

**ASSESSMENT OF MECHANICAL PROPERTIES OF CONCRETE USING
DIFFERENT TYPES OF CEMENT AVAILABLE IN LOCAL MARKETS IN
BANGLADESH**

Submitted by

MD. Rakib Sarker

ID: 192-47-1013

Kingshuk Ray Chowdhury

ID: 192-47-1044

Md. Bodruzzoha

ID: 192-47-1049

Supervised by

JM Raisul Islam Shohag

Lecturer

Department of Civil Engineering

Daffodil International University

A Thesis submitted to the Department of Civil Engineering, Daffodil International
University in partial fulfillment of the requirements for the Degree of
Bachelor of Science in Civil Engineering



Department of Civil Engineering

FACULTY OF ENGINEERING

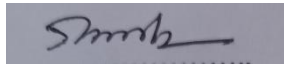
Daffodil International University

December 2022

DECLARATION

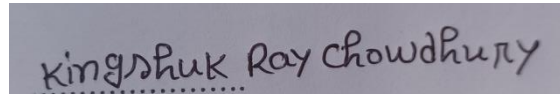
The thesis, “Assessment of Mechanical Properties of Concrete Using Different Types of Cement Available in Local Markets in Bangladesh,” was completed under the guidance of **JM Raisul Islam Shohag**, Department of Civil Engineering, Daffodil International University, Dhaka, Bangladesh,

Accepted as partial fulfillment of the requirements for the Civil Engineering Bachelor of Science. The centerpiece, to the greatest of our knowledge, does not contain any previously published or written works by others, unless appropriate citation is provided in the centerpiece proper.



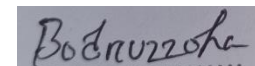
.....
Md. Rakib Sarker

ID: 192-47-1013



.....
Kingshuk Ray Chowdhury

ID: 192-47-1044



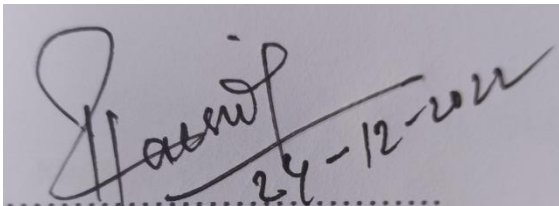
.....
Md. Bodruzzoha

ID: 192-47-1049

Certification

This is to certify that the thesis on “**Assessment of Mechanical properties Of Concrete Using Different Types of Cement Available in Local Markets in Bangladesh**”. It is the eventual record of thesis done by **Md. Rakib Sarker; ID: 192-47-1013, Kingshuk Ray Chowdhury; ID: 192-47-1044, Md. Bodruzzoha; ID: 192-47-1049** for the partial fulfillment of the requirement for the degree of **Bachelor of Science in Civil Engineering** from Daffodil International University.

The thesis titled “**Assessment of Mechanical properties Of Concrete Using Different Types of Cement Available in Local Markets in Bangladesh**”



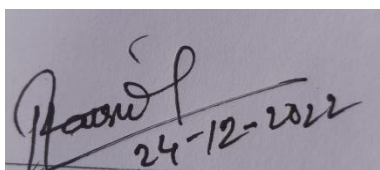
JM Raisul Islam Shohag

Lecturer

Department of Civil Engineering

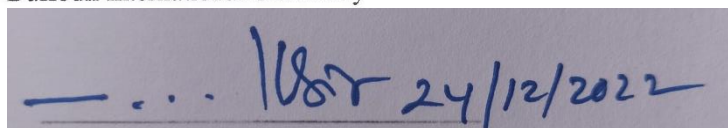
Daffodil International University

BOARD OF EXAMINERS



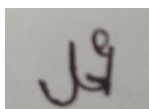
(Supervisor)

Department Of Civil Engineering
Daffodil International University



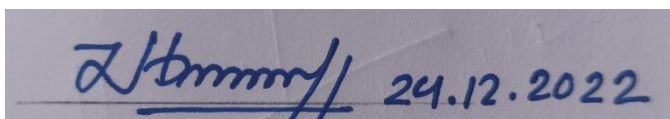
Chairman

Department of Civil Engineering
Daffodil International University



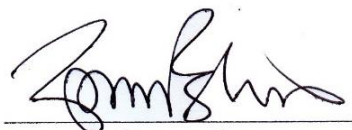
Member (Internal)

Department of Civil Engineering
Daffodil International University



Member (Internal)

Department of Civil Engineering
Daffodil International University



Member (External)

Department of Civil Engineering

**DEDICATED TO
OUR PARENTS**

ACKNOWLEDGEMENT

First of all, I would like to express my gratitude to the Almighty Allah who created us, as well as to all the individuals or organizations who have extended their hands of advice, help and cooperation to complete this work. In this context, the name to be mentioned first is our guide, **JM Raisul Islam Shohag**. Lecturer department of civil engineering. Daffodil International University who gave us the golden opportunity to do this wonderful project. Which helped a lot of research. Through which we were able to learn something new. We have been able to complete this project successfully due to his sincere help, guidance and guidance. We are very thankful to our respected parents and respected teachers of Daffodil International University and our friends who completed this research within a limited time. Helped us a lot. Finally it can be said that if this research of ours is of little use to the people of the country in view of the actual situation, then we feel that this tireless work and effort has been worthwhile.

ABSTRACT

Construction of structures in our country is increasing day by day. And we all know that a large part of the materials for building this structure is concrete, and the main component of these concrete materials is cement. The strength of concrete depends largely on the quality of this cement. We know that there are different types of cement available in the current market with different qualities, so to get high strength cement, we must have an idea of which cement to use for building structures. By doing this, the construction of the structure and its quality will definitely increase. The main aim of this study is to investigate. To find out which cement company is good for concrete. In this project, we used cement from three companies, Premier, Shah and Akiz, and made concrete cylinders of specific sizes with them. These cylinders were soaked in water for 7, 14, 28 days respectively. Then we calculated the compressive strength of each of them separately. By comparing the results obtained at seven days, we found out which cement gives more strength to the concrete, similarly, by comparing the results of 14 days, we found out which cement gives the highest strength. By comparing the results of compressive strength obtained from the last 28 days, that of concert. We found out which cement gives the highest strength. Finally we select the highest strength cement as admixture for concrete.

Keyword: Local Cement, Grade of concrete, compressive strength, workability.

Contents

DECLARATION.....	I
CERTIFICATION.....	II
BOARD OF EXAMINERS.....	III
ACKNOWLEDGEMENT.....	V
ABSTRACT.....	VI
CHAPTER 1.....	1
1.1 BASIC CONCEPT.....	1
1.2 BACKGROUND OF STUDY.....	1
1.3 SCOPE OF THIS STUDY.....	2
1.4 OBJECTIVE.....	2
CHAPTER 2.....	3
LITERATURE REVIEW.....	3
2.1 INTRODUCTION.....	3
2.2 LITERATURE REVIEW.....	3
2.3 CONCRETE.....	5
2.4 CEMENT.....	5
2.5 COMPONENTS OF CEMENT.....	5
2.6 TYPES OF CEMENT COMPANIES.....	6
CHAPTER 3.....	8
METHODOLOGY.....	8
3.1 INTRODUCTION.....	8
3.2 WHAT IS THE GRADE OF CONCRETE M10:.....	8
3.3 WHAT IS THE GRADE OF CONCRETE M15:.....	8
3.4 WATER.....	9
3.5 CEMENT.....	9
3.6 AGGREGATE.....	10

