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THE EFFECT OF ADDING WATER TO PYROLYSIS CARBON BLACK (PCB) CONCRETE

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I OBJECTIVES



OBJECTIVES

This project aims to study the effect of gradually increasing the ratio of water to cement in certain proportions while maintaining the percentage of carbon in the mixture and reducing its cost in terms of production. The specific objectives of this project include the following:

- 1 Verify its ability to maintain the carbon content of the mixture.*
- 2 Determination of the mechanical properties of concrete when adding water to it*
- 3 Verifying the best percentage of water added to the concrete that would lead to a reduction in the compressive strength of the concrete*

LITERATURE REVIEW

S.B.singh

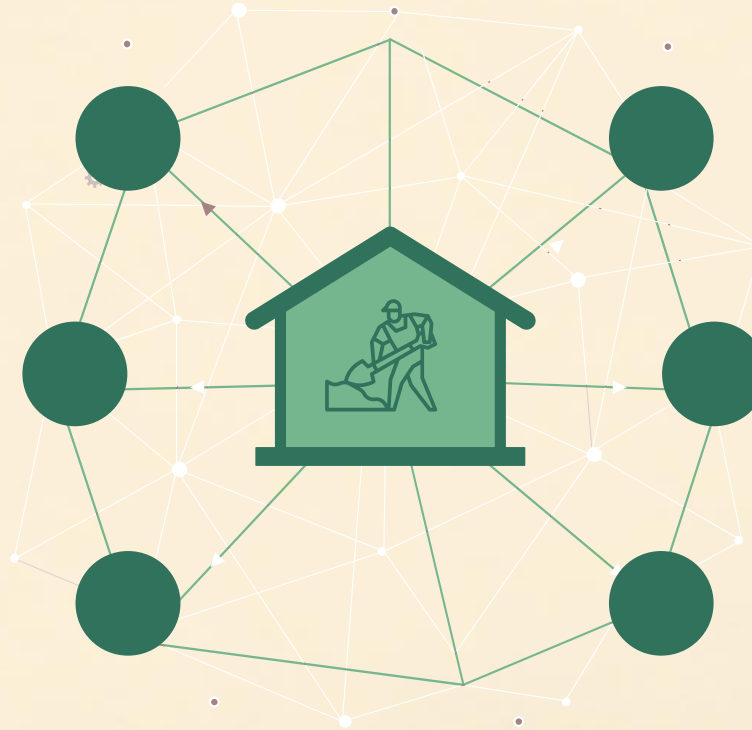
- $w/c = 0.5 - 1.2$
- $C.S = 22.5 - 15.35$
- Ordinary Portland cement

Nyista Samson

- $w/c = 0.4 - 0.6$
- $C.S = 22.5 - 15.35$
- Ordinary Portland cement & burnt bricks

Dr.M.B.varma

- $w/c = 0.5 - 0.6$
- $C.S = 31.26 - 18.22$
- Variable (decreasing) quantity of ordinary Portland Cement (0.6 - 0.5)



Adeyami, A.o

- $w/c = 0.45 - 0.6$
- $C.S = 30 - 22$
- Slump = .4 - 1.6 cm
- Ordinary Portland cement & palm kernel shell

Male inflorescence

The male date palm yields flowers that produce the pollen

Kernel

- Represent 10% of palm fruit waste
- Used in cosmetics, as it reduces the visible signs of aging



III

METHODOLOGY



METHODOLOGY

*preparing the
concrete sample*

*Mechanical
testing*

Take a result



*preparing the concrete
sample*



preparing the concrete sample



Cement
(3.706 kg)



Sand
(3.578kg)



carbon
(4% constant)





1-W/C(0.54-0.63)
2-super j7(2%)





Aggregate
D=18-25 mm(7.66kg)
D = 7-17 mm (3.83 kg)
D= 1-6 mm (9.458kg)



Mechanical testing



***The aim of Mechanical testing :
is used to determine the
specific mechanical
properties of a material in a
given environment***



Mechanical testing

For the Mechanical testing in the concrete there are four tests The precision results of these tests is used to determine suitability of materials for the field application

- Compressive strength test**
- Friction test**
- Water adsorption test**
- Slump test**



Compressive strength test

A compressive strength: is the maximum compressive stress that under a gradually applied load a given solid material will sustain without *fracture*

The formula of compressive stress:

$$\text{Compressive strength} = \frac{\text{Ultimate load (N)}}{\text{mm}^2} = \text{MPa}$$



Friction test

is a force that opposes motion between two surfaces that are in contact caused corrosion of the body

$$F_{\text{friction}} = \frac{m_i - m_f}{m_i} * 100\%$$

Where m_i is mass before friction and m_f is mass after friction.

