 5-parts coarse aggregates, and 0.4:0.5 parts water. For the experimental setup, the samples will be partially replaced by sugarcane bagasse ash and coconut shell with 5%, 10%, and 15% of the total weight of the cement and coarse aggregates. The concrete component will then be mixed manually until the right consistency is achieved.

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- ✓ After achieving the correct consistency of the concrete mixture, the mixture was poured into the molds. Then, the researcher filled every 1/3 height of the molds with the concrete mixture, tamp it 25 times, and then tap the outside of the mold with a sledge hammer for 15 times. The procedure was repeated until the molds were fully filled.

- ✓ After all the molds are filled with the concrete mixture, for up to 48 hours, specimens were maintained in the molder at temperatures ranging from 16 to 27 degrees Celsius. The samples are then removed from the molds and placed in water for the concrete setting time.
- ✓ Finally, the samples underwent 7, 14, and 28 days of curing. After 7 days, the samples were taken out of the water for testing. Subsequently, after 14 days, the other samples were taken out of the water for analysis, and the remaining samples were tested after 28 days.

- Curing process

The curing process avoids cracking by maintaining the concrete's moisture content. This will be based on ASTM C192 known as " Standard Practice for making and curing concrete test specimens in the laboratory" to determine the maximum number of days where the maximum strength of the cylindrical sample will be achieved. In this study, the curing will be conducted on 7th, 14th, and 28th day.

- ✓ The samples will be placed on the ground to dry for the proper curing, aproximately for 48 hours. A total of 48 cylindrical samples contains three (3) different percentage of CS and SCBA, and 24 controlled samples were added.
- ✓ Every seven (7) days, 24 pieces of cylindrical samples are carried out to test while the remaining 48 samples are left to continue with the curing process until it will reach on the 14th and 28th days then will be also carried out for testing to check the samples strength.

- Other Test Procedures

✓ Slump Cone Test

The slump test is done to investigate the workability of freshly made concrete while easing the flow of the concrete. The slump test was done by filling a mould with concrete mix in three layers, each layer was uniformly tamped 25 times. The mold was then removed vertically and slowly after the pervious process was finished. The slump was immediately measure downwards from the trowel to the top after it stopped moving.

✓ Water Absorption Test

This is the following procedure:

- The researcher created an improvised mold that measured 100 mm by 50 mm.
- Coconut shell and sugarcane bagasse are partially replaced in the 1:2.5:5 concrete mix. The researcher evaluated if the desired consistency of the concrete mixture had been attained after all the concrete components had been combined.
- After checking the consistency, the mixture was put into the improvised mold.
- Next, after waiting for 24 hours, remove the molds, and after 7 days, the material sample is prepared for testing by weighing it.
- The sample was weighed seven days later. After that, the sample was put under the water then weigh it once more after 24 hours.
- Finally, after weighing the mold again, The sample put inside the oven for eight hours then weighed once more after it is done.

➢ *Research Sample*

Base on the proportions, samples were designated as control sample (C1) and experimental sample (E1, E2, and E3).

✓ Controlled sample

- C0% SCBA and 0% CS

✓ Experimental sample

- Cylindrical 1 with 5% CS and 5% SCBA
- Cylindrical 2 with 10% CS and 10% SCBA
- Cylindrical 3 with 15% CS and 15% SCBA

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Table 2: Total Sample needed in the study

CLASSIFICATIONS		SCBA	CS	Concrete Mixture	Days	No. of Sample
Controlled Sample	C1	0%	0%	100%	7	6
					14	6
					28	6
Experimental Sample	E1	5%	5%	90%	7	6
					14	6
					28	6
	E2	10%	10%	80%	7	6
					14	6
					28	6
	E3	15%	15%	70%	7	6
					14	6
					28	6
Total Samples						72

C. Phase 3: Collection and Data Analysis

➢ *Research Testing*

The compressive and durability strengths of all specimens, including the control and experimental setups, were determined using a Universal Testing Machine (UTM). Laboratories and testing centers were used to achieve a more valid and reliable result after testing. The compressibility, workability, and durability of all four (4) sample arrangements will then be tested by the researchers. The results obtained from the Universal Testing Machine (UTM) were compared. The comparison results determined whether the compressive properties of concrete changed significantly when coconut shell and sugarcane bagasse ash were added as an additive in a concrete mixture.

- Slump Cone Test (Workability)

Slump is a measurement of the consistency of concrete samples that shows how fluid the concrete will be. It can help predict the strength and indicate workability, which can indicate how simple or difficult a concrete mixture will be to set. According to ASTM C143 "Standard Test Method for Slump of Hydraulic-Cement Concrete". The slump test is the most basic concrete workability test, with low costs and quick results.

Table 3: Concrete Use Slump in Inches

Concrete Use Slump in Inches	
Walls	2½ - 4
Floors and Slabs	2 – 4
Beams	2 – 4
Blocks and Footings	2 – 4

Note: Do not use concrete with a slump greater than 1-inch over the specified maximum.

Table 4: Concrete Use Slump in Inches

Workability	Slump value	
	mm	inches
Very low workability	0-25	0 - 1
Low workability	25 - 50	1 - 2
Medium workability	50 - 100	2 - 4
High workability	100 - 175	4 - 7

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The Table above shows the concretes value of workability which is very low workability, low workability, medium workability, and high workability. Very low and low workability also known as harsh concrete or unworkable concrete, this concrete has very little amount of water and high segregation of aggregates which is very difficult to maintain. This workability has below 0.4 water cement ration. Next is medium wokability, the concrete workability that is used in most construction projects. It is easy to mix and compact without much segregation. Water cement ratio for medium workability is 0.4 to 0.55. And lastly, the high workability which is also very easy to mix and compact in structures, but there is high chances of segregation. The coarse aggregates tend to settle at the bottom and the concrete paste comes up. Such concrete is used in case of heavy reinforcement is used where vibration of concrete is not possible. Example of highly workable concrete is self-compacting concrete. Water cement ratio of such concrete is more than 0.55.

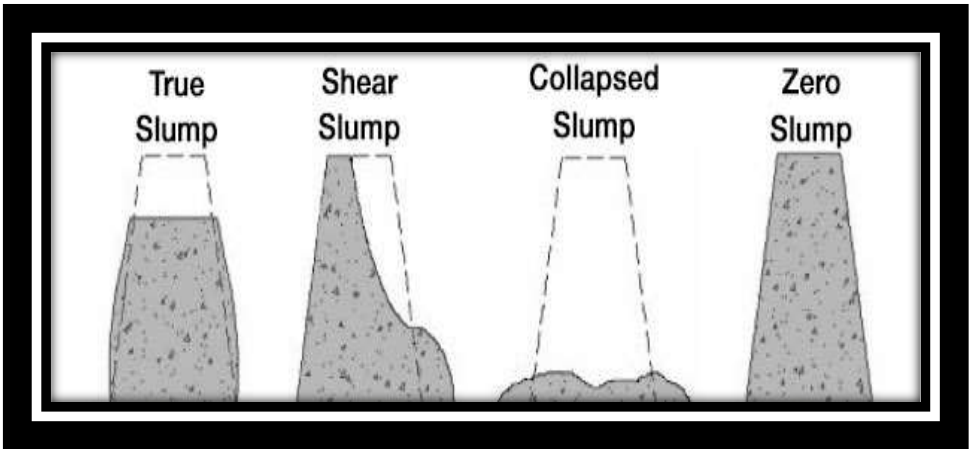

Fig. 3: Types of Slump

As shown in Figure 3, the concrete mixture slump can be classified as true, shear, collapse and zero slump and may occur in many kinds of shapes or forms. The height difference between the mold and the sample after removing the mold from the concrete is the value of the slump. True slumps are the type of slumps that are inquired for concrete's workability since the concrete simply subsides in a true slump, maintaining its shape more or less. Shear slump occurs with lack of cohesion in the concrete mix when the top portion of the concrete breaks off and slips sideways. In most cases, a collapse slump indicates that the mixture is either too wet or has a high workability level, while zero indicates stiffness, consistency, and has no workability, or concrete that was producing dry mixtures.

- Compressive Strength Test

The compressive strength test was performed to determine the average strength capacity and maximum load of a concrete using ASTM C39/C39M-12a processes ('Standard Test Method for Cylindrical Concrete Specimens' Compressive Strength'). The greater the concrete's compressive strength, the better It is.

36 samples were tested at 7, 14, and 28 days of cure. The type of material being tested generally determines the curing time. The set samples will consist of four (4) set-ups of four (3) samples each. When a component of the concrete mixture is changed, the increase in compressive strength may vary depending on the circumstances. As a result, an increase in compressive strength is typically seen every seven (7) days as the concrete begins to cure.

Then, the researcher computed the average strength using the formula in each set up (each set-up consist of 3 samples), then the computed three values was added and divided by three. The formula to be used in Compressive Strength Test is:

$$F = \frac{P}{A}$$

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Where:
F= The Compressive Strength (MPa)
P= Maximum Load or Load until Failure (N)
A= A cross section of the area of the materials resisting the load (mm^2)

- Water Absorption Test (Durability)

According to ASTM C 140 "Water Absorption", the test procedure involves drying a specimen to a constant weight, weighing it, immersing it in water for specified amount of time, and weighing it again. The increase in weight as a percentage of the original weight is expressed as its absorption (in percent). ***The average absorption of the test samples shall not be greater than 5% with no individual unit greater than 7%.***

To calculate the percentage of the sample, the researcher used the formula from ASTM 1585 "Standard Test Method For Measurement Of Rate Of Absorption Of Water By Hydraulic-Cement Concretes

$$\text{Increase in weight, \%} = \frac{\text{wet weight} - \text{conditioned weight}}{\text{conditioned weight}} \times 100$$

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CHAPTER THREE

RESULTS AND DISCUSSIONS

The findings from the researchs calculations, tests, and experiments are presented in this chapter**.** This chapter will discuss the results of the Slump Cone Test, Compressive Strength Test, and Water Absorption Test of all the expiremental samples that the researcher has made from 7th, 14th and 28th days.

A. Slump Cone Test Results

This test is base on ASTM C 143 “Standard Test Method for Slump of Hydraulic-Cement Concrete.". The Slump Cone Test was held in Filipino Ready Mix Corporation (FilMixCo.) at Sindalan San Fernando, Pampanga. This test will show the workability of the experimental samples from control setup or the original concrte mixture to 5%, 10%, 15% admixture.

Table 5: Slump Cone Tests Results

Sample Idnetification	Slump inches (in)	Remarks
0% Controlled Sample	4	True Slump
5% Admixture (Coconut Shell and Sugarcane Bagasse Ash)	3.2	True Slump
10% Admixture (Coconut Shell and Sugarcane Bagasse Ash)	2.8	True Slump
15% Admixture (Coconut Shell and Sugarcane Bagasse Ash)	2.3	True Slump

As shown in Table 5, compared to the experimental setups, the concrete in the control setup settles and mostly maintains its shape after the mold has been removed. The control setup has slump of 4 inches or 101.6mm, while the expiremental setup that was partially replaced by 5%, 10%, 15% of coconut shell and sugarcane bagasse ash. The expiremental setup with 5% replacement was measured from the top of the concrete to the top of the concrete mold and has a slump value of 3.2 in or 81.28mm which means that the concrete still settles and mostly maintains its shape after the mold has been removed . The next expiremental setup with 10% replacement has slump value of 2.8 in or 71.12mm was remain settles and mostly maintains its shape after the mold has been removed. And lastly, the expiremental setup with 15% replacements was remains settled and sustains its shape after the mold has been removed with a slump value of 2.3 in or 58.42mm.