3.7 COMPRESSION TEST	10
3.8 SLUMP TEST	10
3.9 COMPRESSIVE STRENGTH TEST:	11
CHAPTER 4.....	12
RESULTS & DISCUSSION.....	12
4.1 INTRODUCTION.....	12
4.2 CALCULATION OF FM OF SYLHET (FIND AGGREGATE).....	13
4.3 CALCULATION OF FM COURSE AGGREGATE:.....	15
4.4 DISCUSSIONS	24
CHAPTER 5.....	26
CONCLUSION AND RECOMMENDATION	26
5.1 INTRODUCTION.....	26
5.2 CONCLUSION	26
5.3 RECOMMENDATION	26

TABLE

Table 1: Chemical Composition of Standard Portland cement.....	5
Table 2: Chemical Composition of Shah Cement.....	6
Table 3: Chemical Composition of Premier Cement.....	7
Table 4: Chemical Composition of Akij Cement	7
Table 5: Calculation of FM of Sylhet Sand (Fine Aggregate).....	13
Table 6: Calculation of FM Coarse Aggregate.....	15
Table 7: Concrete Compressive Strength result for 3 different cement companies after 7 days.	17
Table 8: Concrete compressive strength result for 3 different cement companies after 14 days	18
Table 9: Concrete compressive strength result for 3 different cement companies after 28 days by M10.....	19
Table 10: Concrete compressive strength result for 3 different cement companies after 7 days by M15.....	20
Table 11: Concrete compressive strength result for 3 different cement companies after 14 days by M15.....	21
Table 12: Concrete compressive strength result for 3 different cement companies after 28 days by M15.....	22

FIGURE

Figure 1: Water weight	9
Figure 2: Three types cements	9
Figure 3: Slump test of concrete	11
Figure 4: Compression Test	12
Figure 5: Particle Size Distribution Curve.....	14
Figure 6: Particle Size Distribution Curve.....	16
Figure 7: Concrete compressive strength result for 3 different cement companies after 7 days by M10.....	17
Figure 8: Concrete compressive strength result for 3 different cement companies after 14 days by M10	18
Figure 9: Concrete compressive strength result for 3 different cement companies after 28 days by M10.....	19
Figure 10: Concrete compressive strength result for 3 different cement companies after 7 days by M15.....	20
Figure 11: Concrete compressive strength result for 3 different cement companies after 14 days by M15.....	21
Figure 12: Concrete compressive strength result for 3 different cement companies after 28 days by M15.....	22
Figure 13: Concrete compressive strength result for 3 different cement companies.....	23
After 28 days by M10 and M15.....	23
Figure 14: Making molds.....	27
Figure 16: Completed molds.....	28
Figure 17: Measuring Stone sand Cement and water for concrete mixture.....	28
Figure 18: Mixing Stone sand cement and water in concrete.....	29
Figure 19: Concrete mixture	29
Figure 20: Prepared for slump test.....	29
Figure 21: Taking Slump test result.....	29
Figure 22: Leveling molds by number.....	29
Figure 23: Molds curing tank for curing.....	29

Figure 24: Lifted from curing tank 29
Figure 25: Compression test 29

CHAPTER 1

INTRODUCTION

1.1 BASIC CONCEPT

Concrete made from a combination of cement, coarse aggregates, aggregates and water is called cement concrete and is known as plain concrete. This type of concrete has high pressure resistance, so it is used where concrete has to withstand high pressure. Like bed block, thick gravity, retaining wall arch etc. We have already discussed that one of the main components of concrete is the quality of the binding material (cement), the workability of concrete depends to a large extent, Concrete is very popular in building construction because it can be easily molded into any shape. It is strong, durable and long-lasting. Non-flammable, high pressure resistance. In addition, concrete is resistant to sound heat and moisture. There are different companies of cement available in the market today. And through this projector we will make concrete blocks using three main types of cement available in the market and check its effectiveness.

1.2 BACKGROUND OF STUDY

Time is incredibly valuable in today's marketplace. Therefore, in order to complete all requirements and cut costs, we must concentrate on time work. Reduction in cost is only attainable with efficient time management and the use of new tools. Concrete is a very useful material for construction activities. Crucial roles in cost increase or decrease although there are many different varieties of concrete on the market, choosing the proper kind can save us time and money. In this project we have used cement from three companies available in the local market of Bangladesh as admixes in the concrete components. Through which the concrete mold made according to the rules is cured for a certain time and its compressive strength has been extracted respectively.

1.3 SCOPE OF THIS STUDY

The availability of concrete materials, and concrete can easily be molded into various shapes and is strong, durable and has high pressure resistance, the use of concrete is increasing day by day in the present world. Cement is an important component of concrete, it acts as an admixed of concrete, the strength of concrete depends greatly on the quality of cement. If the quality of cement is good, the strength of concrete increases. If the quality is relatively poor, the strength of concrete is relatively reduced. The main focus is to find out the compressive strength of the concrete using three types of cement in local market in Bangladesh.

1.4 OBJECTIVE

- 1) To fine out compressive strength of concrete made with different types of cement available in local market in Bangladesh.
- 2) To compare compressive strength among different types of cement available in local market in Bangladesh.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

We have already discussed that our research is mainly based on cement concrete. The ingredients of this concrete are cement, sand, and water. Cement is the main ingredient of concrete. In this research we have used cement of three main companies available in the local market of Bangladesh and reviewed them.

2.2 LITERATURE REVIEW

Many researchers were endeavoring to upheave the physical and mechanical properties of concrete sporadically. New methods and experiments are being successfully applied for revamping in the era of waste recyclable technology with proper application of the waste material in concrete as fiber material (J. M. R. I. Shohag , K. K. Islam, M. N. I. Bhuiyan, 2022)

Concrete structures are often subjected to long term static and short term dynamic loads. Due to a relatively low tensile strength and energy dissipating characteristics, the impact resistance of concrete is poor (*J. M. R. I. Shohag, S. Chowdhury, A. Hasan, 2022)

The compressive strength of cement and, consequently, its physical properties could vary as a result of variations in the raw materials, as well as in manufacturing conditions. Therefore, an experimental study has been checked out herein by investigating the mechanical and physical properties of concrete specimens by means of four different types of Ordinary Portland Cements. (Asal Soltani, Salim Khoso, Manthar Ali Keerio, Antonio Formisano, 2019)

The Compressive strength, splitting tensile strength and modulus of elasticity were investigated at 7, 14 and 28 days of curing age. The obtained results showed Diaper Hali (Indian Black Stone) is most suitable for concreting having distinguished variation in compressive strength. (Faruk Patowary, Raqib Al Mahmood, 2022)

The compressive strength of cement and, consequently, its physical properties could vary as a result of variations in the raw materials, as well as in manufacturing conditions. Therefore, an experimental study has been checked out herein by investigating the mechanical and physical properties of concrete specimens by means of four different types of Ordinary Portland Cements, namely Black Bull, Lucky, Pak Land and DG obtained from the market of Sindh Pakistan. (A. Adjrad,,* , Y. Bouafia), M. S. Kachi), and F. Ghazi, 20196)

Construction industry is focusing on creation of infrastructure like laying of roads, bridges, port development, various types of commercial and residential buildings and other development activities and this has resulted in increasing the demand for aggregates. (N S Ghadzali,M H W Ibrahim,M S H Mohd Sani,N Jamaludin,M S M Desa,Z Misri, 2018)

Concrete mixtures were prepared so that mass of cement, water cement ratio and granulometric composition have been varied. Values of the coefficient m_a/m_c in experimental research ranged between 7, 20 in concrete mixtures mixed with 250 kg of cement to 3.60 in concrete mixtures mixed with 500 kg per $1m^3$. (R. M. Salem, * A. E. Al-Salami, 2016)

2.3 CONCRETE

Concrete made from a combination of cement, coarse aggregates, aggregates and water is called cement concrete and is known as plain concrete. This type of concrete has high pressure resistance, so it is used where concrete has to withstand high pressure. Like bed block, thick gravity, retaining wall arch etc. There are four types of concrete namely lime concrete, cement concrete, reinforced cement concrete, and pre-stressed concrete. Our research is mainly based on cement concrete. As we know, the ingredients of cement concrete are cement, sand and water.