Slump test

1. *Slump test: or slump cone test is to determine the workability or consistency of concrete mix prepared at the laboratory or the construction site during the progress of the work.*

1 -The decrease in the height of the center of fallen concrete is called slump.

2 -Slump is measured by placing the cone directly next to the sloped concrete and the heating rod is placed over

the cone so that it must also come over the area of the sloped concrete

3 - The measurement is made by a ruler (cm).



Water adsorption

Water absorption of concrete: the test procedure consists of drying the sample to a constant weight, weighing it, immersing it in water for a specified period of time, and then weighing it again

After the concrete samples were immersed in a waterway for 7 days, they were removed from the waterway to dry as required and well.

Until the concrete is completely dried, the samples are placed in a dry oven at 110 C after 28 days, and we use a digital scale to weigh the concrete after continuous drying, and this process is called drying of the concrete.

After complete drying of the samples, the concrete cubes are immersed in water for 48 hours, then removed and the surface is dried after weighing and wetting. This process is called wet concrete.

$$\text{Adsorption test} = \frac{\text{Wet} - \text{Dry}}{\text{Dry}} * 100\%$$



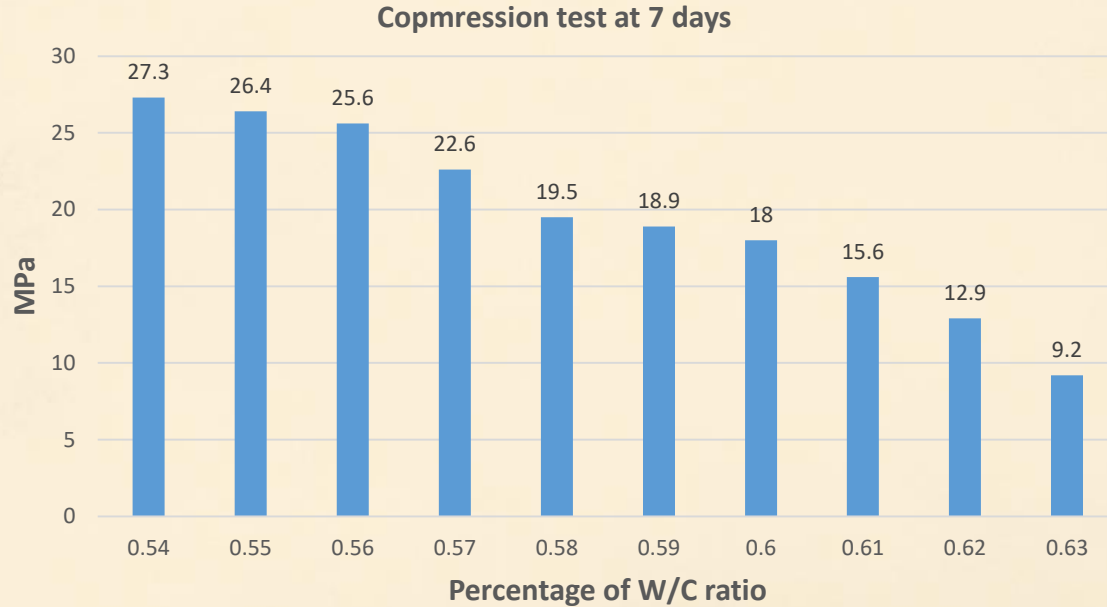


Results



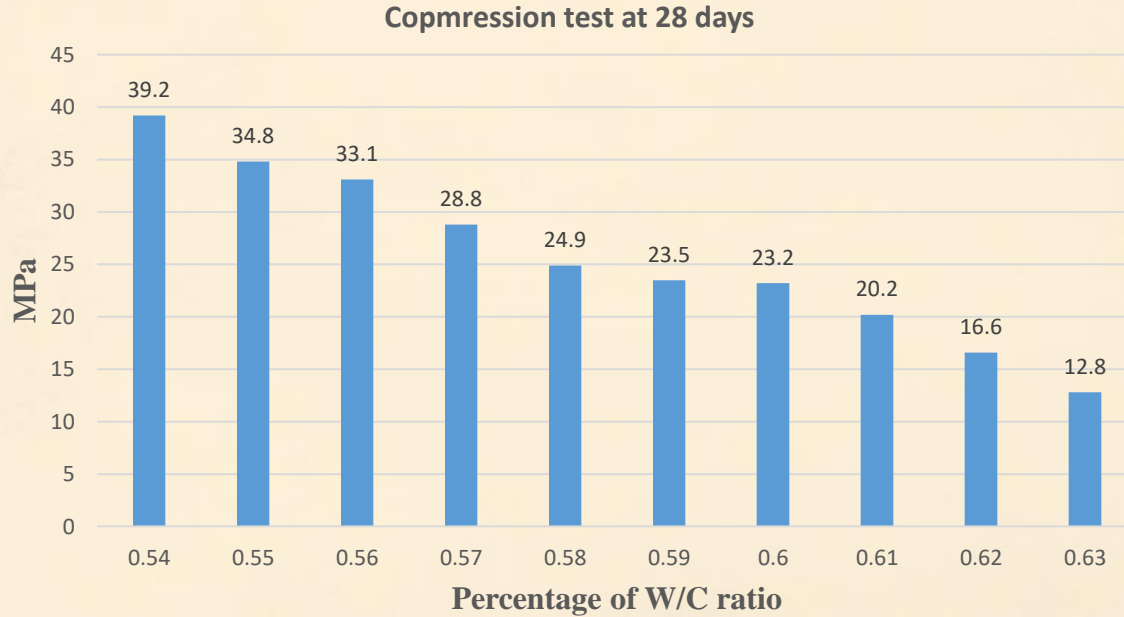
Results

1. Compressive strength test:
 - Compression test at 7 days



RESULTS



- Compression test at 28 days





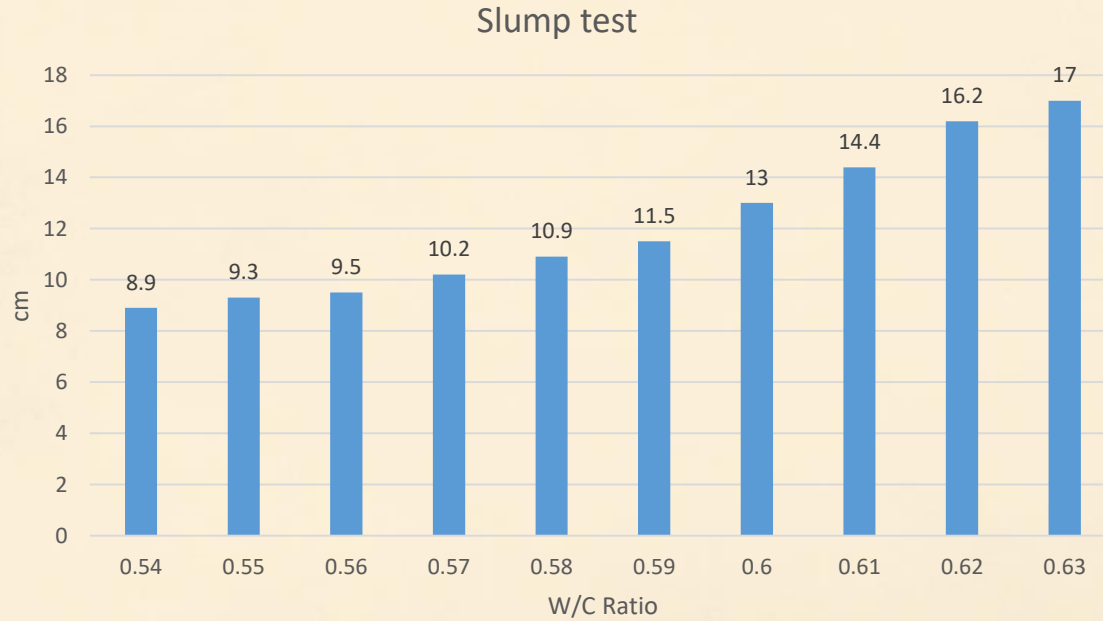
RESULTS



1. When the water/cement ratio increase the compression stress decrease.
 2. The results show that at (0.54 and 0.63) w/c the compression stress was 27.3 MPa and 9.2 Mpa at 7 day.
 3. The minimum desired value for 7 days of 22 MPa was 0.57 w/c of 22.6 MPa.
 4. However, the w/c of 0.54 and 0.63 have compression stress of 39.2 MPa and 28.8 Mpa at 28 day
 5. The desired minimum compression stress of 30 MPa for 28 days should be with the range between 0.56 to 0.57 (33.1MPa -28.8MPa) respectively.
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RESULTS

2. Slump test





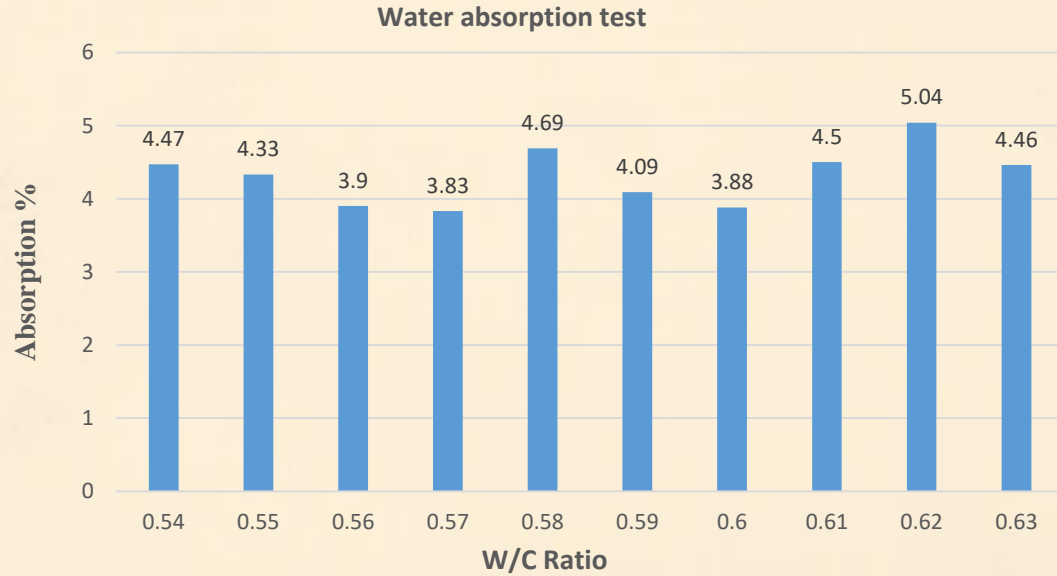
RESULTS

1. The optimal value for a slump test is between 7-12 cm
2. The w/c that meet the standard value of slump was range between (0.54 to 0.59) with values of (8.9 cm to 11.5 cm)



RESULTS

3. Absorption test





Results





1. The figure indicates that the minimum and maximum values of water absorption was 0.57 and 0.62 of absorption values of 3.83% and 5.04% respectively.
2. The optimal value for a absorption test is between 3 - 4 %





CONCLUSIONS

1. The minimum desired value for 7 days of 22 MPa was 0.57 w/c of 22.6 MPa.
 2. However, the w/c of 0.54 and 0.63 have compression stress of 39.2 MPa and 28.8 Mpa at 28 day
 3. the desired minimum compression stress of 30 MPa for 28 days should be with the range between 0.56 to 0.57 (33.1MPa -28.8MPa) respectively.
 4. The w/c that meet the standard value of slump was range between (0.54 to 0.59) with values of (8.9 cm to 11.5 cm)
 5. The figure indicates that the minimum and maximum values of water absorption was 0.57 and 0.62 of absorption values of 3.83% and 5.04% respectively.
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THANKS

