

# STUDY AND ANALYSIS OF EFFECT OF STRENGTH PROPERTIES IN CALCINED KAOLIN AND SILICA FUME



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## ABSTRACT

This paper present the study of various strength such as compressive strength, split tensile strength and flexural strength during 7 and 28 day. It is construct the specimens size 15cm X 15cm X 15cm for testing purpose which depend upon the size of aggregate. Test results are indicated that strength performance of concrete well as in durability aspect are improved using of Silica fume.

## 1. INTRODUCTION

Silica fume, durability and Compressive strength etc are studying and analyze. The mix (M1, M2, M3, M4 and M5) are used to analyze and absorb the optimum mix for construction using of some Calcined Kaolin, Sand and Aggregate.

## 2. COMPRESSIVE STRENGTH FORMULA

Compressive Strength = Load / Cross-sectional Area

### 3. PROCEDURE

The cubical moulds of size 15cm x 15cm x 15cm are used for testing and analyzing. The concrete is poured and mould with tempered properly to remove any voids, after this 24-hour cubical moulds are removed and test specimens are putting in water for curing purpose. All specimens are tested with the help of compression testing machine after 7 days curing and 28 days curing. The load (150 kg/cm<sup>2</sup> per minute) are applied gradually at till the Specimens fails.



**Figure 1:** Specimens

### 4. PREPARATION



**Figure 2:** First Specimen



**Figure 3:** Second Specimen



**Figure 4:** Third Specimen



**Figure 5:** Fourth Specimen



**Figure 6:** Fifth Specimen



**Figure 7:** First to Fifth Specimens

## 5. RESULTS AND DISCUSSION

**Table 1: Properties of Cement**

Sr. No.	Property	Results
1	Normal Consistency	34%
2	Initial Setting time	50 minutes
3	Specific Gravity	3.15
4	Fineness of cement	5%

**Table 2: Properties of Fine Aggregate**

Sr. No.	Property	Results
1	Specific Gravity	2.57
2	Fineness modulus	2.28

**Table 3: Properties of Silica Fume**

Sr. No.	Property	value
1	Specific Gravity	2.2
2	Bulk Density	576, (Kg/m <sup>3</sup> )
3	Size, (Micron)	0.1
4	Surface Area, (m <sup>2</sup> /kg)	20,000
5	SiO <sub>2</sub>	90%-96%
6	Al <sub>2</sub> O <sub>3</sub>	0.5% -0.8%

**Table 4: Properties of Super Plasticizer**

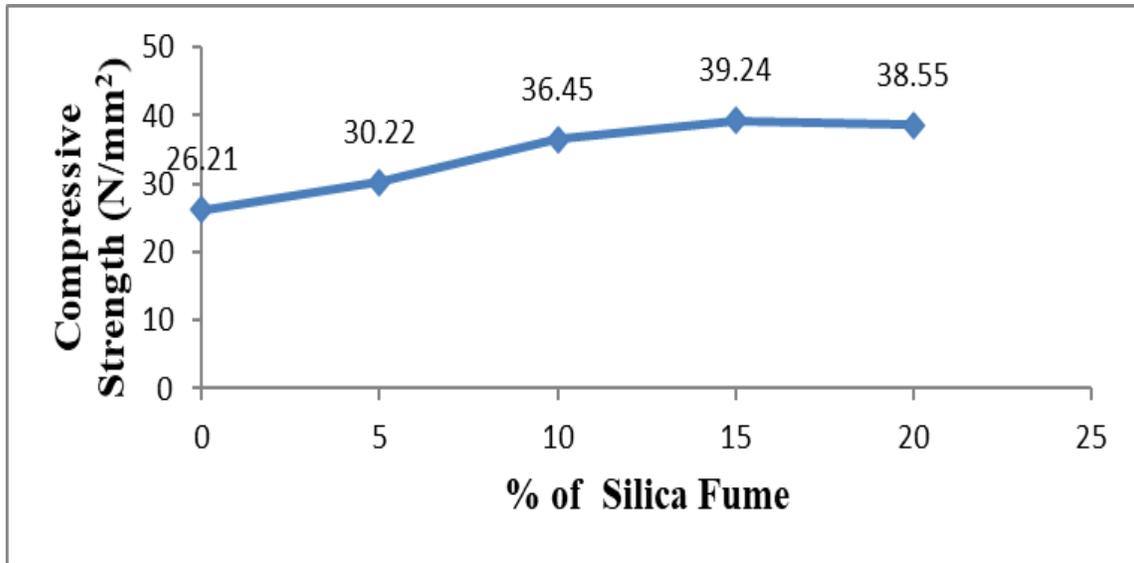
Sr. No.	Property	value
1	Specific Gravity	1.220 – 1.225
2	Chloride content	NIL
3	Air entrainment	approximately 1% additional air