2.4 CEMENT

Cement is the general name for a powdery substance which, when mixed with water or another liquid, forms a pliable, mud-like substance, which solidifies over a period of the time to form a solid of various strengths. Cement acts as a binding material in concrete. Cement is usually made by mixing calcium and magnesium compounds into a fine powder. The required cement is available according to the type and quality of the work, it is easy to work with, and the work is more durable. Cement is used in almost all engineering constructions. Hence cement is called a superior quality binder.

2.5 COMPONENTS OF CEMENT

By mixing Portland clinker limestone (calcium carbonate, CaCO_3) with a little mud or alumina silicate (Al_2SiO_5) and heating it in a special furnace or kiln at a temperature of 1400°C or higher carbon dioxide separates from calcium carbonates. Calcium oxide is released.

Table 1: Chemical Composition of Standard Portland cement

Element Name	% of Each Elements
Clinker	97
Gypsum	3

2.6 TYPES OF CEMENT COMPANIES

We look for the best cement among the various cements available in the market.

Available everywhere and are the three best cements in Bangladesh are

1. Shah Cement: Shah Cement is a product of Shah Cement Industries, a sister concern of Abul Khair Group, a well-known and renowned company in Bangladesh. Shah cement is available in Bangladesh market since 2000. For the past 22 years, Shah Cement has maintained its position in the cement marketplace of this country with its reputation. It truly is a source of great pride to deliver the world's most technologically advanced cement products to every Bangladeshi's doorstep. With a capacity of 10 million metric tons annually, Shah Cement Industries Ltd. is the largest cement manufacturing facility in Bangladesh.

Table 2: Chemical Composition of Shah Cement

Element Name	% of Each Elements
Clinker	80-90
Lime Stone	10-20
Gypsum	0-5

2. Premier cement: Premier Cement is one of the most famous cement brands in Bangladesh. Several advertisements of Premier Cement gained popularity in the country. Premier Cement Industries Limited is the manufacturer and supplier of Premier Cement. Premier Cement located in Munshiganj, Dhaka was first marketed in 2004. My mentor, Ms. Farhana Nur Malik, has given me the assignment to write the report that follows. I had the chance to see and learn new things about how a cement firm in Bangladesh operates throughout my three months of internship employment at Premier Cement Mills Ltd. This report is a reflection of my in-depth knowledge of this company's different aspects and the cement business as a whole.

Table 3: Chemical Composition of Premier Cement

Element Name	% of Each Elements
Clinker	80-94
Lime Stone	6-20
Gypsum	0-5

3. Akij Cement: Akij Group is a reputed company in Bangladesh Akij has been expanding their business in various sectors Their walk in the market of Bangladesh since 2002 in making cement Akij has a huge factory in narayanganj, Dhaka Akij Cement is the first company in Bangladesh to manufacture cement using vertical roller machines and exports cement outside the country. One of the biggest industrial conglomerates in Bangladesh is called Akij Group. Textiles, tobacco, food and beverage, cement, ceramics, printing and packaging, pharmaceuticals, consumer goods, etc. are some of the industries covered by this conglomerate . The largest local tax payer in 2009, Akij Group paid 390 million euros in taxes, making about 2% of the country's total budget. Additionally, Akij offers services in the fields of healthcare, IT, and communications.

Table 4: Chemical Composition of Akij Cement

Element Name	% of Each Elements
Clinker	72-79
Lime Stone	21-28
Gypsum	0-5

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

In this project we have prepared a total of 54 concrete molds of specific sizes with separately prepared Premier Cement, Shah Cement and Akiz Cement as admixes among the concrete components.

3.2 WHAT IS THE GRADE OF CONCRETE M10:

M10 indicates the grade of concrete. The mixture of M10 is made up of binding material (cement) Fine aggregate (sand) course aggregate (Stone chips) in the ratio of 1:3:6 respectively.

Uses of M10: It's generally used for patio slabs, pathways and non-structural work.

Type: Domestic and commercial use.

3.3 WHAT IS THE GRADE OF CONCRETE M15:

M15 indicates the grade of concrete. The mixture of M10 is made up of binding material (cement) Fine aggregate (sand) course aggregate (Stone chips) in the ratio of 1:5:3 respectively.

Used of M15: It's generally used for pavement kier and floor blinding.

Type: Domestic and commercial.

3.4 WATER

Generally suitable for human consumption ie potable water suitable for use in concrete. The pH range of ideal water for concrete mixing should be (7.2 to 7.6), and the amount of water for this concrete mixing is calculated from the water cement ratio, and this amount of water affects the strength of concrete. We used water cement ratio of 0.68 for Grate of Concrete M10 in this project, and water cement ratio of 0.60 for M15. Through which we have taken out specific quantity of water for each work.



Figure 1: Water weight

3.5 CEMENT

We have already discussed that in this project we have used cement of three types of companies available in the market. We have used Premier Cement, Shah Cement, and Akiz Cement as cement in this project.



Figure 2: Three types cements

3.6 AGGREGATE

Another important component of concrete is aggregate. There are 2 types of aggregates.

- 1) Fine Aggregate
- 2) Course Aggregate

We have used these two types of aggregates in our project.

Fine aggregate: According to ACI Code, aggregate less than 10 mm in diameter is called fine aggregate. For example Sand. Good quality sand should be used as fine aggregate and the fineness modulus of this fine aggregate should be between 2.3 to 3.

Course aggregate: As per ACI Code, the aggregate with diameter more than 10 mm is called course aggregate. For example gravel. This particle size should be between 5 mm and 20 mm.

3.7 COMPRESSION TEST

We know that concrete can take compressive strength but not tensile strength. The compressive strength of concrete is determined by compression test. And the main objective of our project is to check the compressive strength of this concrete.

3.8 SLUMP TEST

Freshly mixed concrete should be such that it can easily move and be molded between the formwork. This quality of concrete is called workability of concrete. This workability of concrete depends on the variation of water. This workability of concrete is verified through slump test.