According to Table 6, the experiment conducted for the control and experimental setups both produce the expected type of slump, the True Slump. When the control setup slump values were determined, they were found to fit into two types: high workability and medium workability, while experimental setups fall into the medium workability type. This indicates that the required value of slump, which was medium workability, was reached for all samples, including those from the control setup and experimental setups with 5%, 10%, and 15% replacement.

B. Compressive Test Results

Compressive strength of concrete is a measure of the concrete's ability to resist loads which tend to compress it. It is one of the most important and widely measured properties of concrete. One of the components required to make a concrete mix is cement and coarse aggregates, These two components are among the priciest material in a concrete mix. This research intend to study the impact of Coconut shell and Sugarcane Baggasse Ash as partial replacement of course aggregates and cement in a concrete mix. This research will compare the experimental set up which is partially replacing coarse aggregtaes and cement by Coconut shell and Sugarcane Baggasse Ash to the original concrete mixture by assessing the effectiveness of the experiment.

There are four set up in this study: the first set up is the control set up which is the original mixture of concrete and the other three is the experimental set up which is the partially replaced concrete mixture.

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The data listed below in Table 3.2, is the compressive test results which is conducted at Unified Geotect Laboratory Incorporation in San Fernando Pampanga.

Table 6.1: Compression Strength Test Results on the 7th Day

Sample Identification	Date sample	Age in days	Dia. mm	Length mm	Area mm	Machine Reading (kN)	Specification PSI @28 DAYS	Compressive Strength			
								MPa	Ave. Mpa	Psi	Ave. Psi
0% Controlled Sample	3/8/23	28	152.4	304.8	18242	400.87	2500	21.98	21.39	3186	3102
	3/8/23	28	152.4	304.8	18242	375.27	2500	20.57		2983	
	3/8/23	28	152.4	304.8	18242	394.62	2500	21.63		3137	
5% Admixture (Coconut Shell and Sugarcane Bagasse Ash	3/8/23	28	152.4	304.8	18242	279.69	2500	15.33	15.2	2223	2203.33
	3/8/23	28	152.4	304.8	18242	282.22	2500	15.47		2243	
	3/8/23	28	152.4	304.8	18242	269.76	2500	14.79		2144	
10% Admixture (Coconut Shell and Sugarcane Bagasse Ash	3/8/23	28	152.4	304.8	18242	213.76	2500	11.72	11.55	1699	1674.67
	3/8/23	28	152.4	304.8	18242	206.98	2500	11.35		1645	
	3/8/23	28	152.4	304.8	18242	211.40	2500	11.59		1680	
15% Admixture (Coconut Shell and Sugarcane Bagasse Ash	3/8/23	28	152.4	304.8	18242	162.11	2500	8.89	8.96	1289	1299.33
	3/8/23	28	152.4	304.8	18242	169.29	2500	9.28		1346	
	3/8/23	28	152.4	304.8	18242	158.87	2500	8.71		1263	

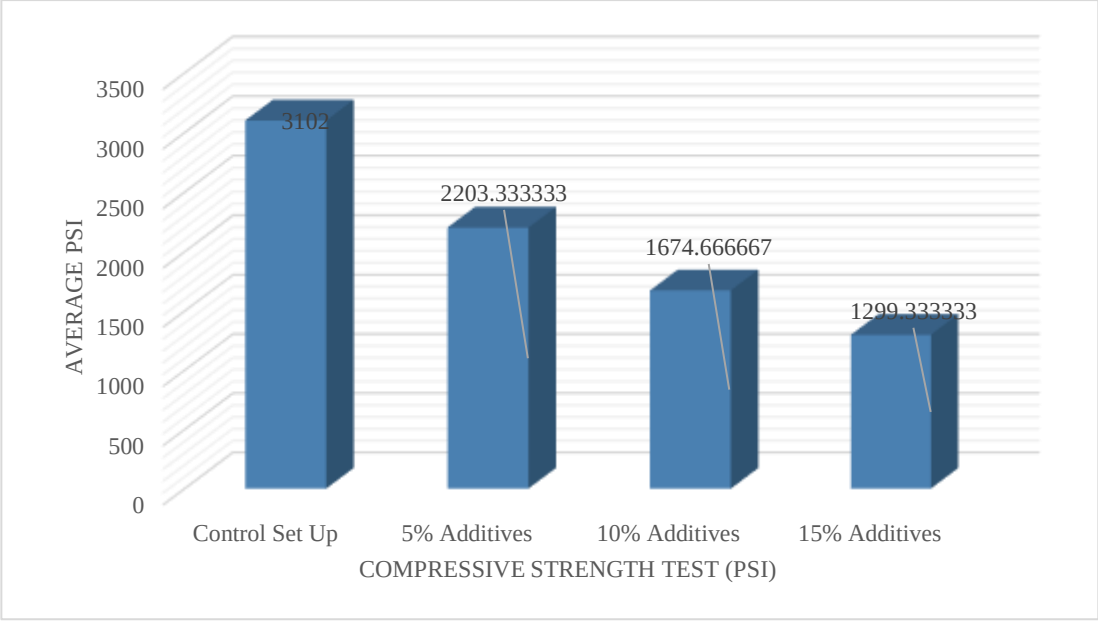

Fig. 4.1: Compressive Strength Obtained on 7th Da

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In Figure 4.1, it shows that the Control Setup with 3102 Psi has the highest compressive strength, followed by the 5% Admixture with a 2203.33 Psi, then the 10% Admixture with 1674.67 Psi, and lastly the 15% Admixture with 1299.33 Psi Compressive Strength. On the other hand, it appears that 5%, 10%, 15% admixture failed to reach the minimum compressive strength required for Class B concrete mixture on day 7 which is 3000 Psi.

Table 6.2: Compression Strength Test Results on the 14th Day

Sample Identification	Date sample	Age in days	Dia. mm	Length mm	Area mm	Machine Reading (kN)	Specification PSI @28 DAYS	Compressive Strength			
								MPa	Ave. Mpa	Psi	Ave. Psi
0% Controlled Sample	3/8/23	28	152.4	304.8	18242	378.06	2500	20.73	20.66	3005	2995
	3/8/23	28	152.4	304.8	18242	371.11	2500	20.34		2950	
	3/8/23	28	152.4	304.8	18242	381.25	2500	20.90		3031	
5% Admixture (Coconut Shell and Sugarcane Bagasse Ash	3/8/23	28	152.4	304.8	18242	351.76	2500	19.28	19.21	2796	2784.67
	3/8/23	28	152.4	304.8	18242	349.13	2500	19.14		2775	
	3/8/23	28	152.4	304.8	18242	350.16	2500	19.20		2783	
10% Admixture (Coconut Shell and Sugarcane Bagasse Ash	3/8/23	28	152.4	304.8	18242	332.61	2500	18.23	18.24	2644	2644.33
	3/8/23	28	152.4	304.8	18242	338.96	2500	18.58		2694	
	3/8/23	28	152.4	304.8	18242	326.52	2500	17.90		2595	
15% Admixture (Coconut Shell and Sugarcane Bagasse Ash	3/8/23	28	152.4	304.8	18242	328.18	2500	17.99	18.05	2609	2617.67
	3/8/23	28	152.4	304.8	18242	329.62	2500	18.07		2620	
	3/8/23	28	152.4	304.8	18242	330.16	2500	18.10		2624	

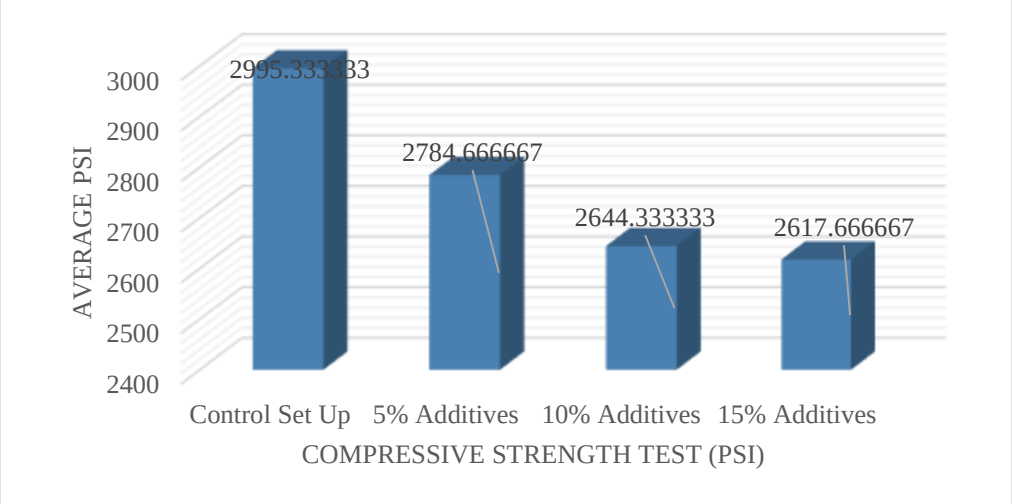

Fig. 4.2: Compressive Strength Obtained on 14th Day

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In accordance to Figure 4.2, the control setup has the most compressive strength of 2995.33 Psi, followed by the 5% admixture with 2784.67 Psi compressive strength. Additionally, the 10% admixture has a compressive strength of 2644.33 psi, and the 15% admixture has a compressive strength of 2617.67 Psi. As shown in Figure 4.1, all the expiremental setups from controlled to experimental setups did not passed the required minimum compressive strength of Class B concrete mixture which is 3000 Psi on the day 14.

Table 6.3: Compression Strength Test Results on the 28th Day

Sample Identification	Date sample	Age in days	Dia. mm	Length mm	Area mm	Machine Reading (kN)	Specification PSI @28 DAYS	Compressive Strength			
								MPa	Ave. Mpa	Psi	Ave. Psi
0% Controlled Sample	3/8/23	28	152.4	304.8	18242	414.62	2500	22.73	24.68	3296	3579
	3/8/23	28	152.4	304.8	18242	462.25	2500	25.34		3674	
	3/8/23	28	152.4	304.8	18242	473.94	2500	25.98		3767	
5% Admixture (Coconut Shell and Sugarcane Bagasse Ash	3/8/23	28	152.4	304.8	18242	388.58	2500	21.30	21.25	3089	3081
	3/8/23	28	152.4	304.8	18242	393.14	2500	21.55		3125	
	3/8/23	28	152.4	304.8	18242	381.08	2500	20.89		3029	
10% Admixture (Coconut Shell and Sugarcane Bagasse Ash	3/8/23	28	152.4	304.8	18242	289.45	2500	15.87	15.96	2301	2313.67
	3/8/23	28	152.4	304.8	18242	299.18	2500	16.40		2378	
	3/8/23	28	152.4	304.8	18242	284.57	2500	15.60		2262	
15% Admixture (Coconut Shell and Sugarcane Bagasse Ash	3/8/23	28	152.4	304.8	18242	190.60	2500	10.45	10.42	1515	1510.33
	3/8/23	28	152.4	304.8	18242	182.38	2500	10.00		1450	
	3/8/23	28	152.4	304.8	18242	196.97	2500	10.80		1566	

Fig. 4.3: Compressive Strength Obtained on 28th Day

As shown in Figure 4.3, the control setup has the highest compressive strength of 3579 Psi, followed by the 5% admixture with 3081 Psi. In addition, the compressive strengths of the 10% and 15% admixtures are 2313.67 Psi and 1510.33 Psi, respectively. As shown in Figure 4.2, both controlled setup and 5% admixture passed the required minimum compressive strength of Class B concrete mixture, although the 5% admixture has less compressive strength than the controlled setups. However, it is clear that 10% and 15% did not meet the required compressive strength for Class B concrete mixture on the 28th days.