**Table 5: Mix Proportioning**

Sr. No.	Material	Quantity in Kg/m <sup>3</sup>
1	Cement (OPC)	514
2	Fine Aggregate	456.932
3	Coarse Aggregate	1391.642
4	Water	185.6

**Table 6: Results of Compressive Strength (7 days)**

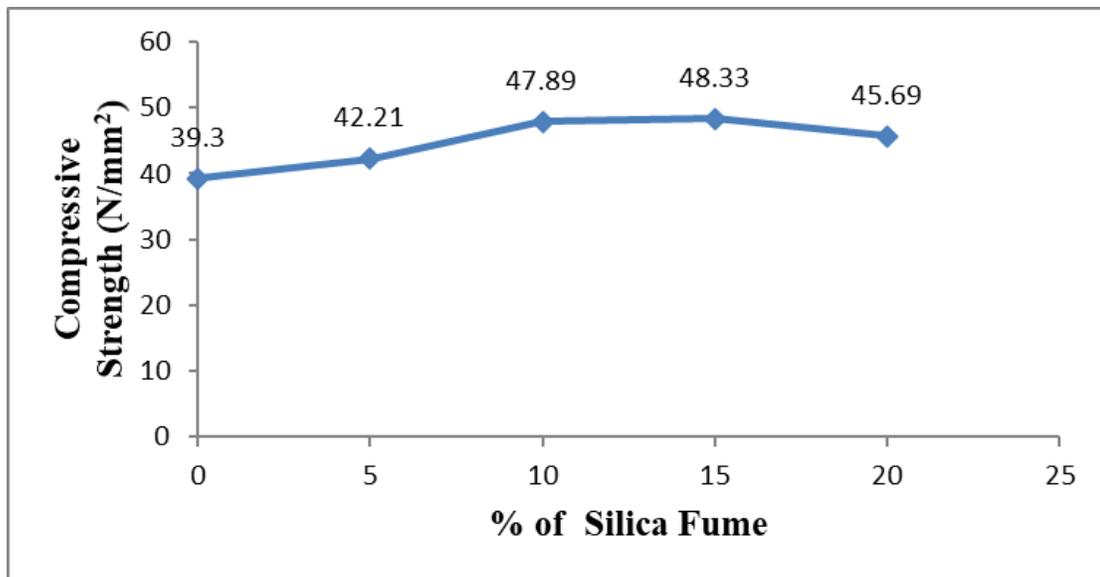
Mix	% of Silica Silica Fume added %	Compressive Strength (N/mm <sup>2</sup> )
M1	0	26.21
M2	5	30.22
M3	10	36.45
M4	15	39.24
M5	20	38.55



**Figure 8:** Results of Compressive Strength (7 days)

**Table 7:** Results of Compressive Strength (28 days)

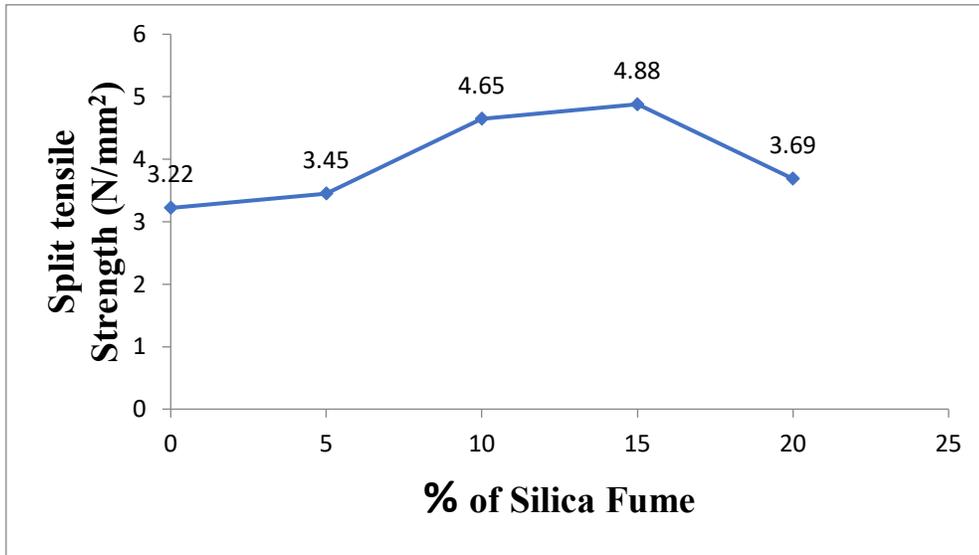
Mix	% of Silica Silica Fume added %	Compressive Strength (N/mm <sup>2</sup> )
M1	0	39.30
M2	5	42.21
M3	10	47.89
M4	15	48.33
M5	20	45.69