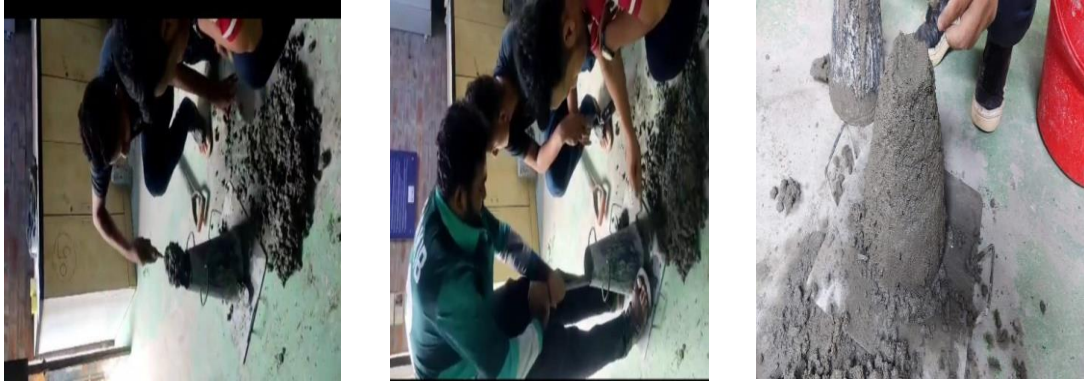


Figure 3: Slump test of concrete

3.9 COMPRESSIVE STRENGTH TEST:

The cylinder specimens we used for testing the compressive strength of concrete have a diameter of 102 mm and a length of 204 mm. And this size cylinder is used in both M10 grade of concrete and M15 grade of concrete. A total of 27 molds were made for M10, with nine for Premier Cement, nine for Shah Cement, and a total of nine molds for Akiz Cement. Similarly for M15 a total of 27 molds have been made for Premier Cement, Shah Cement and Akiz Cement. And each mold was opened from the cylinder after 24 hours of casting and cured for 7 days, 14 days and 28 days respectively, then these curing molds higher tested on Universal testing machine (UTM) and the load was noted. the compressive strength was calculated as follows:

$$\text{Compressive Strength (MPa)} = (\text{failure load} / \text{cross-sectional area})$$



Figure 4: Compression Test

RESULTS & DISCUSSION

4.1 INRODUCTION

We made a total of 54 molds with M10 grade of concrete and M15 grade of concrete and cured for 7 days, 14 days and 28 days respectively. After taking the molds out of the water after 24 hours we tested its compressive strength by Universal Testing Machine. We have reviewed them here, collecting the results of each separately. First, we compared the compressive strength obtained after 7 days from the concrete mold made with Premier cement, Shah Cement and Akiz cement, which cement gives more strength. After comparing the compressive strength obtained after 14 days from the concrete mold made with these three cements, we saw which cement gives more strength. Similarly, comparing the results obtained at 28 days, we have seen which cement gives relatively higher strength.

4.2 CALCULATION OF FM OF SYLHET (FINE AGGREGATE)

Table 5: Calculation of FM of Sylhet Sand (Fine Aggregate)

Sieve No	Opening (mm)	Mass Retained (g)	% Retained	Cumulative % Retained	Cumulative Mass Retained (g)	% Finer
1.5"	37.5	0	0	0	0	100
3/4"	19.5	0	0	0	0	100
3/8"	9.5	0	0	0	0	100
1/4"	6.3	1.71	0.17	0.17	1.71	99.83
#8	2.36	13.97	1.41	1.58	15.68	98.42
#16	1.18	83.61	8.42	10	99.29	90
#30	0.60	288.91	29.08	39.08	388.2	60.92
#50	0.30	539.79	54.33	93.41	927.99	6.59
#100	0.150	54.3	5.46	98.87	982.29	1.13
Pan		11.27	1.13	100	993.56	0
Total		993.56				

$$FM = \frac{\#8 + \#16 + \#30 + \#50 + \#100}{100}$$

$$FM = \frac{1.58 + 10 + 39.08 + 93.41 + 98.87}{100}$$

FM=2.43

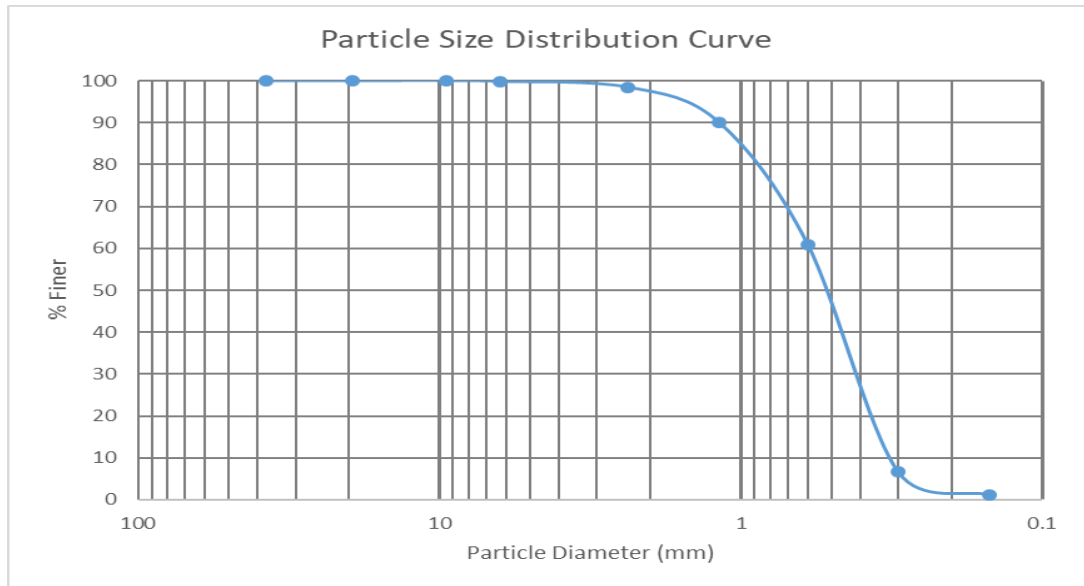


Figure 5: Particle Size Distribution Curve

4.3 CALCULATION OF FM COURSE AGGREGATE:

Table 6: Calculation of FM Coarse Aggregate

Sieve No	Opening (mm)	Mass Retained (g)	% Retained	Cumulative % Retained	Cumulative Mass Retained (g)	% Finer
1.5"	37.5	0	0	0	0	100
3/4"	19.5	83.4	8.32	8.32	83.4	91.68
3/8"	9.5	900.68	89.89	98.21	984.08	1.79
1/4"	6.3	16.21	1.62	99.82	1000.29	0.18
#8	2.36	0.33	0.04	99.87	1000.62	0.13
#16	1.18	0	0	99.87	1000.62	0.13
#30	0.60	0	0	99.87	1000.62	0.13
#50	0.30	0.15	0.01	99.88	1000.77	0.12
#100	0.150	0.36	0.04	99.92	1001.13	0.08
Pan		0.90	0.09	100	1002.03	0
Total		1002.03				