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Table 6.4: Result of the Compressive Strength Test for 7, 14, and 28 Days

Setup Identification	Mix Ratio	Compressive Strength (Psi)		
		7th	14th	28th
Control Setup	1-part cement, 2 ½ -parts fine aggregates (sand), 5-parts coarse aggregates, and 0.5- parts water.	**3102**	**2995.33**	**3579**
5% Admixture (coconut shell and sugarcane bagasse ash)	1-part cement (5% of Sugarcane Bagasse Ash and 95% of cement), 2 ½ -parts fine aggregates (sand), 5-parts coarse aggregates (5% coconut shell and 95% of coconut shell), and 0.5- parts water.	**2203.33**	**2784.67**	**3081**
10% Admixture (coconut shell and sugarcane bagasse ash)	1-part cement (10% of Sugarcane Bagasse Ash and 90% of cement), 2 ½ -parts fine aggregates (sand), 5-parts coarse aggregates (10% coconut shell and 90% of coconut shell), and 0.5- parts water	**1674.67**	**2644.33**	**2313.67**
15% Admixture (coconut shell and sugarcane bagasse ash)	1-part cement (15% of Sugarcane Bagasse Ash and 85% of cement), 2 ½ -parts fine aggregates (sand), 5-parts coarse aggregates (5% coconut shell and 85% of coconut shell), and 0.5- parts water	**1299.33**	**2617.67**	**1510.33**

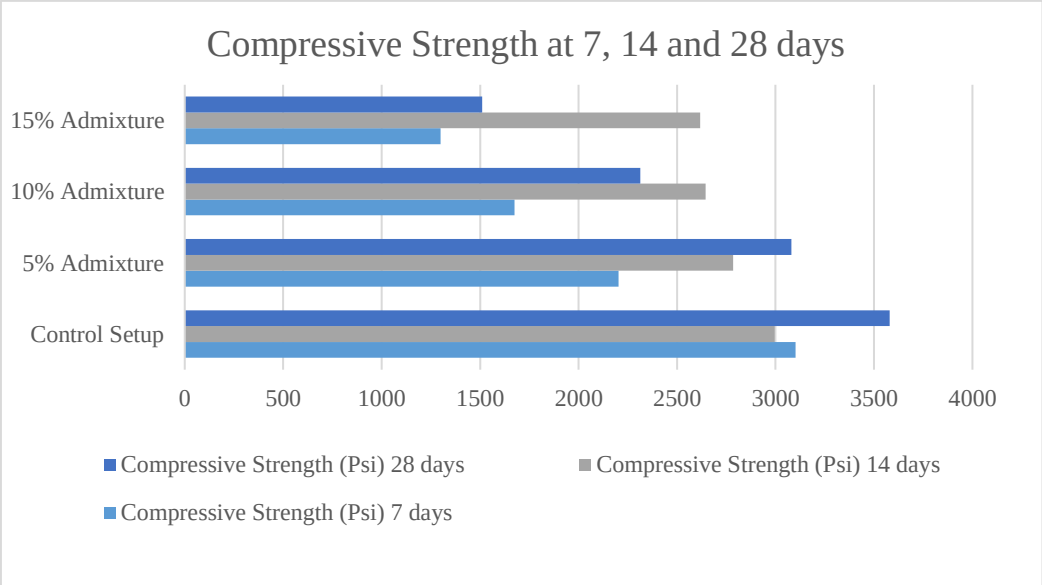

Fig. 4.4: Compressive Strength of the Setups for 7, 14 and 28 Days

As shown in Figure 4.4, researchers managed to attain the compressive strength test results of the expiremental samples by the use of Universal Testing Machine (UTM). The results of the test showed that the strength of the samples increased as the curing days increased. Specifically, it was observed that the compressive strength of the 5% admixture and control setup was more sufficient from 28 days of curing compared with 7 and 14 days, while the compressive strength of the 10% and 15% admixture was more sufficient from 14 days than the 7 and 28 days. This indicates that the curing time plays an important role in the compressive strength of the samples.

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The allowable compressive strength of all the expiremental samples must range from 3000 Psi. Therefore, the maximum compressive strength was with the 28 days of curing, where the compressive strength of control setup has 3579 Psi, while 5% admixture has 3081 Psi of 28 days which pass the required allowable compressive strength but has lower compressive strength than the control setup. Moreover, the compressive strength of 10% and 15% which has 2313.67 Psi and 1510.33 Psi after 28 days of curing did not pass the required allowable compressive strength and the control setup.

C. Water absorption

Sample Identification	Sample Mark	Date Tested	Age in days	Original Weight of Samples (gm)	Bulk Specific Gravity (SSD)	Weight of Oven Dry (gm)	Percentage of Absorption	Ave. Percentage of Absorption
Control setup	Sample 1	03/15/23	7	1254	1267	1228	3.18	3.40
	Sample 2	03/15/23	7	1181	1193	1149	3.83	
	Sample 3	03/15/23	7	1280	1291	1251	3.20	
5% Admixture (coconut shell and sugarcane bagasse ash)	Sample 1	03/15/23	7	1164	1181	1149	2.79	2.75
	Sample 2	03/15/23	7	1131	1149	1118	2.77	
	Sample 3	03/15/23	7	1170	1186	1155	2.68	
10% Admixture (coconut shell and sugarcane bagasse ash)	Sample 1	03/15/23	7	976	997	953	4.62	4.65
	Sample 2	03/15/23	7	923	942	901	4.55	
	Sample 3	03/15/23	7	880	900	859	4.77	
15% Admixture (coconut shell and sugarcane bagasse ash)	Sample 1	03/15/23	7	992	1018	973	4.62	4.43
	Sample 2	03/15/23	7	1003	1029	985	4.47	
	Sample 3	03/15/23	7	992	1016	975	4.21	

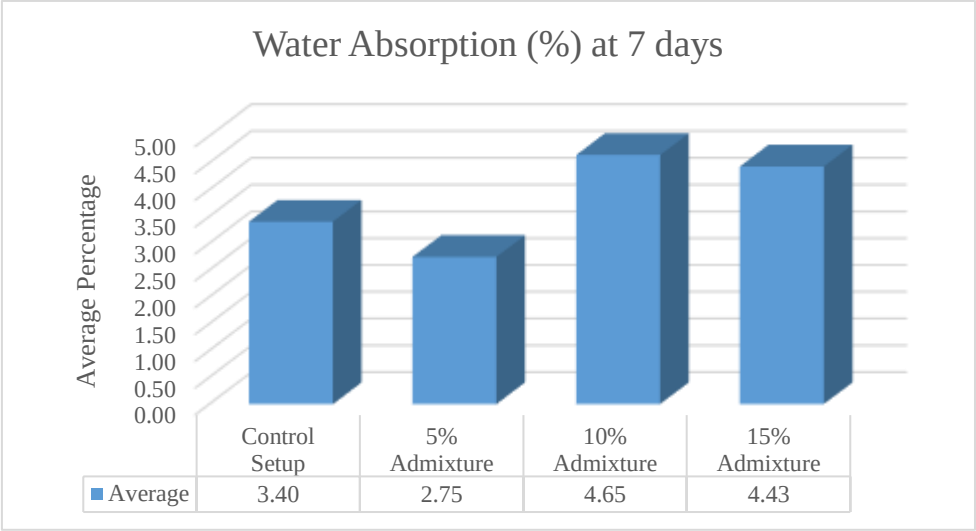

Fig. 5.1: Water Absorption Average Percentage at 7th days

As shown in Figure 5.1: the experimental setup with 10% admixture has obtained the highest water absorption with an average percentage of 4.65 %, followed by the experimental setup with 15% admixture that has average percentage of 4.43% water absorption, then the control setup with an average percentage of 3.40% water absorption, and lastly the experimental setup with 5% admixture which obtained the lowest water absorption with an average percentage of 2.75% at 7 days.

Sample Identification	Sample Mark	Date Tested	Age in days	Original Weight of Samples (gm)	Bulk Specific Gravity (SSD)	Weight of Oven Dry (gm)	Percentage of Absorption	Ave. Percentage of Absorption
Control setup	Sample 1	03/15/23	14	1252	1265	1228	3.01	3.26
	Sample 2	03/15/23	14	1182	1194	1152	3.65	
	Sample 3	03/15/23	14	1282	1293	1254	3.11	
5% Admixture (coconut shell and sugarcane bagasse ash)	Sample 1	03/15/23	14	1166	1182	1151	2.69	2.62
	Sample 2	03/15/23	14	1134	1148	1120	2.50	
	Sample 3	03/15/23	14	1175	1188	1157	2.68	
10% Admixture (coconut shell and sugarcane bagasse ash)	Sample 1	03/15/23	14	978	998	955	4.50	4.44
	Sample 2	03/15/23	14	924	945	904	4.54	
	Sample 3	03/15/23	14	884	902	865	4.28	
15% Admixture (coconut shell and sugarcane bagasse ash)	Sample 1	03/15/23	14	993	1019	975	4.51	4.32
	Sample 2	03/15/23	14	1005	1031	988	4.35	
	Sample 3	03/15/23	14	995	1018	978	4.09	

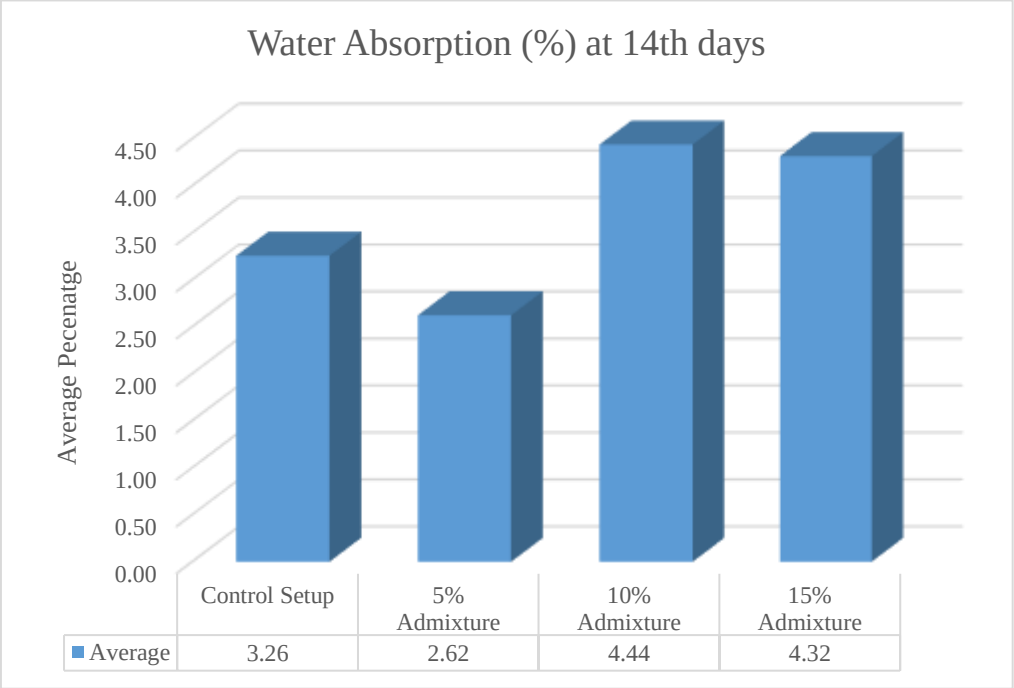

Fig. 5.2: Water Absorption Average Percentage at 14th days

As shown in Figure 5.2: the experimental setup with 10% admixture has obtained the highest water absorption with an average percentage of 4.44 %, followed by the experimental setup with 15% admixture that has average percentage of 4.32% water absorption, then the control setup with an average percentage of 3.26% water absorption, and lastly the experimental setup with 5% admixture which obtained the lowest water absorption with an average percentage of 2.62% at 14 days.