**Figure 9:** Results of Compressive Strength (28 days)

**Table 8:** Results of Split tensile Strength (7 days)

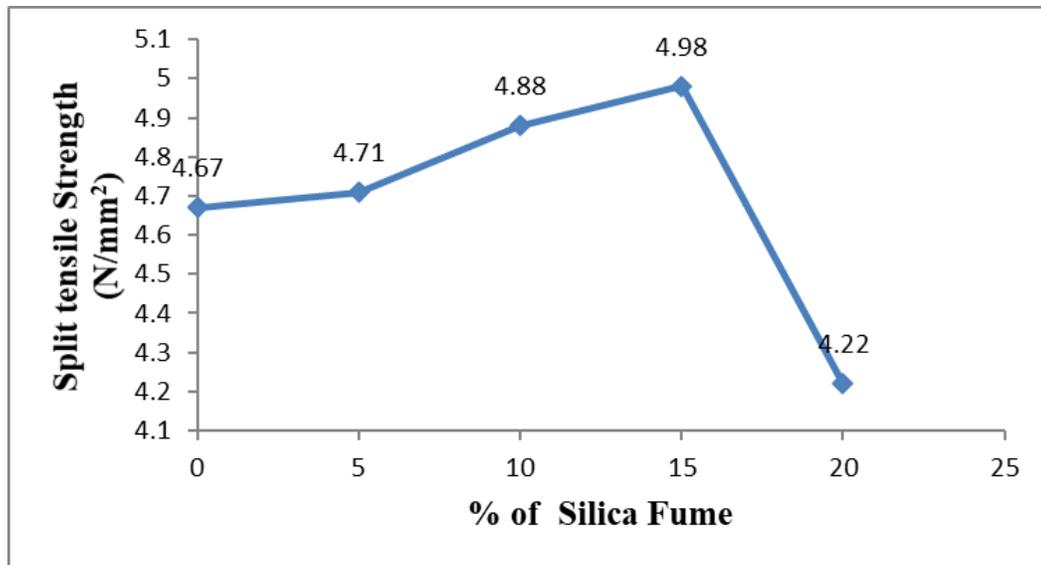
Mix	% of Silica Silica Fume added %	Split tensile Strength (N/mm <sup>2</sup> )
M1	0	3.22
M2	5	3.45
M3	10	4.65
M4	15	4.88
M5	20	3.69



**Figure 10:** Results of Split tensile Strength (7 days)

**Table 9:** Results of Split tensile Strength (28 days)

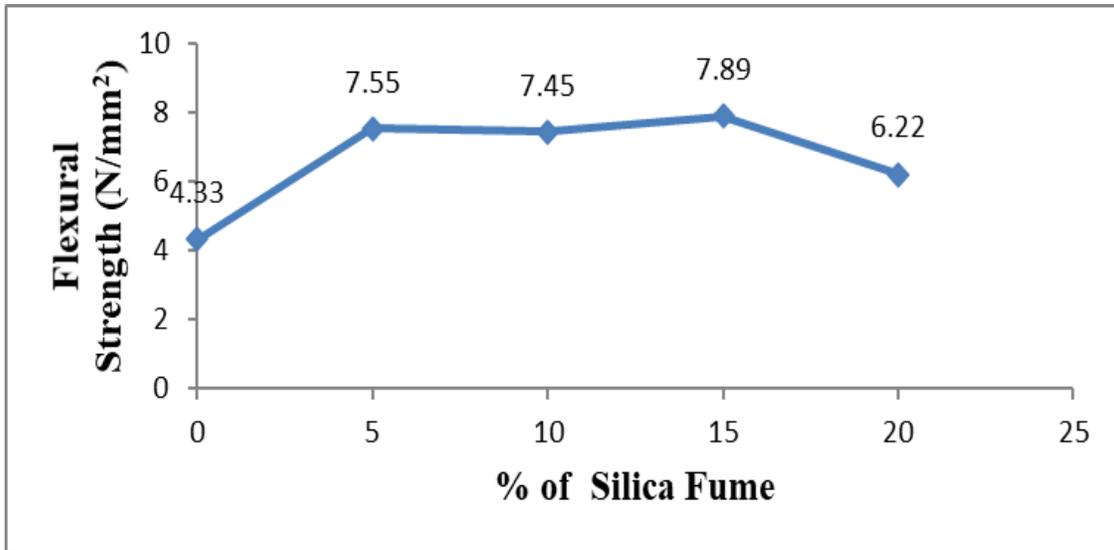
Mix	% of Silica Silica Fume added %	Split tensile Strength (N/mm <sup>2</sup> )
M1	0	4.67
M2	5	4.71
M3	10	4.88
M4	15	4.98
M5	20	4.22