$$FM = \frac{8.32+98.21+99.82+99.87*3+99.88+99.92}{100}$$

$$FM = 7.1$$

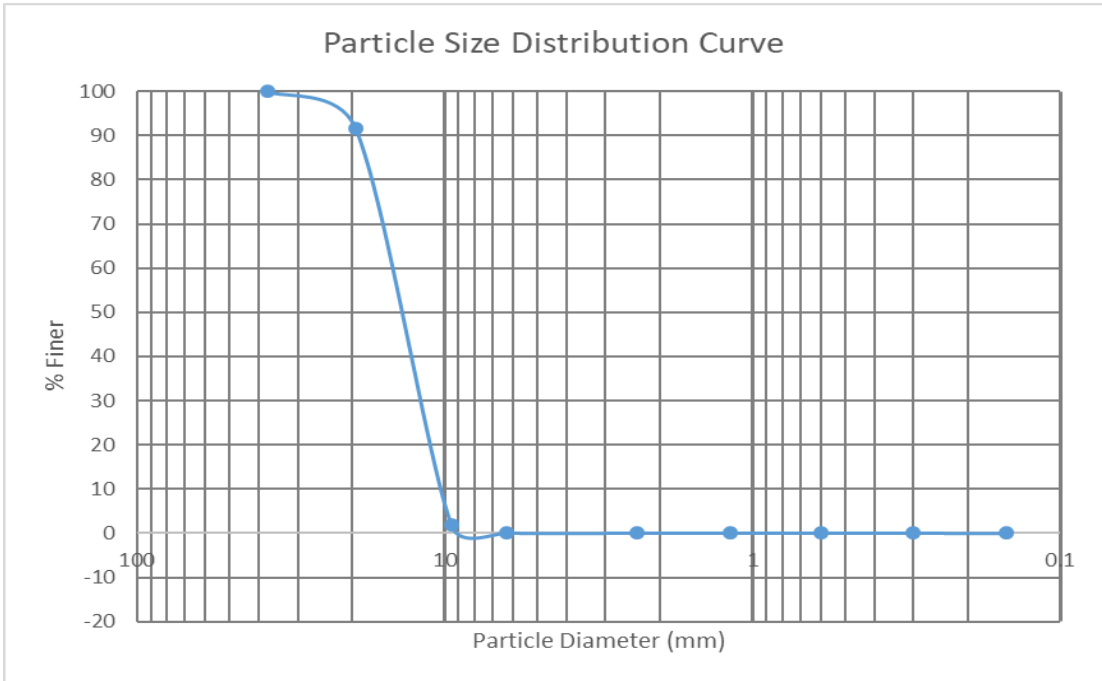


Figure 6: Particle Size Distribution Curve

M10 grade of concrete (1:3:6)

Table 7: Concrete Compressive Strength result for 3 different cement companies after 7 days.

Name of cement used in concrete	Compression load (KN)	Compression load (N)	Cylinder Dia Meter (mm)	Cylinder Area (mm) ²	Compressive Strength (N/mm ²)	Average
Premier Cement	50	50000	101	8011.8	6.24	6.53
	55	55000			6.86	
	52	52000			6.49	
AKIJ Cement	48	48000	101	8011.8	5.99	6.05
	48.5	48500			6.05	
	49	49000			6.12	
Shah Cement	49	49000	101	8011.8	6.12	6.26
	50	50000			6.24	
	51.5	51500			6.43	

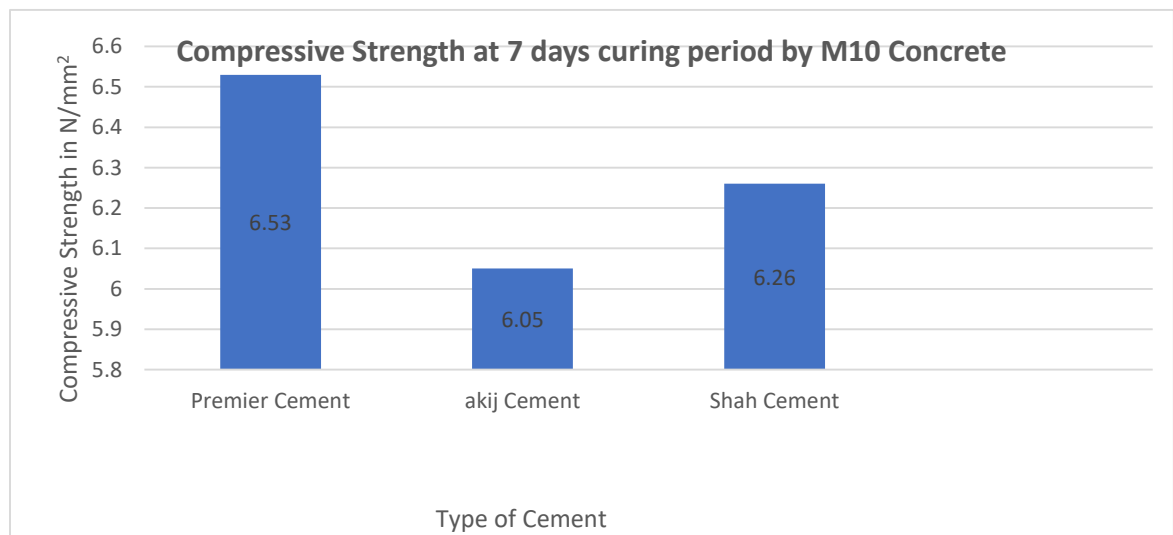


Figure 7: Concrete compressive strength result for 3 different cement companies after 7 days by M10

Table 8: Concrete compressive strength result for 3 different cement companies after 14 days

Name of cement used in concrete	Compression load (KN)	Compression load (N)	Cylinder Dia Meter (mm)	Cylinder Area (mm) ²	Compressive Strength (N/mm ²)	Average
Premier Cement	76	76000	101	8011.8	9.49	9.47
	75.5	75500			9.42	
	76	76000			9.49	
AKIJ Cement	72	72000	101	8011.8	8.99	9.09
	74	74000			9.24	
	72.5	72500			9.05	
Shah Cement	75	75000	101	8011.8	9.36	9.21
	73	73000			9.11	
	73.5	73500			9.17	

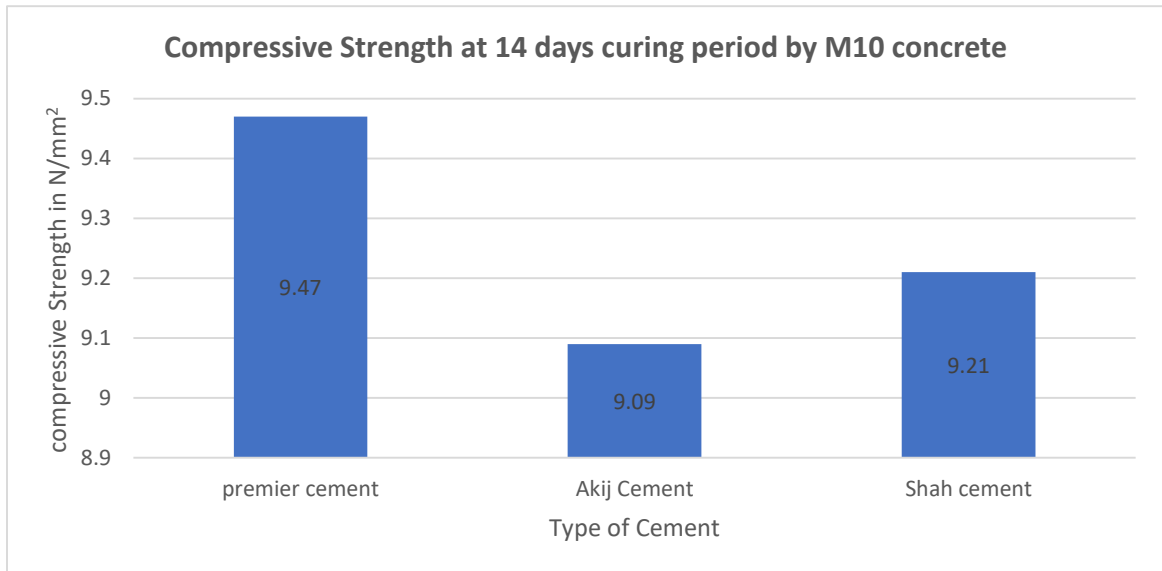


Figure 8: Concrete compressive strength result for 3 different cement companies after 14 days by M10

Table 9: Concrete compressive strength result for 3 different cement companies after 28 days by M10

