

# Affect on mechanical properties of Concrete By Using Recycled Coarse Aggregates

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**Abstract**— Mortar is one of the important part in brick masonry. The strength of mortar depends on the cement and sand properties, however the construction industry is increasing making extensive demand of this material and is feared to accommodate the many requests at one time. The test were conducted by partials replacement of Kota stone slurry with sand of 25%, 50%, 75% & 100% for 1:3 mix ratio for mortar. One more experimental are done in which 100% sand are replace by 66.66% of Kota stone and 33.33% of fly ash are used.

## INTRODUCTION

After histrionic development about society on the earth one consisting necessary substance need of human being is the shelter, considering power chance to passes the different type of modification as with the help the commonly available subject, matter comes into existence concrete. Additionally mortar are also histrionic and most used material in the system of Epithetical structures, road and other remaining infrastructure. There's an days of industrial explosion so as the demand is exactly expanding as long as population increases and modernity is morden way related to mankind, availability of supplies is reducing, and natural resources are exhausting at a very rapid rate, so the people are panic about their future effort.

**Objectives of the Study-** The fundamental motive of this work of art is to change moderate mortars by using particular mortars and achieve a beneficial operation of Kota stone slurry. This challenge describes the recession in use of exclusive mortars containing Kota stone slurry.

## EXPERIMENTAL PROGRAM

### 2.1 MATERIAL CHARACTERISATION

#### 2.1.1 Cement

Portland cement is used in the first series and then pozzolana portland cement is used to economize the mortar. The quality of cement is judged by doing several tests on cement like consistency test, specific gravity test, initial setting time and final setting time. Initially, our aim was not to replace the cement and used OPC cement but later seeing the positive results OPC is superseded by PPC and a portion of cementations content is replaced by Kota stone slurry. Cement used must be free from any lumps and should be in good condition. (Indian Standard 2000).

#### 2.1.2 Water

As per IS code 10262:2009 water used for the drinking purpose can be used for the making of concrete and mortar.

#### 2.1.3 Fine Aggregates

Natural sand is used as a fine aggregate in the mortars these are the river sand generated in the river along with the flow of water due to depletion of rocks and river bed mortar. Sands are classified in different zones as per fineness modulus and percentage finer as per the Indian standards. (Indian Standard 2000)

#### 2.1.4 Kota stone slurry

Kota stone slurry is a fine powder form of Kota stone cutting and polishing waste taken from Jhalawar and Kota district of Rajasthan. before using it in mortar Kota stone slurry was tested for its physical and chemical property, and it is found that Kota stone slurry have suitable property to be used as a construction materials ingredients.

#### 2.1.5 Fly ash

It is industrial waste generated in the thermal power plants in huge amount which is unutilised and dangerous for the environment because of its fine sizes.

### 2.2 Development of Mortar proportion

After doing a study on the conventional mix proportion (1:3) with the replacement of sand with Kota stone slurry and getting good results regarding tensile, compressive and water absorption, it comes into mind to make some new proportions which will be suitable for different works as per the requirement.

- Control mix Mortar (1:3) (cement: sand (100%): Kota stone (0%))
- Replacement 25% of Kota Stone (cement: sand (75%): Kota stone (25%))
- Replacement 50% of Kota Stone (cement: sand (50%): Kota stone (50%))
- Replacement 75% of Kota Stone (cement: sand (25%): Kota stone (75%))
- Replacement 100% of Kota Stone (cement: sand (0%): Kota stone (100%))
- Replacement 100% of (cement: sand (0%): Kota stone (66.66%): fly ash (33.33%))

**2.2.1 Proportions and materials weight .**

Partial replacement of Sand with Kota stone slurry. And kota stone slurry are replaced by fly ash.

Table - Proportions and weight of materials taken per batch`

S. No	Proportions	Cement (kg)	Sand (kg)	Kota stone slurry (kg)	Water/cement	fly ash (kg)
1	control mix	1.59	5.697	0.000	0.72	0.00
2	R25	1.59	4.178	0.980	0.74	0.00
3	R50	1.59	2.840	2.000	0.78	0.00
4	R75	1.59	1.59	1.59	0.90	0.00
5	R100	1.59	0.00	3.90	1.00	0.00
6	R100 (fly-ash +Kota stone)	1.59	0	2.62	0.90	0.96

**2.3 TESTING OF SPECIMENS**

**2.3.1 Material test**

**2.3.1.1 Sieve analysis of fine aggregate**

Before using fine aggregates in mortar sieve analysis is done which is shown in this table;