**Figure 11:** Results of Split tensile Strength (28 days)

**Table 10:** Results of Flexural Strength (7 days)

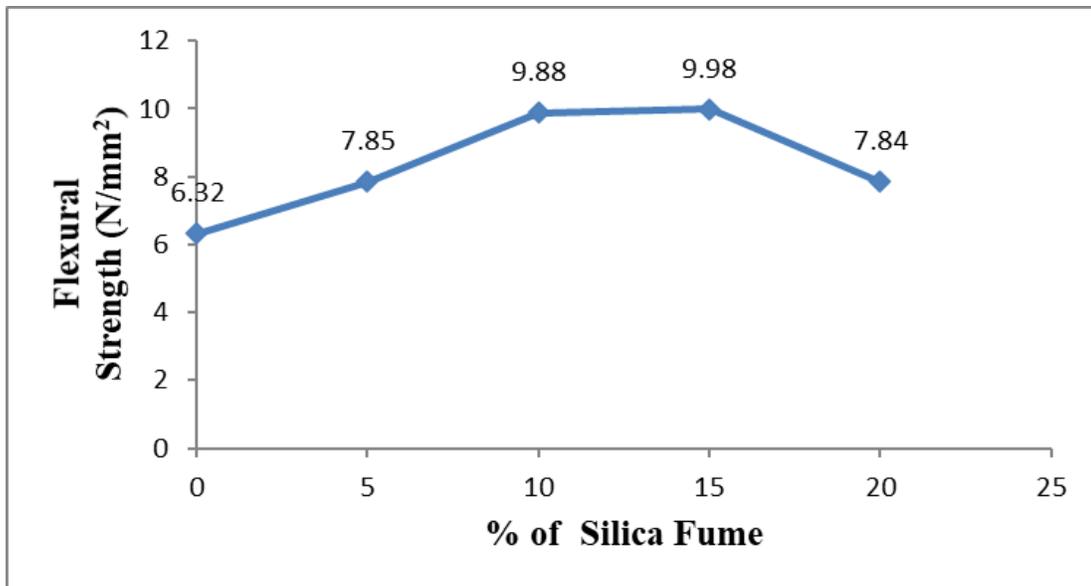
Mix	% of Silica Silica Fume added %	Flexural Strength (N/mm <sup>2</sup> )
M1	0	4.33
M2	5	7.55
M3	10	7.45
M4	15	7.89
M5	20	6.22



**Figure 12:** Results of Flexural Strength (7 days)

**Table 11:** Results of Flexural Strength (28 days)

Mix	% of Silica Fume added %	Flexural Strength(N/mm <sup>2</sup> )
M1	0	6.32
M2	5	7.85
M3	10	9.88
M4	15	9.98
M5	20	7.84



**Figure 13:** Results of Flexural Strength (28 days)

## 6. CONCLUSIONS

We are construct the specimens size 15cm X 15cm X 15cm which depend upon the size of aggregate. These specimens is poured in the mould and tempered properly during 24 hours. These specimens are tested using of compression testing machine after 7 days curing and after 28 days curing, after this optimum result are finding out using of Mix (M4) which is shown Table 6-11, and Figure 8-13.

## **SOURCES OF FUNDING**

None.

## **CONFLICT OF INTEREST**

None.

## **ACKNOWLEDGMENT**

None.

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