Name of cement used in concrete	Compression load (KN)	Compression load (N)	Cylinder Dia Meter (mm)	Cylinder Area (mm) ²	Compressive Strength (N/mm ²)	Average
Premier Cement	99	99000	101	8011.8	12.36	12.59
	100.5	105000			13.11	
	98.5	98500			12.29	
AKIJ Cement	100	100000	101	8011.8	12.48	12.33
	98	98000			12.23	
	98.5	98500			12.29	
Shah Cement	102	102000	101	8011.8	12.73	12.58
	101	101000			12.60	
	99.5	99500			12.41	

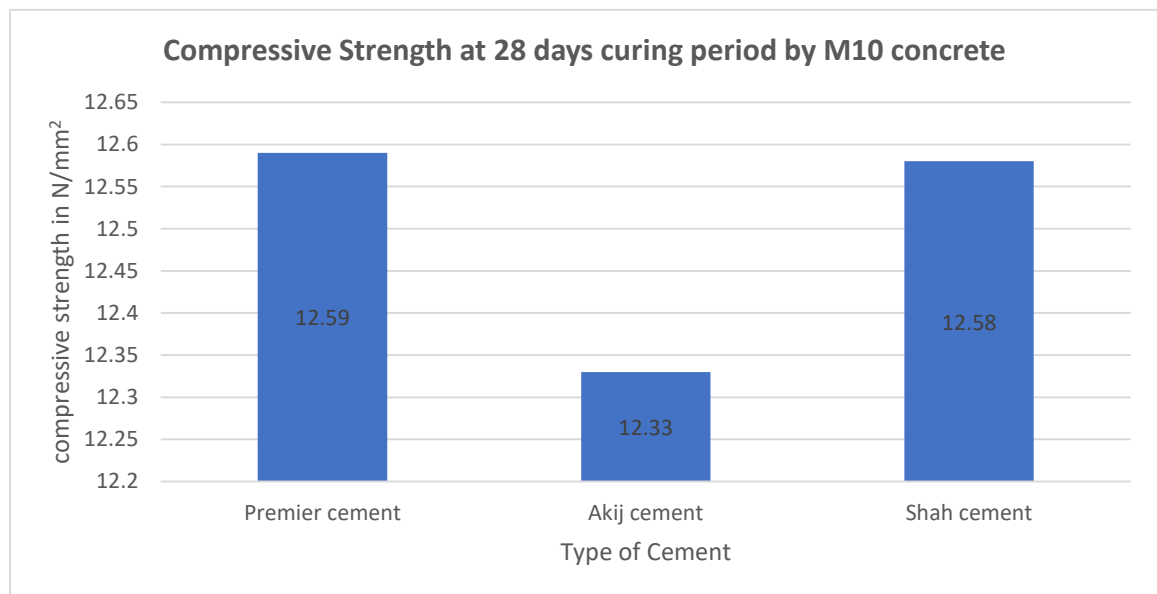


Figure 9: Concrete compressive strength result for 3 different cement companies after 28 days by M10

Table 10: Concrete compressive strength result for 3 different cement companies after 7 days by M15

Name of cement used in concrete	Compression load (KN)	Compression load (N)	Cylinder Dia Meter (mm)	Cylinder Area (mm) ²	Compressive Strength (N/mm ²)	Average
Premier Cement	65	65000	101	8011.8	8.11	8.22
	66	66000			8.24	
	66.5	66500			8.30	
AKIJ Cement	63.5	63500	101	8011.8	7.93	8.01
	64	64000			7.99	
	65	65000			8.11	
Shah Cement	67	67000	101	8011.8	8.36	8.10
	64	64000			7.99	
	63.5	63500			7.93	

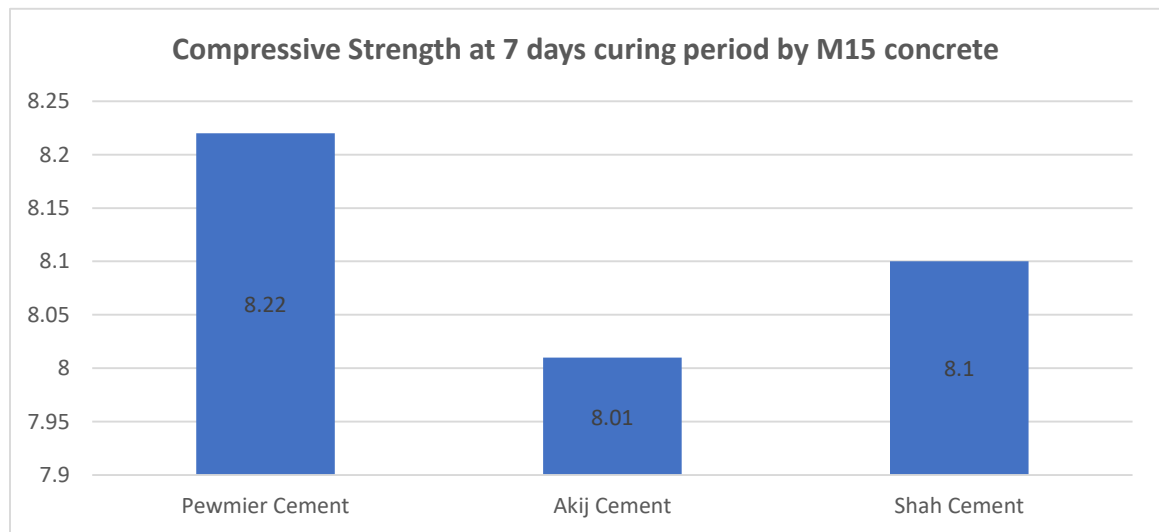


Figure 10: Concrete compressive strength result for 3 different cement companies after 7 days by M15

Table 11: Concrete compressive strength result for 3 different cement companies after 14 days by M15

Name of cement used in concrete	Compression load (KN)	Compression load (N)	Cylinder Dia Meter (mm)	Cylinder Area (mm) ²	Compressive Strength (N/mm ²)	Average
Premier Cement	91	91000	101	8011.8	11.36	11.51
	93	93000			11.61	
	92.5	92500			11.55	
AKIJ Cement	94	94000	101	8011.8	11.79	11.63
	92	92000			11.48	
	93.5	93500			11.67	
Shah Cement	91	91000	101	8011.8	11.36	11.26
	89	89000			11.11	
	90.5	90500			11.30	

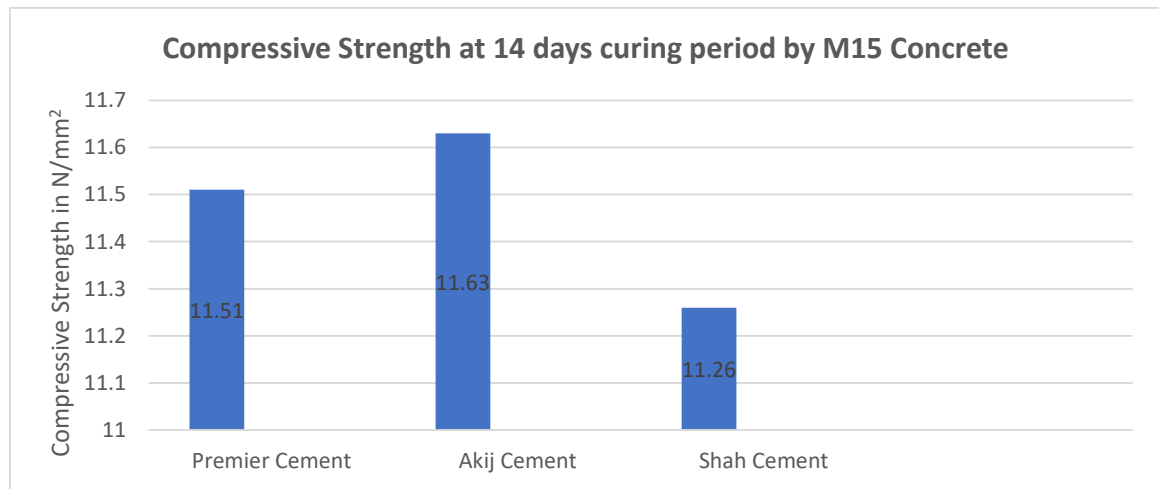


Figure 11: Concrete compressive strength result for 3 different cement companies after 14 days by M15