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Sample Identification	Sample Mark	Date Tested	Age in days	Original Weight of Samples (gm)	Bulk Specific Gravity (SSD)	Weight of Oven Dry (gm)	Percentage of Absorption	Ave. Percentage of Absorption
Control setup	Sample 1	03/15/23	28	1258	1268	1230	3.09	3.08
	Sample 2	03/15/23	28	1184	1192	1154	3.29	
	Sample 3	03/15/23	28	1284	1291	1255	2.87	
5% Admixture (coconut shell and sugarcane bagasse ash)	Sample 1	03/15/23	28	1164	1184	1152	2.78	2.42
	Sample 2	03/15/23	28	1135	1146	1123	2.05	
	Sample 3	03/15/23	28	1174	1186	1158	2.42	
10% Admixture (coconut shell and sugarcane bagasse ash)	Sample 1	03/15/23	28	979	992	957	3.66	4.12
	Sample 2	03/15/23	28	927	948	908	4.41	
	Sample 3	03/15/23	28	884	902	865	4.28	
15% Admixture (coconut shell and sugarcane bagasse ash)	Sample 1	03/15/23	28	994	1021	978	4.40	4.28
	Sample 2	03/15/23	28	1009	1032	989	4.35	
	Sample 3	03/15/23	28	992	1021	981	4.08	

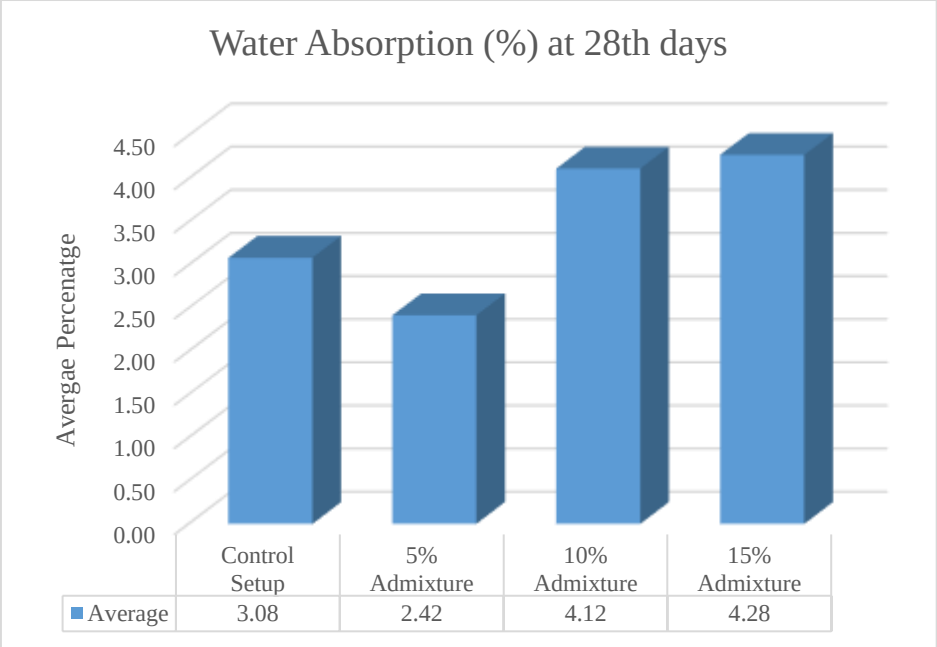

Fig. 5.3: Water Absorption Average Percentage at 28th days

As shown in Figure 5.3: the experimental setup with 15% admixture has obtained the highest water absorption with an average percentage of 4.28 %, followed by the experimental setup with 10% admixture that has average percentage of 4.12% water absorption, then the control setup with an average percentage of 3.08% water absorption, and lastly the experimental setup with 5% admixture which obtained the lowest water absorption with an average percentage of 2.42% at 28 days.

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CHAPTER FOUR

CONCLUSION AND RECOMMENDATIONS

A. Summary of the Findings

- *Slump Cone Test*

Based on the results that stated in chapter 3, The results of the slump cone test demonstrate that the controlled sample with 0% concrete mixture had the highest slump value of 4 inches, followed by the experimental setup with 5% admixture which had a slump value of 3.2 inches, then the 10% admixture with a slump value of 2.8 inches, and the 15% admixture with a slump value of 2.3 inches. The results of the test demonstrate that as the admixture percentage increases, the slump decreases, yet all the results obtained a similar remark which is true slump. All the setups from controlled to experimental acquired a similar workability, having medium workability. This shows that the admixture is having an impact on the slump of the concrete mixture, but not to the extent that it affects the overall results. Another one is medium workability concrete is easier to mix, transported and compacted so it is usually used in construction works, hence making it acceptable in this experiment.

- *Compressive Strength Test*

Based on the results that stated in chapter 3, the maximum compressive strength was obtained on the 28 days. The controlled setup achieved the highest compressive strength with 3579 Psi compared to the experimental setups. The experimental setups with 5% admixture attained 3081 Psi which also passed the required minimum compressive strength but has lower compressive strength than the controlled setup, while experimental setup with 10% and 15% admixture had 2313.67 Psi and 1510.33 Psi which did not passed the required minimum compressive strength of Class B concrete mixture. Therefore, 5% replacement of CS and SCBA can be used as partial replacement of coarse aggregates and cement of a concrete mixture, it is because of the rate material has the most well distributed fiber inside the concrete which does not overwhelm the original mix design.

- *Water Absorption Test*

Table 5.4: Water Absorption Results at 7th, 14th, 28th days

Sample Identification	Water Absorption			ASTM STANDARD maximum %	Remarks
	7th Day	14th Day	28th Day		
Control setup	3.40	3.26	3.08	<5%	Passed
5% Admixture (coconut shell and sugarcane bagasse ash)	2.75	2.62	2.42	<5%	Passed
10% Admixture (coconut shell and sugarcane bagasse ash)	4.65	4.44	4.12	<5%	Passed
15% Admixture (coconut shell and sugarcane bagasse ash)	4.43	4.32	4.28	<5%	Passed

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As shown in Table 5.4, the result of the water absorption test achieved the required average percentage of water absorption which is not greater than 5% absorption but not less than 7% from ASTM 1585. All the setups from controlled to expiremental with 5%, 10%, 15% admixture. The 28 days of curing has the lowest water absorption obtaining 2.42% – 4.28% absorption, but overall results achieved the required absorption from 7, 14, and 28 days.

The researcher created four samples: a controlled setup of 0% mixture, 5%, 10%, and 15% admixture with Coconut shell and Sugar Cane Bagasse Ash partially replaced.

We achieved the highest water absorption of 4.65% on day 7 after three curing days (7th, 14th, and 28th). Based on the results, we obtained that all of the testing performed on the sample from the 7th to the 28th day obtained the remark passed because all of the results were less than 5% based on ASTM1585.

B. Conclusion

The main goal of this research is to provide an effective partial replacement of cement and coarse aggregate for the concrete mixture. The researchers came to the following conclusion based on the results and conclusions of the experiments they conducted:

- Based on the summarize results of slump cone test, all the setups from controlled to experimental are in medium workability with slump value ranging from 2.3 – 4 inches. All the setups achieved similar remarks which is True Slump given that these mixtures remained its consistency, was easy to mix and compacted without much segregation. Additionally, medium workability concrete is usually used in construction works, hence making it acceptable in this experiment. To conclude, 5 % of coconut shell and sugarcane bagasse ash mix is the best to choose among other experimental percentage.
- Based on the outcomes, researchers came to the following conclusions for compressive strength. The results presented in Chapter 3 shows that the required concrete quality achieved with a 5% mixture of coconut shell and sugarcane bagasse ash. Its Psi values was 3081 which is greater than the required standard compressive strength of 3000 Psi. Therefore, 5% admixture is the recommended, since it has the most promising and suitable compressive strength.
- Based on the summarize result of water absorption, all the setups from controlled to experimental achieved the required average percentage of water absorption which is not greater than 5% absorption but not less than 7%. The lowest percentage obtained 2.42% absorption was at 28 days of curing with 5% admixture which is lower than the controlled setup or standard concrete mixture. This means that 5% admixture is the adequate mixture with a 2.42% absorption. So inshort, the quality of the construction material improves with decreasing absorption.

C. Recommendations

The researchers recommended the following for the future researchers:

- The researcher recommend to explore more design of concrete mixture proportions for further investigations on the effect of coconut shell and sugarcane bagasse ash as partial replacement of cement and coarse aggregates. Since the strength of the 5% partially replaced by CS and SCBA is 3081psi, it is possible that this concrete mixture can also be classified as Class B and can be used for slabs, floors, walls, and footings. Therefore checking for the tensile strength should be done to know if it falls under Class A concrete mixture.
- Also, consider using a different mixing ratio while producing concrete if it has an effect on its strength and the ability to absorb water and it may also affect the total cost of the produced concrete. Further study and investigation of combining other materials with coconut shell and sugarcane bagasse ash to be effective load bearing concrete.
- To investigate the effects of combining coconut shell and sugarcane bagasse ash with a different percentage. For an example 5% of coconut shell combined with 10% of sugarcane bagasse ash.
- No. 200 - 0.075mm fineness of sugarcane bagasse as would work and be more effective as a binder

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- To encourage further researchers to investigate additional material waste and suitable replacement building materials.
- To explore other suitable material waste to combine with coconut shell or with sugarcane bagasse ash.

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APPENDICES

APPENDIX A: ASTM STANDARDS

ASTM C595 Standard Specification for Blended Hydraulic Cements

This specification pertains to blended hydraulic cements for both general and special applications, using slag or pozzolan, or both, with portland cement or portland cement clinker, or slag with lime.

ASTM C150 Standard Specification for Portland Cement

This specification covers ten types of portland cement:

1. *Type I* – For use when the special properties specified for any other type are not required.
2. *Type IA* – Air-entraining cement for the same uses as Type I, where air-entrainment is desired.
3. *Type II* – For general use, more especially when moderate sulfate resistance is desired.
4. *Type IIA* – Air-entraining cement for the same uses as Type II, where air-entrainment is desired.
5. *Type II(MH)* – For general use, more especially when moderate heat of hydration and moderate sulfate resistance are desired.
6. *Type II(MH)A* – Air-entraining cement for the same uses as Type II(MH), where air-entrainment is desired.
7. *Type III* – For use when high early strength is desired.
8. *Type IIIA* – Air-entraining cement for the same use as Type III, where air-entrainment is desired.
9. *Type IV* – For use when a low heat of hydration is desired.
10. *Type V* – For use when high sulfate resistance is desired.

ASTM C192 Standard Practice for making and curing concrete test specimens in the laboratory

This specification covers hollow and solid nonloadbearing concrete masonry units made from Portland cement, water, and mineral aggregates with or without the inclusion of other materials.

ASTM C 140 Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units

These test methods provide various testing procedures commonly used for evaluating characteristics of concrete masonry units and related concrete units. Methods are provided for sampling, measurement of dimensions, compressive strength, absorption, unit weight (density), moisture content, flexural load, and ballast weight.