Sieve size	Percentage passing
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4.75	100
2.36	98.9
1.18	91
600µ	67.78
300µ	13
150µ	0.79
75µ	0.13
Pan	00

**2.3.1.2 Bulk density of fine aggregates**

Table - Bulk density of fine aggregates

Weight of sample and container	8.617	Kg
Weight of container	3.50	Kg
Weight of sample	5.217	Kg
Volume of container	0.00303	cum
Uncompact bulk density	1688.77	Kg/m <sup>3</sup>

**2.3.1.3 Bulk density of Kota stone slurry**

Table - Bulk density of Kota stone slurry

Weight of sample and container	7.004	Kg
Weight of container	3.50	Kg
Weight of sample	3.514	kg
Volume of container	0.00303	cum
Uncompact bulk density	1156.43	Kg/cum

**2.3.2.1 Result and Analysis**

The table below shows the water absorption test results.

proportion (1:3)	Water cement
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	ratio
control mix	0.74
Replacement 25%	0.73
replacement 50%	0.68
replacement 75%	0.81
replacement 100%	1
Fly-ash and Kota stone	0.95

replacement 75%	7.1	10.2
replacement 100%	7.3	10.9
Fly-ash and Kota stone	7.5	13.2

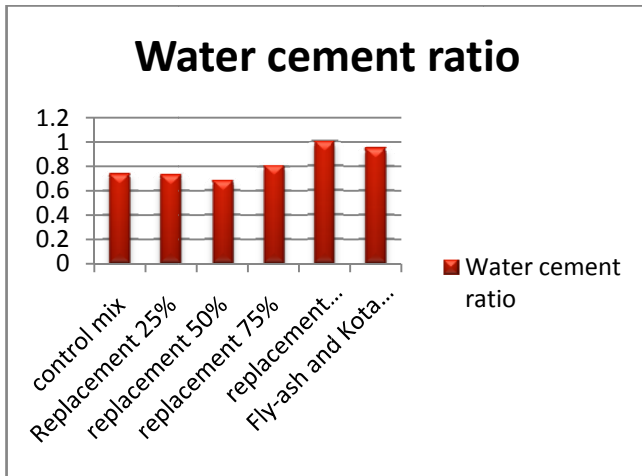


Figure - water cement ratio

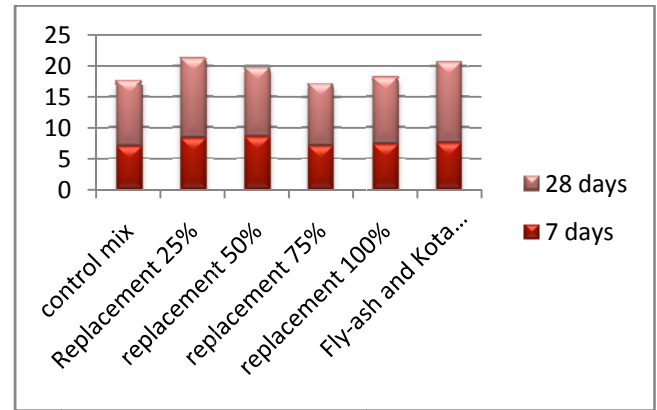


Figure -compressive strengths for different proportions.

### 2.3.3 Compressive strength

#### 2.3.3.1 Compressive strength Test Result and Analysis

The compressive strength of specimens after seven days and 28 days is given in the following table.

Table - Different proportions and their compressive strength .

Proportion (1:3)	7 days	28 days
control mix	7	10.7
Replacement 25%	8.3	13
replacement 50%	8.5	11.32

### 2.3.4 Tensile strength test

Table- different proportions and their tensile strength

proportion (1:3)	Tensile strength(Mpa)
control mix	0.677
Replacement 25%	0.718
replacement 50%	0.621
replacement 75%	0.504
replacement 100%	0.497
flyash and Kota stone	0.515

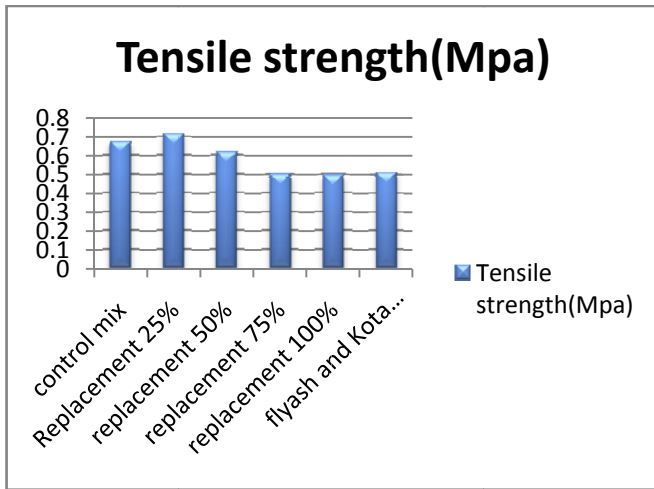


Figure- Graph showing tensile strength for different replacements .

