

# ANALYSIS OF CRUSHED PALM KERNEL SHELL AND LOCALLY SOURCED COARSE AGGREGATES

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**Abstract** - This examination paper is centered around the investigation accomplished for the incomplete supplanting of coarse total with palm portion shell (PKS) in concrete and subsequently creation of lightweight cement. Palm bit shell is a waste and in this way by utilizing it condition cordial cement is created. For the development of cement, the materials which utilized are concrete, sand, coarse total and palm bit shell. The proportion of these materials are 1: 1.5: 3 by volume group and the component of the 3D square is 150mm x 150mm x 150mm and the size of coarse total which is utilized are passed by 16 mm sifter and held on 12.5mm strainer. At that point the incomplete substitution of coarse total is finished by 10%, 13%, 15%, 20%, and 25% and the testing of the solid shape is done on 7days, 14days, and 28days. This test gives the thought regarding the conceivable measure of weight decrease of cement without vigorously influencing the quality of cement.

**Key Words:** : Palm Kernel Shell, gravel aggregates, compressive quality, rock total, stone chips, and so on.

## 1. INTRODUCTION

India is Developing nation, and for the ceaseless development, we need constant turn of events and the main factor for the improvement is framework. Structural designing is tied in with developing, overseeing and keeping up the foundation that bolsters present day society including structures, spans, streets, burrows, dams, and so on. This whole Infrastructure includes a lot of solid which is expensive and its expense is expanding step by step. Along these lines, in this exploration paper, we show the creation of Lightweight Concrete and Cost viable Concrete.

As development segment is driving the turn of events and simultaneously we additionally are the main source of condition aggravation and contamination, so we likewise must be a pioneer in sparing nature by utilizing the waste material for development purposes. By utilizing this it makes less mischief or no damage the earth. Thus, this exploration paper talks about the utilization of palm portion shell as incomplete substitution of coarse totals. The solid which is delivered is Cost successful as the particular gravity of palm piece shell is low when

contrasted with other accessible coarse total [1] and can be utilized in building development likewise, it is additionally lightweight cement [2,3]. Palm part is a material which can be handily found and have a ton of employments both monetarily and mechanically. In Industries it is utilized for the creation of Palm Oil. (In India Palm oil industry is arranged in Kerala and is ceaselessly growing).So, we can discovered Palm Kernel shell as financially and Industrial waste. The fundamental point of this analysis is to deliver lightweight concrete and affordable cement by utilizing the ecologically neighborly technique and hence adding to the security of the earth.

## 1.1 MATERIALS AND METHOD

The materials used in this experiment are Cement, Sand, Coarse Aggregate, Palm kernel shell (PKS).

**CEMENT:** The cement is used in this experiment is ordinary Portland cement and is locally available and is as per the requirement of Indian Standard Code.

**COARSE AGGREGATE:** Granite is used as coarse-aggregate and it is available in local market and of size 16mm is used for the experiment.

**SAND:** Sand is available locally and used.

**PALM KERNEL SHELL:** Palm kernel shell is a waste, which is available locally and for the large amount it is available in Kerala in Indian.



Fig. 1. Palm kernel shell.

1.2 TESTING OF MATERIALS

Testing is done on the materials which are used like cement, sand, and aggregate to check the standard.

A. Casting of Cubes

The Cube is being cast in the dimension of 150mmX150mmX150mm and the volume-batched mix of 1: 1.5: 3 of cement, sand and aggregate is used, as batched by volume performed better than batched by weight and the coarse aggregate of 16mm size is used.

B. Testing of Cubes

The mold is open after 24 hours of casting and kept for 7, 14, and 28 days for curing. The testing of the cube is done on the compression testing machine in the laboratory of civil engineering department, Lucknow and all the reading should be recorded



Fig. 2 Compressive testing machine.

C. Abrasion Value Test

Abrasion test is done with the help of Los angel’s abrasion testing machine and The outcome which is gain by the test is appeared in table

Table 1.

TABLE-1 ABRASION VALUE OF AGGREGATE

S No.	Wt of dry sample gm W1	Wt of portion passing 1.7 mm sieve gm W2	Abrasion Value %
1	5000	1635	32.7

C. Testing of Sand

1) Bulking of Sand

The outcome which is gain by the test is appeared in table

TABLE-2 RESULT OF BULKING TEST

S No.	Height of Loose Sand (h)	Height of Saturated Sand (h')	Pore Bulking
1	11	10.8	1.8%

2) Silt Content

The outcome which is gain by the test is appeared in table

TABLE -3 SILT CONTENT OF SAND

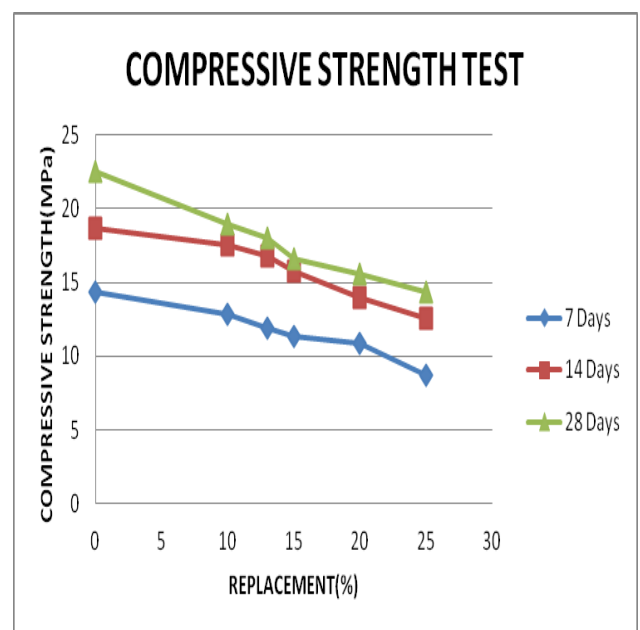
S No.	Volume of Sample (v) ml 1	Volume of silt after three hr (v) ml 2	Percentage Silt
1	400	20	5

D. Compressive Strength

The results which we get from the compression testing machine by crushing the cubes after curing are presented in Table 4.