ASTM D5470 Standard Test Method for Thermal Transmission Properties of Thermally Conductive Electrical Insulation Materials

This standard covers a test method for measurement of thermal impedance and calculation of an apparent thermal conductivity for thermally conductive electrical insulation materials ranging from liquid compounds to hard solid materials.

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ASTM C 136, "Sieve or Screen Analysis of Fine and Coarse Aggregates."

Standard Seive Designation (ASTM E11)		Nominal Seive Opening	
		mm	In
Coarse Seive			
Standard	Alternate		
75 mm	3 in.	75	3
63 mm	2 ½ in.	63	2.5
50 mm	2 in.	50	2
37.5 mm	1 ½ in.	37.5	1.5
25 mm	1 in.	25	1
19 mm	¾ in.	19	0.75
12.5 mm	½ in.	12.5	0.50
9.5 mm	3/8 in.	9.5	0.375
Finest seive normally used for aggregates			
236mm	No. 8	2.36	0.93
75 mm	No. 200	0.075	0.0029

ASTM C143 "Standard Test Method for Slump of Hydraulic-Cement Concrete".

Concrete Use Slump in Inches	
Walls	2½ - 4
Floors and Slabs	2 – 4
Beams	2 – 4
Blocks and Footings	2 – 4

ASTM C39/C39M-12a processes ('Standard Test Method for Cylindrical Concrete Specimens' Compressive Strength')

$$F = \frac{P}{A}$$

$$\text{Percentage} = \frac{\text{compressive strength at 7 days}}{\text{compressive strenth at 28 days}} \times 100\%$$

ASTM 1585 "Standard Test Method For Measurement Of Rate Of Absorption Of Water By Hydraulic-Cement Concretes"

For concrete pavers, the test procedure involves drying a specimen to a constant weight, weighing it, immersing it in water for specified amount of time, and weighing it again. The increase in weight as a percentage of the original weight is expressed as its absorption (in percent). The average absorption of the test samples shall not be greater than 5% with no individual unit greater than 7%.

$$\text{Increase in weight, \%} = \frac{\text{wet weight} - \text{conditioned weight}}{\text{conditioned weight}} \times 100$$

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APPENDIX B: COMPRESSIVE STRENGTH TEST RESULT

TEST REPORT ON COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE
ASTM C - 39

Name of Project : **AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT**
Location : DON HONORIO VENTURA STATE UNIVERSITY
Client : **ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING**
Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : **UNI-23-0304-08**
Kind of Sample : CONCRETE CYLINDER
Date Submitted : March 4, 2023
Date Tested : March 4, 2023

SAMPLE IDENTIFICATION	DATE SAMPLED	AGE IN DAYS	SIZE OF SAMPLE		AREA mm²	MACHINE READING (kN)	COMPRESSIVE STRENGTH		TYPE OF FRACTURE	SPECIFICATION
			DIA. mm	LENGTH mm			psi	MPa		
0% CONTROLLED SAMPLE	2/25/23	7	152.4	304.8	18242	400.87	3186	21.98	CS	2500 PSI @ 28 DAYS
	2/25/23	7	152.4	304.8	18242	375.27	2983	20.57	CS	
	2/25/23	7	152.4	304.8	18242	394.62	3137	21.63	CS	
5% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)	2/25/23	7	152.4	304.8	18242	279.69	2223	15.33	CS	
	2/25/23	7	152.4	304.8	18242	282.22	2243	15.47	CL	
	2/25/23	7	152.4	304.8	18242	269.76	2144	14.79	CS	

***** PAGE 1 OF 2 *****

TYPE OF FRACTURE

Test Witnessed by:
ELIZABETH ALIANA MENDIOLA
JOSEPH P. TANTAMCO
TRIXIA L. PARAS
RICHARD S. GAMBOA
MARK DAVID A. FRANCHE
EMEL BANTING

Tested by:
RENZ MARK G. CASTILLO
LABORATORY TECHNICIAN

Certified Correct by:
RONEL R. MANALO
LABORATORY HEAD

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TEST REPORT ON COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE
ASTM C - 39

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT
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Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING
Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0304-08
Kind of Sample : CONCRETE CYLINDER
Date Submitted : March 4, 2023
Date Tested : March 4, 2023

SAMPLE IDENTIFICATION	DATE SAMPLED	AGE IN DAYS	SIZE OF SAMPLE		AREA mm²	MACHINE READING (kN)	COMPRESSIVE STRENGTH		TYPE OF FRACTURE	SPECIFICATION
			DIA. mm	LENGTH mm			psi	MPa		
10% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)	2/25/23	7	152.4	304.8	18242	213.76	1699	11.72	SW	2500 PSI @ 28 DAYS
	2/25/23	7	152.4	304.8	18242	206.98	1645	11.35	SW	
	2/25/23	7	152.4	304.8	18242	211.40	1680	11.59	S	
15% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)	2/25/23	7	152.4	304.8	18242	162.11	1289	8.89	SW	
	2/25/23	7	152.4	304.8	18242	169.29	1346	9.28	CS	
	2/25/23	7	152.4	304.8	18242	158.87	1263	8.71	SW	

***** PAGE 2 OF 2 *****

TYPE OF FRACTURE

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA
TRIXIA L. PARAS
MARK DAVID A. FRANCHE
JOSEPH P. TANTAMCO
RICHARD S. GAMBOA
EMEL BANTING

Tested by:
RENZ MARK G. CASTILLO
LABORATORY TECHNICIAN

Certified Correct by:
RONEL R. MANALO
LABORATORY HEAD

Unified Geotest Laboratory

Unified

TEST REPORT ON COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE
ASTM C - 39

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT
Location : DON HONORIO VENTURA STATE UNIVERSITY
Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING
Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0311-15
Kind of Sample : CONCRETE CYLINDER
Date Submitted : March 11, 2023
Date Tested : March 11, 2023

SAMPLE IDENTIFICATION	DATE SAMPLED	AGE IN DAYS	SIZE OF SAMPLE		AREA mm²	MACHINE READING (kN)	COMPRESSIVE STRENGTH		TYPE OF FRACTURE	SPECIFICATION
			DIA. mm	LENGTH mm			psi	MPa		
0% CONTROLLED SAMPLE TM 1	2/25/23	14	152.4	304.8	18242	378.06	3005	20.73	SW	2500 PSI @ 28 DAYS
	2/25/23	14	152.4	304.8	18242	371.11	2950	20.34	CL	
	2/25/23	14	152.4	304.8	18242	381.25	3031	20.90	CL	
5% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH) TM 2	2/25/23	14	152.4	304.8	18242	351.76	2796	19.28	SW	
	2/25/23	14	152.4	304.8	18242	349.13	2775	19.14	CP	
	2/25/23	14	152.4	304.8	18242	350.16	2783	19.20	SW	

***** PAGE 1 OF 2 *****

TYPE OF FRACTURE

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA
TRIXIA L. PARAS
MARK DAVID A. FRANCHE
JOSEPH P. TANTAMCO
RICHARD S. GAMBOA
EMEL BANTING

Tested by:
CHARLIE R. GARCIA
LABORATORY TECHNICIAN

Certified Correct by:
RONEL R. MANALO
LABORATORY HEAD

Unified Geotest Laboratory

TEST REPORT ON COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE
ASTM C - 39

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT
Location : DON HONORIO VENTURA STATE UNIVERSITY
Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING
Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0311-15
Kind of Sample : CONCRETE CYLINDER
Date Submitted : March 11, 2023
Date Tested : March 11, 2023

SAMPLE IDENTIFICATION	DATE SAMPLED	AGE IN DAYS	SIZE OF SAMPLE		AREA mm²	MACHINE READING (kN)	COMPRESSIVE STRENGTH		TYPE OF FRACTURE	SPECIFICATION
			DIA. mm	LENGTH mm			psi	MPa		
10% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH) TM 3	2/25/23	14	152.4	304.8	18242	332.61	2644	18.23	SW	2500 PSI @ 28 DAYS
	2/25/23	14	152.4	304.8	18242	338.96	2694	18.58	C	
	2/25/23	14	152.4	304.8	18242	326.52	2595	17.90	CP	
15% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH) TM 4	2/25/23	14	152.4	304.8	18242	328.18	2609	17.99	SW	
	2/25/23	14	152.4	304.8	18242	329.62	2620	18.07	C	
	2/25/23	14	152.4	304.8	18242	330.16	2624	18.10	CL	

***** PAGE 2 OF 2 *****

TYPE OF FRACTURE

Test Witnessed by:
ELIZABETH ALIANA MENDIOLA
JOSEPH P. TANTAMCO
TRIXIA L. PARAS
RICHARD S. GAMBOA
MARK DAVID A. FRANCHE
EMEL BANTING

Tested by:
CHARLIE R. GARCIA
LABORATORY TECHNICIAN

Certified Correct by:
RONEL R. MANALO
LABORATORY HEAD

Unified Geotest Laboratory

Unified

TEST REPORT ON COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE
ASTM C - 39

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT
Location : DON HONORIO VENTURA STATE UNIVERSITY
Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING
Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0405-14
Kind of Sample : CONCRETE CYLINDER
Date Submitted : April 5, 2023
Date Tested : April 5, 2023

SAMPLE IDENTIFICATION	DATE SAMPLED	AGE IN DAYS	SIZE OF SAMPLE		AREA mm²	MACHINE READING (kN)	COMPRESSIVE STRENGTH		TYPE OF FRACTURE	SPECIFICATION
			DIA. mm	LENGTH mm			psi	MPa		
0% CONTROLLED SAMPLE	3/8/23	28	152.4	304.8	18242	414.62	3296	22.73	S	2500 PSI @ 28 DAYS
	3/8/23	28	152.4	304.8	18242	462.25	3674	25.34	SW	
	3/8/23	28	152.4	304.8	18242	473.94	3767	25.98	SW	
5% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)	3/8/23	28	152.4	304.8	18242	388.58	3089	21.30	SW	
	3/8/23	28	152.4	304.8	18242	393.14	3125	21.55	SW	
	3/8/23	28	152.4	304.8	18242	381.08	3029	20.89	CL	

***** PAGE 1 OF 2 *****

TYPE OF FRACTURE

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA
TRIXIA L. PARAS
MARK DAVID A. FRANCHE
JOSEPH P. TANTAMCO
RICHARD S. GAMBOA
EMEL BANTING

Tested by:
LAURENCE M. TAPNIO
LABORATORY TECHNICIAN

Certified Correct by:
RONEL R. MANALO
LABORATORY HEAD

Unified Geotest Laboratory

DPWH DBS Accredited Laboratory

TEST REPORT ON COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE
ASTM C - 39

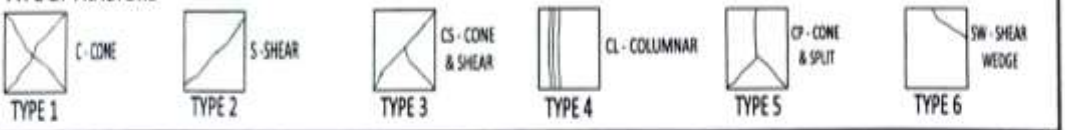
Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT
Location : DON HONORIO VENTURA STATE UNIVERSITY
Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING
Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0405-14
Kind of Sample : CONCRETE CYLINDER
Date Submitted : April 5, 2023
Date Tested : April 5, 2023