**2.3.5 Water absorption test**

The table below shows the water absorption test results.

Proportion (1:3)	Percentage
control mix	5.2
Replacement 25%	5.45
replacement 50%	11
replacement 75%	13.2
replacement 100%	13.98
Fly-ash and Kota stone	12.45

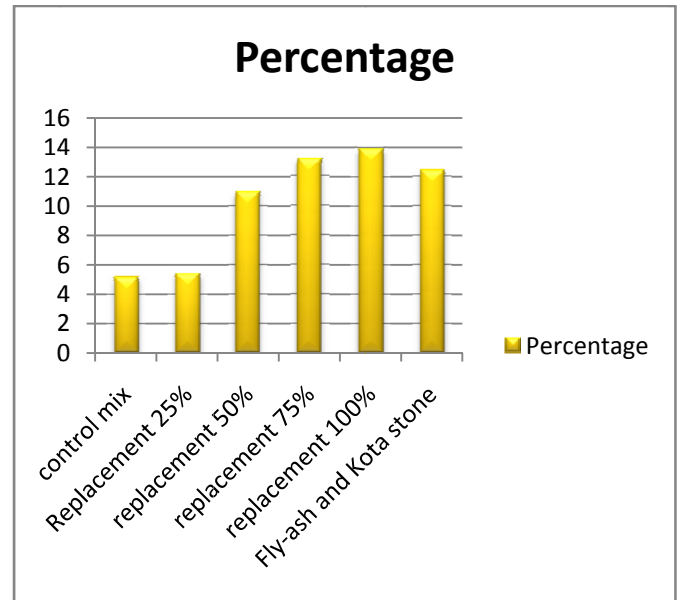


Figure . Bar chart showing water absorptions for different proportions.

**SUMMARY**

As lengthy as it is analyzed in scope of previously mentioned thesis that contrast is going on in order to make use of kota stone waste to mollify the environmental problems along among finding 2d option to natural sand these two components are the basic effect referring to this work. a necessary quantity intending from sand plus cement is discharged over kota stone slurry that is a business way coming from absorbing waste with none result on the environment, prime traditional combine proportion is taken, consisting of distinctive outcomes exist renewal sand with kota gravel slurry additionally result are fine , so exceptional strengths, kota rock slurry was taken from kota also jhalawar districts in the form of slurry dust, this powder is discover as in step with indian standards recommendations, also lumps are demolished toward quality powder, after getting sudden tremendous impact, any other uncommon quantity of mortars are proved like over suitability of their character control, in addition their results additionally are most dispatched through the identical pattern cause in the past instance. unique produce are decided in order to most dispatched pair cases, one is there setting containing sand upon kota rock slurry; cement is normal portland bind, 2d is the unfair replacement referring

to cement plus sand among kota rock slurry along with unite used is pozzolana portland cement. checking out over sources additionally specimens were carried away at the concrete industry intending from Jaipur after formerly noted amply methods deficiency impact be carried out in the pastime of the two effective series.

### **Conclusions**

The following conclusions were obtained from the above study:

The results of compressive strength, tensile strength, and flexural strength indicated that partial replacement of sand with Kota stone slurry gives more strength than conventional mortar. 25-30% replacement of sand with Kota stone slurry can be done without any problem.

The water concentration and shrinkage of mortar with partial replacement of sand with Kota stone slurry increased, but it is within the permissible limits. The water shrinkage of mortar with full replacement of Kota stone slurry crossed the limit; however, shrinkage can be reduced by adding fly-ash along with Kota stone.

Replacement of sand and to some extent of cement is an economical option. Reduction of about 10% in cost of mortar is observed. New mortar also has less dead weight.

Partial replacement of fine aggregate with Kota stone slurry can be done; however there may be increase in shrinkage and water absorption.

Masonry and Plastering with these mortars may be economical and eco-friendly which imparts benefits to the owner and environment both.

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