TABLE -4 COMPRESSIVE STRENGTH OF CONCRETE

% Partial Replacement	Compressive Strength at different No. of Days in Curing Tank (MPa)		
	7 days	14 days	28 days
0	14.3	18.65	22.5
10	12.8	17.5	18.95
20	10.9	14	15.55



### 3) Sieve Analysis

Various composition passing through various IS Sieve is shown in table 5.

TABLE-5 SIEVE ANALYSIS

IS Sieve	Weight of Soil Retained (gm)	Cumulative Weight Retained (gm)	Cumulative Weight Retained as % of Total Sand	Cumulative % Passing as % of Total Sand
2mm	113	113	28.25	71.75
1mm	162	275	68.75	31.25
600u	18	293	73.25	26.75
425u	82	375	93.75	6.25
300u	20	395	98.75	1.25
150u	2	397	99.25	0.75
75u	1	398	99.55	0.45
Pan	1	399	99.75	0.25

Fig. 3 shows the percentage of various particle size of sand present in the sample of the sand used for the testing. the result shows that the aggregate and cement are of Indian standard as per IS

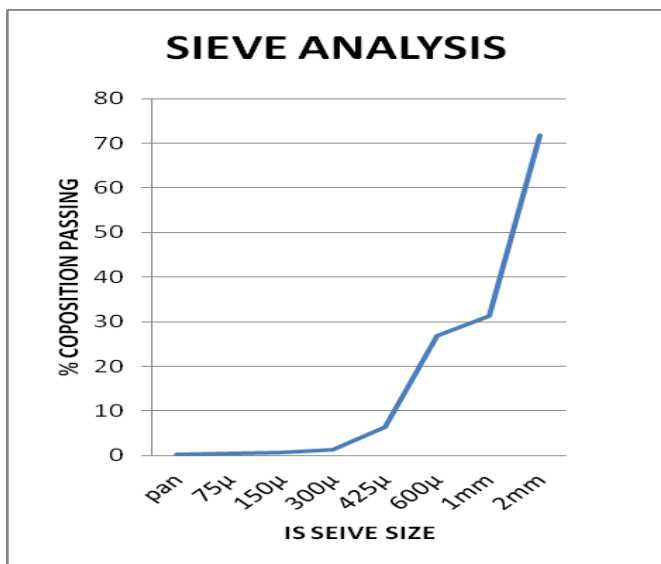


Fig. 3. Graph of sieve analysis.

## 2. RESULT AND DISCUSSION

Testing of materials is accomplished for checking the norm of materials and whether it is as indicated by Indian norm or not and reasonableness of materials for tests.

### A. Testing of Cement

The aftereffect of the fineness test performed on the concrete is appeared in table 1.

#### 1) Fineness of Cement

The result of the fineness test performed on the cement is shown in table 1.

TABLE-1 FINENESS OF CEMENT

S No.	Weight of Sample (g)	Weight of residue (g)	fineness	percentage
1	100	4.2	0.042	4.2%
2	100	3.7	0.037	3.7%
3	100	3.2	0.032	3.2%

The average value of fineness of cement is 3.7%.

#### 2) Consistency Value

The outcome gets by this test is appeared in Table.

TABLE-2 CONSISTENCY OF CEMENT

S No.	Weight of Cement	% of water	Quantity of water	Penetration of plunger
1	400 g	28	112	7
2	400 g	26	104	6

### B. Testing of Aggregate

#### 1) Water Absorption Test

Water Absorption of coarse total is done and the outcome is appeared in table 3.

TABLE-3 RESULT OF ABSORPTION TEST

S No.	Weight of Dry Aggregate gm(W1)	Weight of Saturated Aggregate gm (W2)	Water Absorption gm (W2-W1)
1	2000	2010	10

2) Impact Value Test

Result gain by this test is shown in table 4.

TABLE-4 RESULT OF IMPACT VALUE TEST

S No.	Wt of Aggregate gm w1	Wt of aggregate passing through 2.36 mm sieve gm w2	Impact value %
1	700	60	8.57

3) Crushing Test

The crushing value of aggregate is shown in table 5.

TABLE-5 CRUSHING VALUE OF AGGREGATE

S No.	Wt of Aggregate gm W1	Wt of Aggregate passing 2.36 mm sieve gm W2	Crushing Value %
1	2500	575	23

4) Abrasion Value Test

Abrasion test is done with the help of Los angel's abrasion testing machine and the result is presented in Table 6.

TABLE-6 ABRASION VALUE OF AGGREGATE

S No.	Wt of dry sample gm W1	Wt of portion passing 1.7 mm sieve gm W2	Abrasion Value %
1	5000	1635	32.7

3. CONCLUSIONS

- With the expanding, the level of palm portion shell in concrete, the compressive quality, cost and weight of the solid declines all the while.

At around 10% halfway supplanting of coarse total with palm part shell in solid gives a noteworthy decline in cost and weight of the solid absent much by way of influencing the compressive quality of cement.

- There is a huge extent of making the development natural agreeable by supplanting the development material with squander.

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