SAMPLE IDENTIFICATION	DATE SAMPLED	AGE IN DAYS	SIZE OF SAMPLE		AREA mm²	MACHINE READING (kN)	COMPRESSIVE STRENGTH		TYPE OF FRACTURE	SPECIFICATION
			DIA. mm	LENGTH mm			psi	MPa		
10% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)	3/8/23	28	152.4	304.8	18242	289.45	2301	15.87	SW	2500 PSI @ 28 DAYS
	3/8/23	28	152.4	304.8	18242	299.18	2378	16.40	SW	
	3/8/23	28	152.4	304.8	18242	284.57	2262	15.60	SW	
15% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)	3/8/23	28	152.4	304.8	18242	190.60	1515	10.45	CL	
	3/8/23	28	152.4	304.8	18242	182.38	1450	10.00	C	
	3/8/23	28	152.4	304.8	18242	196.97	1566	10.80	SW	

***** PAGE 2 OF 2 *****

TYPE OF FRACTURE



Test Witnessed by:
ELIZABETH ALIANA MENDIOLA
JOSEPH P. TANTAMCO
TRIXIA L. PARAS
RICHARD S. GAMBOA
MARK DAVID A. FRANCHE
EMEL BANTING

Tested by:
LAURENCE M. TAPNIO
LABORATORY TECHNICIAN

Certified Correct by:
RONEL R. MANALO
LABORATORY HEAD

Unified Geotest Laboratory

ISSN No:-2456-2165

APPENDIX D: WATER ABSORPTION TEST RESULTS

TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Kind of Materials : CYLINDER (SAMPLE #1) 0% CONTROLLED SAMPLE

Sampled at : JOBSITE

Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0314-24

Date Submitted : March 14, 2023

Date Tested : March 15, 2023

Tested by: : CHARLIE R. GARCIA

	CYLINDER
1. Original Weight of Sampled, gm	1254
2. Bulk Specific Gravity, (SSD)	1267
3. Weight of Oven Dry, gm	1228
4. Absorption %	3.18

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

JOSEPH P. TANTAMCO

TRIXIA L. PARAS

RICHARD S. GAMBOA

MARK DAVID A. FRANCHE

EMEL BANTING

Certified Correct by:

RONEL R. MANALO

LABORATORY HEAD

THIS LABORATORY IS RESPONSIBLE FOR TESTING ONLY

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF THE LABORATORY

Unified Geotest Laboratory

Unit C & D Ground Floor UB Building, MacArthur Highway, Brgy. Sapang, City of San Fernando, Pampanga

(045) 961-1644

DPWH-BRS Accredited Laboratory

Unified

TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT
Location : DON HONORIO VENTURA STATE UNIVERSITY
Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING
Kind of Materials : CYLINDER (SAMPLE #2) 0% CONTROLLED SAMPLE
Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0314-24
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

CYLINDER	
1. Original Weight of Sampled, gm	1181
2. Bulk Specific Gravity, (SSD)	1193
3. Weight of Oven Dry, gm	1149
4. Absorption %	3.83

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA
JOSEPH P. TANTAMCO
TRIXIA L. PARAS
RICHARD S. GAMBOA
MARK DAVID A. FRANCHE
EMEL BANTING

Certified Correct by:
RONEL R. MANALO
LABORATORY HEAD

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(063)-937-8628 / 0925-864-3433 (SUN) / 0917-175-3433 (GLOBE)
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DPWH-BRS Accredited Laboratory

ISSN No:-2456-2165

TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0314-24

Date Submitted : March 14, 2023

Date Tested : March 15, 2023

Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #3)
0% CONTROLLED SAMPLE

Sampled at : JOBSITE

Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

CYLINDER	
1. Original Weight of Sampled, gm	1280
2. Bulk Specific Gravity, (SSD)	1291
3. Weight of Oven Dry, gm	1251
4. Absorption %	3.20

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

JOSEPH P. TANTAMCO

Certified Correct by:

RONEL R. MANALO
LABORATORY HEAD

TRIXIA L. PARAS

RICHARD S. GAMBOA

MARK DAVID A. FRANCHE

EMEL BANTING

Unified Geotest Laboratory

ISSN No:-2456-2165

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TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT

Location : DON HONORIO VENTURA STATE UNIVERSITY
Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No : UNI-23-0314-24
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #1)
5% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

CYLINDER	
1. Original Weight of Sampled, gm	1164
2. Bulk Specific Gravity, (SSD)	1181
3. Weight of Oven Dry, gm	1149
4. Absorption %	2.79

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA
JOSEPH P. TANTAMCO
TRIXIA L. PARAS
RICHARD S. GAMBOA
MARK DAVID A. FRANCHE
EMEL BANTING

Certified Correct by:
RONEL R. MANALO
LABORATORY IN-CHARGE

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ISSN No:-2456-2165

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TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0314-24
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #2)
5% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

	CYLINDER
1. Original Weight of Sampled, gm	1131
2. Bulk Specific Gravity, (SSD)	1149
3. Weight of Oven Dry, gm	1118
4. Absorption %	2.77

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

JOSEPH P. TANTAMCO

Certified Correct by:

RONEL R. MANALO
LABORATORY HEAD

TRIXIA L. PARAS

RICHARD S. GAMBOA

MARK DAVID A. FRANCHE

EMEL BANTING

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TEST REPORT ON WATER ABSORPTION

Name of Project : **AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT**

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : **ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING**

Test Report No. : **UNI-23-0314-24**
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #3)
5% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

	CYLINDER
1. Original Weight of Sampled, gm	1170
2. Bulk Specific Gravity, (SSD)	1186
3. Weight of Oven Dry, gm	1155
4. Absorption %	2.68

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA
JOSEPH P. TANTAMCO
TRIXIA L. PARAS
RICHARD S. GAMBOA
MARK DAVID A. FRANCHE
EMEL BANTING

Certified Correct by:

RONEL R. MANALO
LABORATORY HEAD

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TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT

Location : DON HONORIO VENTURA STATE UNIVERSITY
Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0314-24
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #1)
10% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

CYLINDER	
1. Original Weight of Sampled, gm	976
2. Bulk Specific Gravity, (SSD)	997
3. Weight of Oven Dry, gm	953
4. Absorption %	4.62

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA
JOSEPH P. TANTAMCO
TRIXIA L. PARAS
RICHARD S. GAMBOA
MARK DAVID A. FRANCHE
EMEL BANTING

Certified Correct by:
RONEL R. MANALO
LABORATORY HEAD

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TEST REPORT ON WATER ABSORPTION

Name of Project : **AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT**

Location : DON HONORIO VENTURA STATE UNIVERSITY
Client : **ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING**

Test Report No. : **UNI-23-0314-24**
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #2)
10% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

CYLINDER	
1. Original Weight of Sampled, gm	923
2. Bulk Specific Gravity, (SSD)	942
3. Weight of Oven Dry, gm	901
4. Absorption %	4.55

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA
JOSEPH P. TANTAMCO
TRIXIA L. PARAS
RICHARD S. GAMBOA
MARK DAVID A. FRANCHE
EMEL BANTING

Certified Correct by:
RONEL R. MANALO
LABORATORY HEAD

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Unified Geotest Laboratory
Unit C & D Ground Floor UB Building, MacArthur Highway, Brgy. Sapsap, City of San Fernando, Pampanga
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(045) 963-3644
unified.geotest@gmail.com

DPWH-BRS Accredited Laboratory

TEST REPORT ON WATER ABSORPTION

Name of Project : **AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT**

Location : DON HONORIO VENTURA STATE UNIVERSITY
Client : **ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING**

Test Report No. : **UNI-23-0314-24**
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #3)
10% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

CYLINDER	
1. Original Weight of Sampled, gm	880
2. Bulk Specific Gravity, (SSD)	900
3. Weight of Oven Dry, gm	859
4. Absorption %	4.77

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA
JOSEPH P. TANTAMCO
Certified Correct by:
RONEL R. MANALO
LABORATORY HEAD
TRIXIA L. PARAS
RICHARD S. GAMBOA
MARK DAVID A. FRANCHE
EMEL BANTING

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TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0314-24

Date Submitted : March 14, 2023

Date Tested : March 15, 2023

Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #1)
15% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE

Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

CYLINDER	
1. Original Weight of Sampled, gm	992
2. Bulk Specific Gravity, (SSD)	1018
3. Weight of Oven Dry, gm	973
4. Absorption %	4.62

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

JOSEPH P. TANTAMCO

TRIXIA L. PARAS

RICHARD S. GAMBOA

MARK DAVID A. FRANCHE

EMEL BANTING

Certified Correct by:

RONEL R. MANALO
LABORATORY HEAD

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TEST REPORT ON WATER ABSORPTION

Name of Project : **AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT**

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : **ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING**

Test Report No. : **UNI-23-0314-24**

Date Submitted : March 14, 2023

Date Tested : March 15, 2023

Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #2)
15% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE

Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

CYLINDER	
1. Original Weight of Sampled, gm	1003
2. Bulk Specific Gravity, (SSD)	1029
3. Weight of Oven Dry, gm	985
4. Absorption %	4.47

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

JOSEPH P. TANTAMCO

Certified Correct by:

RONEL R. MANALO
LABORATORY HEAD

TRIXIA L. PARAS

RICHARD S. GAMBOA

MARK DAVID A. FRANCHE

EMEL BANTING

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TEST REPORT ON WATER ABSORPTION

Name of Project : **AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT**

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : **ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING**

Test Report No. : **UNI-23-0314-24**

Date Submitted : March 14, 2023

Date Tested : March 15, 2023

Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #3)
15% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE

Sampled by : ELIZABETH ALIANA MENDIOLA, TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

	CYLINDER
1. Original Weight of Sampled, gm	992
2. Bulk Specific Gravity, (SSD)	1016
3. Weight of Oven Dry, gm	975
4. Absorption %	4.21

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

JOSEPH P. TANTAMCO

Certified Correct by:

RONEL R. MANALO
LABORATORY HEAD

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RICHARD S. GAMBOA

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TEST REPORT ON WATER ABSORPTION

Name of Project : **AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT**

Location : DON HONORIO VENTURA STATE UNIVERSITY
Client : **ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING**

Test Report No. : **UNI-23-0314-24**
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #1) (14 DAYS)
0% CONTROLLED SAMPLE
Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

	CYLINDER
1. Original Weight of Sampled, gm	1252
2. Bulk Specific Gravity, (SSD)	1265
3. Weight of Oven Dry, gm	1228
4. Absorption %	3.01

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA
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EMEL BANTING

Certified Correct by:
RONEL R. MANALO
LABORATORY HEAD

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TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT
Location : DON HONORIO VENTURA STATE UNIVERSITY
Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING
Kind of Materials : CYLINDER (SAMPLE #2) (14 DAYS) 0% CONTROLLED SAMPLE
Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0314-24
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

	CYLINDER
1. Original Weight of Sampled, gm	1182
2. Bulk Specific Gravity, (SSD)	1194
3. Weight of Oven Dry, gm	1152
4. Absorption %	3.65

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA
TRIXIA L. PARAS
MARK DAVID A. FRANCHE
JOSEPH P. TANTAMCO
RICHARD S. GAMBOA
EMEL BANTING

Certified Correct by:
RONEL R. MANALO

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TEST REPORT ON WATER ABSORPTION

Name of Project : **AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT**

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : **ELIZABETH ALIANA MENDIOLA, TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING**

Kind of Materials : CYLINDER (SAMPLE #3) (14 DAYS) 0% CONTROLLED SAMPLE

Sampled at : JOBSITE

Sampled by : ELIZABETH ALIANA MENDIOLA, TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : **UNI-23-0314-24**