Table 12: Concrete compressive strength result for 3 different cement companies after 28 days by M15

Name of cement used in concrete	Compression load (KN)	Compression load (N)	Cylinder Dia Meter (mm)	Cylinder Area (mm) ²	Compressive Strength (N/mm ²)	Average
Premier Cement	118	118000	101	8011.8	14.73	14.85
	120	120000			14.98	
	119	119000			14.85	
AKIJ Cement	115	115000	101	8011.8	14.35	14.46
	117	117000			14.60	
	115.5	115500			14.42	
Shah Cement	117	117000	101	8011.8	14.60	14.54
	116	116000			14.48	
	116.5	116500			14.54	

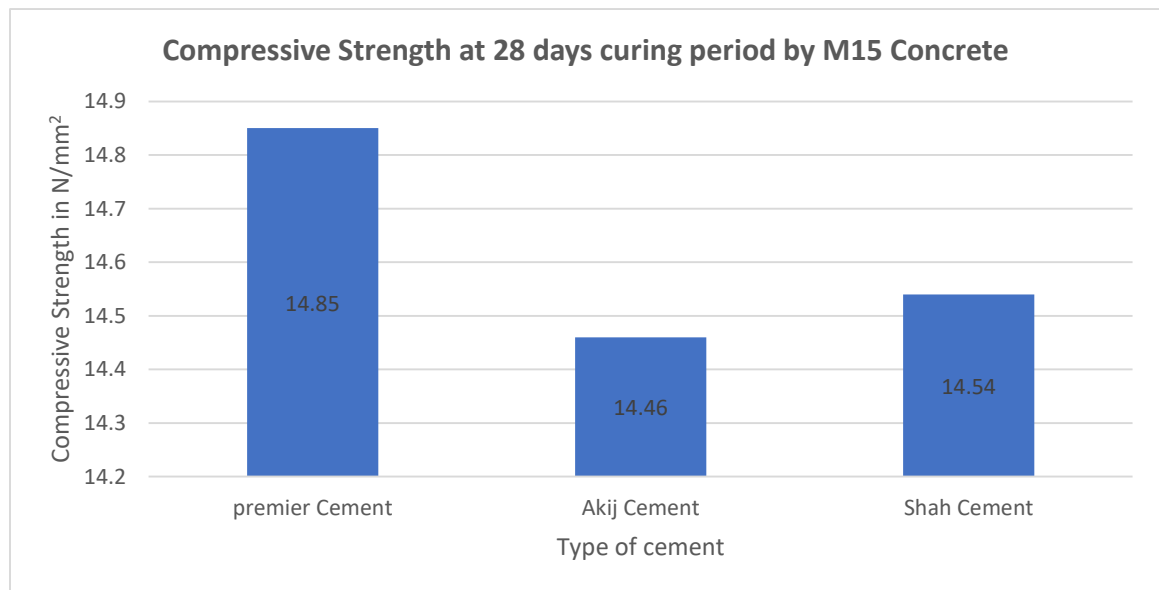


Figure 12: Concrete compressive strength result for 3 different cement companies after 28 days by M15

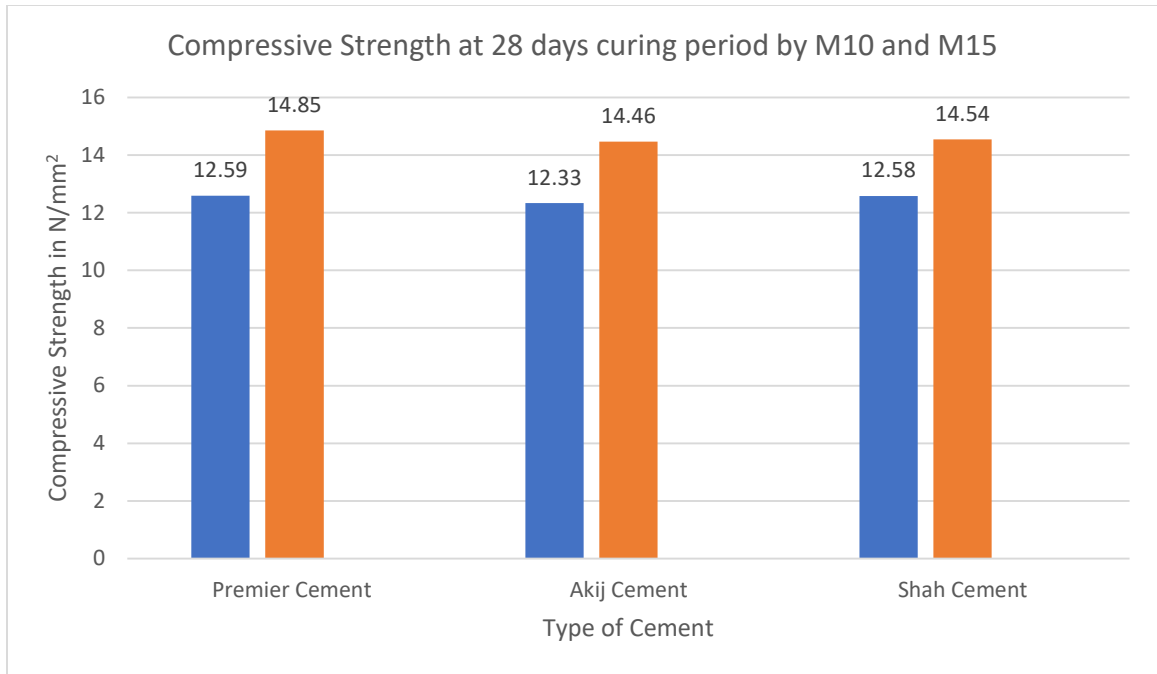


Figure 13: Concrete compressive strength result for 3 different cement companies After 28 days by M10 and M15.

4.4 DISCUSSIONS

From **Table 7: Concrete Compressive Strength result for 3 different cement companies after 7 days**. Seven days average compressive strength of concrete made with Premier, Akij, and Shah Cement for M10 is 6.53 MPa, 6.05 MPa, and 6.26 MPa respectively. If you observe here, it can be seen that the highest comprehensive strength was obtained from Premier cement, then from Shah Cement and then from Akij cement, so it can be said that comparatively, Premier cement is more effective for concrete. Then Shah Cement and then Akij Cement are fruitful for concrete.

From **Table 8: Concrete compressive strength result for 3 different cement companies after 14 days**. Fourteen days average compressive strength of concrete made with Premier, Akij, and Shah Cement for M10 is 9.47 MPa, 9.09 MPa, and 9.21 MPa respectively. If you observe here, it can be seen that the highest comprehensive strength was obtained from Premier cement, then from Shah Cement and then from Akij cement, so it can be said that comparatively, Premier cement is more effective for concrete. Then Shah Cement and then Akij Cement are fruitful for concrete.