Date Submitted : March 14, 2023

Date Tested : March 15, 2023

Tested by: : CHARLIE R. GARCIA

	CYLINDER
1. Original Weight of Sampled, gm	1282
2. Bulk Specific Gravity, (SSD)	1293
3. Weight of Oven Dry, gm	1254
4. Absorption %	3.11

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

JOSEPH P. TANTAMCO

TRIXIA L. PARAS

RICHARD S. GAMBOA

MARK DAVID A. FRANCHE

EMEL BANTING

Certified Correct by:

RONEL R. MANALO

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TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0314-24
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #1) (14 DAYS)
5% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE

Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

CYLINDER	
1. Original Weight of Sampled, gm	1166
2. Bulk Specific Gravity, (SSD)	1182
3. Weight of Oven Dry, gm	1151
4. Absorption %	2.69

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

JOSEPH P. TANTAMCO

TRIXIA L. PARAS

RICHARD S. GAMBOA

MARK DAVID A. FRANCHE

EMEL BANTING

Certified Correct by:

RONEL R. MANALO
LABORATORY HEAD

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TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT
Location : DON HONORIO VENTURA STATE UNIVERSITY
Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING
Kind of Materials : CYLINDER (SAMPLE #2) (14 DAYS) 5% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)
Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0314-24
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

	CYLINDER
1. Original Weight of Sampled, gm	1134
2. Bulk Specific Gravity, (SSD)	1148
3. Weight of Oven Dry, gm	1120
4. Absorption %	2.50

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA
JOSEPH P. TANTAMCO
TRIXIA L. PARAS
RICHARD S. GAMBOA
MARK DAVID A. FRANCHE
EMEL BANTING

Certified Correct by:
RONEL R. MANALO
LABORATORY HEAD

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TEST REPORT ON WATER ABSORPTION

Name of Project : **AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT**

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : **ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING**

Test Report No. : **UNI-23-0314-24**
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #3) (14 DAYS)
5% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

	CYLINDER
1. Original Weight of Sampled, gm	1175
2. Bulk Specific Gravity, (SSD)	1188
3. Weight of Oven Dry, gm	1157
4. Absorption %	2.68

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

TRIXIA L. PARAS

MARK DAVID A. FRANCHE

JOSEPH P. TANTAMCO

RICHARD S. GAMBOA

EMEL BANTING

Certified Correct by:

RONEL R. MANALO
LABORATORY In-Charge

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TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0314-24
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #1) (14DAYS)
10% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE

Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

	CYLINDER
1. Original Weight of Sampled, gm	978
2. Bulk Specific Gravity, (SSD)	998
3. Weight of Oven Dry, gm	955
4. Absorption %	4.50

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

JOSEPH P. TANTAMCO

Certified Correct by:

RONEL R. MANALO
LABORATORY HEAD

TRIXIA L. PARAS

RICHARD S. GAMBOA

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EMEL BANTING

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TEST REPORT ON WATER ABSORPTION

Name of Project	: AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT		
Location	: DON HONORIO VENTURA STATE UNIVERSITY	Test Report No.	: UNI-23-0314-24
Client	: ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING	Date Submitted	: March 14, 2023
		Date Tested	: March 15, 2023
		Tested by:	: CHARLIE R. GARCIA
Kind of Materials	: CYLINDER (SAMPLE #2) (14 DAYS) 10% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)		
Sampled at	: JOBSITE		
Sampled by	: ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING		

	CYLINDER
1. Original Weight of Sampled, gm	924
2. Bulk Specific Gravity, (SSD)	945
3. Weight of Oven Dry, gm	904
4. Absorption %	4.54

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

TRIXIA L. PARAS

MARK DAVID A. FRANCHE

JOSEPH P. TANTAMCO

RICHARD S. GAMBOA

EMEL BANTING

Certified Correct by:

RONEL R. MANALO
LABORATORY HEAD

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TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0314-24
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #3) (14 DAYS)
10% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE

Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

CYLINDER	
1. Original Weight of Sampled, gm	884
2. Bulk Specific Gravity, (SSD)	902
3. Weight of Oven Dry, gm	865
4. Absorption %	4.28

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

TRIXIA L. PARAS

MARK DAVID A. FRANCHE

JOSEPH P. TANTAMCO

RICHARD S. GAMBOA

EMEL BANTING

Certified Correct by:

RONEL R. MANALO

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TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0314-24
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #1) (14 DAYS)
15% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE

Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

CYLINDER	
1. Original Weight of Sampled, gm	993
2. Bulk Specific Gravity, (SSD)	1019
3. Weight of Oven Dry, gm	975
4. Absorption %	4.51

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

JOSEPH P. TANTAMCO

TRIXIA L. PARAS

RICHARD S. GAMBOA

MARK DAVID A. FRANCHE

EMEL BANTING

Certified Correct by:

RONEL R. MANALO
LABORATORY HEAD

THIS LABORATORY IS RESPONSIBLE FOR TESTING ONLY
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Unified Geotest Laboratory
Unit C & D Ground Floor 138 Building, MacArthur Highway, Brgy. Sapian, City of San Fernando, Pampanga
(045) 963-1644
unified.geotest@gmail.com

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TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Kind of Materials : CYLINDER (SAMPLE #2) (14 DAYS) 15% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE

Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No : UNI-23-0314-24

Date Submitted : March 14, 2023

Date Tested : March 15, 2023

Tested by: : CHARLIE R. GARCIA

	CYLINDER
1. Original Weight of Sampled, gm	1005
2. Bulk Specific Gravity, (SSD)	1031
3. Weight of Oven Dry, gm	988
4. Absorption %	4.35

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

JOSEPH P. TANTAMCO

TRIXIA L. PARAS

RICHARD S. GAMBOA

MARK DAVID A. FRANCHE

EMEL BANTING

Certified Correct by:

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TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT
Location : DON HONORIO VENTURA STATE UNIVERSITY
Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING
Kind of Materials : CYLINDER (SAMPLE #3) (14 DAYS) 15% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)
Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0314-24
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

CYLINDER	
1. Original Weight of Sampled, gm	995
2. Bulk Specific Gravity, (SSD)	1018
3. Weight of Oven Dry, gm	978
4. Absorption %	4.09

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

TRIXIA L. PARAS

MARK DAVID A. FRANCHE

JOSEPH P. TANTAMCO

RICHARD S. GAMBOA

EMEL BANTING

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TEST REPORT ON WATER ABSORPTION

Name of Project : **AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT**

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : **ELIZABETH ALIANA MENDIOLA, TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING**

Kind of Materials : CYLINDER (SAMPLE #1) (28 DAYS)
0% CONTROLLED SAMPLE

Sampled at : JOBSITE

Sampled by : ELIZABETH ALIANA MENDIOLA, TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : **UNI-23-0314-24**
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by : CHARLIE R. GARCIA

	CYLINDER
1. Original Weight of Sampled, gm	1258
2. Bulk Specific Gravity, (SSD)	1268
3. Weight of Oven Dry, gm	1230
4. Absorption %	3.09

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

TRIXIA L. PARAS

MARK DAVID A. FRANCHE

JOSEPH P. TANTAMCO

RICHARD S. GAMBOA

EMEL BANTING

Certified Correct:

RONEL R. MANALO

Unified Geotest Laboratory

ISSN No:-2456-2165

TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT
Location : DON HONORIO VENTURA STATE UNIVERSITY
Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING
Kind of Materials : CYLINDER (SAMPLE #2) (28 DAYS) 0% CONTROLLED SAMPLE
Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0314-24
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

	CYLINDER
1. Original Weight of Sampled, gm	1184
2. Bulk Specific Gravity, (SSD)	1192
3. Weight of Oven Dry, gm	1154
4. Absorption %	3.29

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA
JOSEPH P. TANTAMCO
TRIXIA L. PARAS
RICHARD S. GAMBOA
MARK DAVID A. FRANCHE
EMEL BANTING

Certified Correct by:
RONEL R. MANALO
LABORATORY HEAD

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DPWH-BRS Accredited Laboratory

TEST REPORT ON WATER ABSORPTION

Name of Project : **AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT**

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : **ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING**

Kind of Materials : CYLINDER (SAMPLE #3) (28 DAYS) 0% CONTROLLED SAMPLE

Sampled at : JOBSITE

Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : **UNI-23-0314-24**

Date Submitted : March 14, 2023

Date Tested : March 15, 2023

Tested by: : CHARLIE R. GARCIA

CYLINDER	
1. Original Weight of Sampled, gm	1284
2. Bulk Specific Gravity, (SSD)	1291
3. Weight of Oven Dry, gm	1255
4. Absorption %	2.87

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

JOSEPH P. TANTAMCO

Certified Correct by:

RONEL R. MANALO
LABORATORY HEAD

TRIXIA L. PARAS

RICHARD S. GAMBOA

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EMEL BANTING

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TEST REPORT ON WATER ABSORPTION

Name of Project	: AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT		
Location	: DON HONORIO VENTURA STATE UNIVERSITY	Test Report No.	: UNI-23-0314-24
Client	: ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING	Date Submitted	: March 14, 2023
		Date Tested	: March 15, 2023
		Tested by:	: CHARLIE R. GARCIA
Kind of Materials	: CYLINDER (SAMPLE #1) (28 DAYS) 5% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)		
Sampled at	: JOBSITE		
Sampled by	: ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING		

CYLINDER	
1. Original Weight of Sampled, gm	1164
2. Bulk Specific Gravity, (SSD)	1184
3. Weight of Oven Dry, gm	1152
4. Absorption %	2.78

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

JOSEPH P. TANTAMCO

Certified Correct by:

RONEL R. MANACO
LABORATORY HEAD

TRIXIA L. PARAS

RICHARD S. GAMBOA

MARK DAVID A. FRANCHE

EMEL BANTING

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TEST REPORT ON WATER ABSORPTION

Name of Project : **AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT**

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : **ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING**

Test Report No. : **UNI-23-0314-24**
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #2) (28 DAYS)
5% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE

Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

CYLINDER	
1. Original Weight of Sampled, gm	1135
2. Bulk Specific Gravity, (SSD)	1146
3. Weight of Oven Dry, gm	1123
4. Absorption %	2.05

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA — JOSEPH P. TANTAMCO

TRIXIA L. PARAS — RICHARD S. GAMBOA

MARK DAVID A. FRANCHE — EMEL BANTING

Certified Correct by:

RONEL R. MANALO
LABORATORY HEAD

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TEST REPORT ON WATER ABSORPTION

Name of Project	: AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT		
Location	: DON HONORIO VENTURA STATE UNIVERSITY	Test Report No	: UNI-23-0314-24
Client	: ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING	Date Submitted	: March 14, 2023
		Date Tested	: March 15, 2023
		Tested by	: CHARLIE R. GARCIA
Kind of Materials	: CYLINDER (SAMPLE #3) (28 DAYS) 5% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)		
Sampled at	: JOBSITE		
Sampled by	: ELIZABETH ALIANA MENDIOLA, TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING		

	CYLINDER
1. Original Weight of Sampled, gm	1174
2. Bulk Specific Gravity, (SSD)	1186
3. Weight of Oven Dry, gm	1158
4. Absorption %	2.42

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

JOSEPH P. TANTAMCO

TRIXIA L. PARAS

RICHARD S. GAMBOA

MARK DAVID A. FRANCHE

EMEL BANTING

Certified Correct by:

RONEL R. MANALO

Unified Geotest Laboratory

ISSN No:-2456-2165

Unified

TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT

Location : DON HONORIO VENTURA STATE UNIVERSITY
Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0314-24
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #1) (28 DAYS)
10% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

CYLINDER	
1. Original Weight of Sampled, gm	979
2. Bulk Specific Gravity, (SSD)	992
3. Weight of Oven Dry, gm	957
4. Absorption %	3.66

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA
JOSEPH P. TANTAMCO
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RICHARD S. GAMBOA
MARK DAVID A. FRANCHE
EMEL BANTING

Certified Correct by:
RONEL R. MANALO
LABORATORY HEAD

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TEST REPORT ON WATER ABSORPTION

Name of Project	: AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT		
Location	: DON HONORIO VENTURA STATE UNIVERSITY	Test Report No.	: UNI-23-0314-24
Client	: ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING	Date Submitted	: March 14, 2023
		Date Tested	: March 15, 2023
		Tested by:	: CHARLIE R. GARCIA
Kind of Materials	: CYLINDER (SAMPLE #2) (28 DAYS) 10% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)		
Sampled at	: JOBSITE		
Sampled by	: ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING		

CYLINDER	
1. Original Weight of Sampled, gm	927
2. Bulk Specific Gravity, (SSD)	948
3. Weight of Oven Dry, gm	908
4. Absorption %	4.41

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

TRIXIA L. PARAS

MARK DAVID A. FRANCHE

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RICHARD S. GAMBOA

EMEL BANTING

Certified Correct by:

RONEL R. MANALO

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TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Kind of Materials : CYLINDER (SAMPLE #3) (28 DAYS) 10% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE

Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0314-24
Date Submitted : March 14, 2023
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Tested by: : CHARLIE R. GARCIA

	CYLINDER
1. Original Weight of Sampled, gm	884
2. Bulk Specific Gravity, (SSD)	902
3. Weight of Oven Dry, gm	865
4. Absorption %	4.28

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

JOSEPH P. TANTAMCO

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MARK DAVID A. FRANCHE

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TEST REPORT ON WATER ABSORPTION

Name of Project : **AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT**
Location : DON HONORIO VENTURA STATE UNIVERSITY
Client : **ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING**
Kind of Materials : CYLINDER (SAMPLE #1) (28 DAYS)
15% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)
Sampled at : JOBSITE
Sampled by : ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : **UNI-23-0314-24**
Date Submitted : March 14, 2023
Date Tested : March 15, 2023
Tested by: : CHARLIE R. GARCIA

	CYLINDER
1. Original Weight of Sampled, gm	994
2. Bulk Specific Gravity, (SSD)	1021
3. Weight of Oven Dry, gm	978
4. Absorption %	4.40

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA
TRIXIA L. PARAS
MARK DAVID A. FRANCHE
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RICHARD S. GAMBOA
EMEL BANTING

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TEST REPORT ON WATER ABSORPTION

Name of Project : AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT

Location : DON HONORIO VENTURA STATE UNIVERSITY

Client : ELIZABETH ALIANA MENDIOLA, TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

Test Report No. : UNI-23-0314-24

Date Submitted : March 14, 2023

Date Tested : March 15, 2023

Tested by: : CHARLIE R. GARCIA

Kind of Materials : CYLINDER (SAMPLE #2) (28 DAYS)
15% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)

Sampled at : JOBSITE

Sampled by : ELIZABETH ALIANA MENDIOLA, TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING

CYLINDER	
1. Original Weight of Sampled, gm	1009
2. Bulk Specific Gravity, (SSD)	1032
3. Weight of Oven Dry, gm	989
4. Absorption %	4.35

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

JOSEPH P. TANTAMCO

Certified Correct by:

RONEL R. MANALO
LABORATORY HEAD

TRIXIA L. PARAS

RICHARD S. GAMBOA

MARK DAVID A. FRANCHE

EMEL BANTING

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DPWH-BRS Accredited Laboratories

TEST REPORT ON WATER ABSORPTION

Name of Project	: AN EXPERIMENTAL STUDY OF COCONUT SHELL WITH SUGARCANE BAGASSE ASH AS A PARTIAL REPLACEMENT OF COARSE AGGREGATES AND CEMENT		
Location	: DON HONORIO VENTURA STATE UNIVERSITY	Test Report No.	: UNI-23-0314-24
Client	: ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING	Date Submitted	: March 14, 2023
		Date Tested	: March 15, 2023
		Tested by:	: CHARLIE R. GARCIA
Kind of Materials	: CYLINDER (SAMPLE #3) (28 DAYS) 15% ADMIXTURE (COCONUT SHELL AND SUGARCANE BAGASSE ASH)		
Sampled at	: JOBSITE		
Sampled by	: ELIZABETH ALIANA MENDIOLA,TRIXIA L. PARAS, MARK DAVID A. FRANCHE, JOSEPH P. TANTAMCO, RICHARD S. GAMBOA, EMEL BANTING		

CYLINDER	
1. Original Weight of Sampled, gm	992
2. Bulk Specific Gravity, (SSD)	1021
3. Weight of Oven Dry, gm	981
4. Absorption %	4.08

Test Witnessed by:

ELIZABETH ALIANA MENDIOLA

JOSEPH P. TANTAMCO

Certified Correct by:

RONEL R. MANALO

TRIXIA L. PARAS

RICHARD S. GAMBOA

MARK DAVID A. FRANCHE

EMEL BANTING

Unified Geotest Laboratory

ISSN No:-2456-2165

CURRICULUM VITAE

BANTING, EMEL PAGUIO
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Objective

Personal Information

Age: 22
Date of Birth: September 16, 2000
Place of Birth: Guagua, Pampanga
Sex: Male
Civil Status: Single
Citizenship: Filipino
Religion: Roman Catholic
Height: 6'0
Weight: 106 kg

Educational Background

TERTIARY	:Bachelor of Science in Civil Engineering
	:Don Honorio Ventura State University
	:Villa de Bacolor, Pampanga
	:2019-Present
SECONDARY	:Junior-Senior High School
	:Saint Augustine Academy of Pampanga
	:Florida Blanca, Pampanga
	:2013-2019
ELEMENTARY	:Sta. Monica Elementary School
	:Sta. Monica Florida Blanca, Pampanga
	:2007-2013

I hereby certify that the above information is true and correct to the best of my knowledge and belief.

BANTING, EMEL P.
Signature Over Printed Name

ISSN No:-2456-2165

FRANCHE, MARK DAVID ALFONSO

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Objective

Personal Information

Age: 22

Date of Birth: September 16, 2000

Place of Birth: Makabali, San Fernando, Pampanga

Sex: Male

Civil Status: Single

Citizenship: Filipino

Religion: Born Again Christian

Height: 5’10

Weight: 70 kg

Educational Background

TERTIARY	:Bachelor of Science in Civil Engineering
	:Don Honorio Ventura State University
	:Villa de Bacolor, Pampanga
	:2019-Present
SECONDARY	:Senior High School
	:Don Honorio Ventura State University
	:Villa de Bacolor, Pampanga
	:2017-2019
	:Junior High School
	:Christ In You Faith Christian Academy
	:San Fernando Pampanga

:2013-2017

ELEMENTARY :Christ In You Faith Christian Academy

:San Fernando, Pampanga

:2007-2013

I hereby certify that the above information is true and correct to the best of my knowledge and belief.

FRANCHE, MARK DAVID A.
Signature Over Printed Name

ISSN No:-2456-2165

GAMBOA, RICHARD SEVILLA

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Objective

"To secure a challenging position in a reputable organizations to expand my learnings, knowledge, and skills"

Personal Information

Age: 22

Date of Birth: August 26, 2000

Place of Birth: Lubao, Pampanga

Sex: Male

Civil Status: Single

Citizenship: Filipino

Religion: Roman Catholic

Height: 5'7

Weight: 70 kg

Educational Background

TERTIARY	:Bachelor of Science in Civil Engineering
	:Don Honorio Ventura State University
	:Villa de Bacolor, Pampanga
	:2019-Present
SECONDARY	:Junior-Senior High School
	:Santa Rita College of Pampanga
	:2013-2019

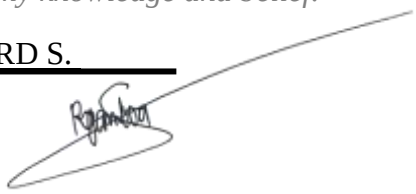
ELEMENTARY :San Basilio Elementary School

:San Basilio Sta. Rita, Pampanga

:2007-2013

I hereby certify that the above information is true and correct to the best of my knowledge and belief.

GAMBOA, RICHARD S.
Signature Over Printed Name



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MENDIOLA, ELIZABETH ALLIANA

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Email Adress: elizabethallianamendiola@gmail.com

Objective

Personal Information

Age: 22

Date of Birth: May 27, 2000

Place of Birth: Chinese General Hospital

Sex: Female

Civil Status: Single

Citizenship: Filipino

Religion: Roman Catholic

Height: 5’4

Weight: 51 kg

Educational Background

TERTIARY	:Bachelor of Science in Civil Engineering
	:Don Honorio Ventura State University
	:Villa de Bacolor, Pampanga
	:2019-Present
SECONDARY	:Senior High School
	:ST. Mary’s Academy of Guagua
	:Guagua, Pampanga
	:2017-2019
	:Junior High School
	:Diosdado Macapagal Memorial High School

:2013-2017

ELEMENTARY :Florida Blanca Elementary School

:Florida Blanca, Pampanga

:2007-2013

I hereby certify that the above information is true and correct to the best of my knowledge and belief.

MENDIOLA, ELIZABETH ALLIANA
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PARAS, TRIXIA LACISTE

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Email Adress: trixiaparas1@gmail.com

Objective

To apply the knowlege that i learned for years of studying to challenge myself to expand my skill set.

Personal Information

Age: 22

Date of Birth: July 23, 2000

Place of Birth: Calauag, Quezon

Sex: Female

Civil Status: Single

Citizenship: Filipino

Religion: Roman Catholic

Height: 5’2

Weight: 58 kg

Educational Background

TERTIARY	:Bachelor of Science in Civil Engineering
	:Don Honorio Ventura State University
	:Villa de Bacolor, Pampanga
	:2019-Present
SECONDARY	:Senior High School
	:Saint Catherine’s Academy
	:Poblacion Porac, Pampanga
	:2017-2019
	:Junior High School
	:Pulung Santol High School ANNEX
	:Poblacion Porac, Pampanga
	:2013-2017

ELEMENTARY :Sumulong Elementary School
:Sumulong Calauag, Quezon Province
:2007-2013

I hereby certify that the above information is true and correct to the best of my knowledge and belief.

PARAS, TRIXIA L.
Signature Over Printed Name

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TANTAMCO, JOSEPH PEREZ

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Email Adress: josephtantamco1@gmail.com

Objective

"To get an opportunity where I can make the best of my potential and contribute to the organization's growth"

Personal Information

Age:27

Date of Birth: July 18, 1995

Place of Birth: Guagua, Pampanga

Sex: Male

Civil Status: Single

Citizenship: Filipino

Religion: Roman Catholic

Height: 5'9

Weight: 88 kg

Educational Background

TERTIARY	:Bachelor of Science in Civil Engineering
	:Don Honorio Ventura State University
	:Villa de Bacolor, Pampanga
	:2019-Present
SECONDARY	:Santa Rita College
	:Sta. Rita, Pampanga
	:2008-2013
ELEMENTARY	:San Juan Elementary School
	:San Juan Sta. Rita, Pampanga
	:2001-2007

ISSN No:-2456-2165

I hereby certify that the above information is true and correct to the best of my knowledge and belief.

TANTAMCO, JOSEPH P.
Signature Over Printed Name