From **Table 9: Concrete compressive strength result for 3 different cement companies after 28 days by M10**. Twenty-eight day's average compressive strength of concrete made with Premier, Akij, and Shah Cement for M10 is 12.59 MPa, 12.33 MPa, and 12.58 MPa respectively. If you observe here, it can be seen that the highest comprehensive strength was obtained from Premier cement, then from Shah Cement and then from Akij cement, so it can be said that comparatively, Premier cement is more effective for concrete. Then Shah Cement and then Akij Cement are fruitful for concrete.

From **Table 10: Concrete compressive strength result for 3 different cement companies after 7 days by M15**. Seven days average compressive strength of concrete made with Premier, Akij, and Shah Cement for M15 is 8.22 MPa, 8.01 MPa, and 8.10 MPa respectively. If you observe here, it can be seen that the highest comprehensive strength was obtained from Premier cement, then from Shah Cement and then from Akij cement, so it can be said that comparatively, Premier cement is more effective for concrete. Then Shah Cement and then Akij Cement are fruitful for concrete.

From **Table 11: Concrete compressive strength result for 3 different cement companies after 14 days by M15**. Fourteen days average compressive strength of concrete made with Premier, Akij, and Shah Cement for M15 is 11.51 MPa, 11.63 MPa, and 11.26 MPa respectively. If you observe here, it can be seen that the highest comprehensive strength was obtained from Akij cement, then from Premier cement and then from Shah Cement, so it can be said that comparatively, Akij cement is more effective for concrete. Then Premier Cement and then Shah Cement are fruitful for concrete.

From **Table 12: Concrete compressive strength result for 3 different cement companies after 28 days by M15**. Twenty-eight day's average compressive strength of concrete made with Premier, Akij, and Shah Cement for M15 is 14.85 MPa, 14.46 MPa, and 14.54 MPa respectively. If you observe here, it can be seen that the highest comprehensive strength was obtained from Premier cement, then from Shah Cement and then from Akij cement, so it can be said that comparatively, Premier cement is more effective for concrete. Then Shah Cement and then Akij Cement are fruitful for concrete.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

We have determined the compressive strength of concrete made with different types of cements available in the local markets of Bangladesh. Checked how compressive strength result. No one wants to give importance to this work, we think that everyone should give importance to this matter.

5.2 CONCLUSION

From the seven day results obtained for M10 grade of concrete we found that Premier cement, Shah Cement and then Akij cement gives comparatively higher strength. After 14 days it was found that Premier Cement, Shah Cement and Akij Cement gave more strength. Finally, the highest compressive strength at 28 days for the same grade was Premier Cement, Shah Cement, and then Akij Cement respectively.

From the seven day results obtained for M15 grade of concrete we found that Premier cement, Shah Cement and then Akij cement gives comparatively higher strength. After 14 days it was found that Akij Cement, Premier Cement and Shah Cement gave more strength.

Finally, the highest compressive strength at 28 days for the same grade was Premier Cement, Shah Cement, and then Akij Cement respectively.

5.3 RECOMMENDATION

Slump test and compressive strength test were done with three types of cement obtained from the local markets of Bangladesh, those who will work in the future will be able to do different types of experimental work using cement from different companies. We have done two experimental tasks that future workers will be able to do below Tensile Strength Test, Penetration Resistance Test, and Absorption Test.

PRELIMINARIES AND TEST FIGURES



Figure 14: Making molds



Figure 15: Mobil coating inside the cylinders



Figure 16: Completed molds



Figure 17: Measuring Stone sand Cement and water for concrete mixture



Figure 18: Mixing Stone sand cement and water in concrete



Figure 19: Concrete mixture



Figure 20: Prepared for slump test



Figure 21: Taking Slump test result



Figure 22: Leveling molds by number



©Daffodil Internatio... **Figure 23: Molds curing tank for curing**



Figure 24: Lifted from curing tank



Figure 25: Compression test

REFERENCES

1. (J. M. R. I. Shohag , K. K. Islam, M. N. I. Bhuiyan, 2022), Human Hair Waste Addition on Performance of Plain Concrete, Journal of Civil and Construction Engineering, Volume-8, Issue-2, Page 39-47,
2. (*J. M. R. I. Shohag, S. Chowdhury, A. Hasan, 2022), Assessment of Influence of Steel Fiber on the Improvement of Concrete's Mechanical Properties, DAFFODIL INTERNATIONAL UNIVERSITY JOURNAL OF SCIENCE AND TECHNOLOGY, VOLUME 17, ISSUE, Page 24-28,
3. (Asal Soltani, Salim Khoso, Manthar Ali Keerio, Antonio Formisano, 2019), Assessment of Physical and Mechanical Properties of Concrete Produced from Various Portland cement Brands, Open Journal of Composite Materials, DOI: 10.4236/ojcm.2019.94020, Page 326-338
4. (Faruk Patowary, Raqib Al Mahmood, 2022), Effect of Local Coarse Aggregate Type on Concrete Mechanical Properties in Bangladesh, International Journal of Engineering and Advanced Technology (IJEAT), Volume-11 Issue-4, Page 103-108
5. (H. M. A. Mahzuz, Mushtaq Ahmed, Jotan Dutta, Rezwanul Haque Rose, 2013), Determination of Several Properties of a Bamboo of Bangladesh, Journal of Civil Engineering Research, volume- 3, Issue 1, page 16-21
6. Zakary, M., Ahmed, M., Hogue, M. and Hanna, A., 2015. Effect of jute yarn on The mechanical behavior of concrete composites. Springer Plus, 4(1), pp.1-8.
7. (Jawad Ahmad , Osama Zaid, Fahid Aslam,Rebeca Martínez-García, Yasir M. Alharthi, 2021), Mechanical properties and durability assessment of nylon fiber reinforced self-compacting concrete, Journal of Engineered Fibers and Fabrics, Volume 16, Page 1-13
8. (Hafsa Jamshaid ,Rajesh Kumar Mishra,Ali Raza,, Uzair Hussain,Md. Lutfor Rahman, 2022), Natural Cellulosic Fiber Reinforced Concrete: Influence of Fiber Type and Loading Percentage on Mechanical and Water Absorption Performance, MDPI stays

neutral with regard to jurisdictional claims in published maps and institutional affiliations, Volume page 1-17.

9. (Asal Soltani, Salim Khoso, Manthar Ali Keerio, Antonio Formisano, 2019), Assessment of Physical and Mechanical Properties of Concrete Produced from Various Portland cement Brands, Open Journal of Composite Materials, issue 2019, 9, volume page 327-337

10 (Development and assessment of cement and concrete made of the burning of quarry by product, 2021), Development and assessment of cement and concrete made of the burning of quarry by product, development and assessment of cement and concrete made of the burning of quarry, issue 2021:15, Volume page 3708-3721

11. (Zoran Grdić, Gordana Topličić Čurčić, Nikola Stojić, 2010), CONCRETE AGGREGATE AND CEMENT MASS CONTENT EFFECTS ON COMPRESSIVE STRENGTH, Architecture and Civil Engineering, Issue 1. 8, No 4, 2010, volume page 413 – 423

12. (R. M. Salem, * A. E. Al-Salami, 2016), Preparation of Waste Paper Fibrous Cement and Studying of Some Physical Properties, Civil and Environmental Research, ISSN 2225-0514, volume page 43-54

13. (N S Ghadzali, M H W Ibrahim, M S H Mohd Sani, N Jamaludin, M S M Desa, Z Misri, 2018), Properties of concrete containing different type of waste materials as aggregate replacement exposed to elevated temperature, IOP Conf. Series: Earth and Environmental Science, issue -1315/140/1/012139, Volume page 1088/1755.

THE END