# Behaviour of Concrete Filled PVC Plastic Tubes (CFPT) Placed in Columns

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***Abstract:-*** **In this study,concrete filled pvc plastic tubes are placed at columns. generally the plastics are having low bonding with concrete so, to increase the bonding strength by forming of scratches on plastic pipes. It may increase bonding strength compare with actual strength of bonding. In this study 10.5cm, 7.5cm ,4.5cm and 2.5cm inner diameter pipes are used in making of cube. In plastic pipe placed on center of concrete cube .the cube specimens are made by $M_{40}$ mixing ratio of concrete .After the curing process the cube specimen tested for axial loading in the UTM machine. All the specimens loading are noted from the UTM machine .**

## I. INTRODUCTION

Columns occupy a vital place in the structural system. Weakness or failure of a column destabilizes the entire structure. Strength & ductility of steel columns need to be ensured through adequate strengthening, repair & rehabilitation techniques to maintain adequate structural performance. Columns are considered as critical members in moment-resisting structural systems.

Their failure may lead to a partial or even a total collapse of the whole structure. Therefore, it is important to improve the ductile deformation capacity and energy dissipation capacity of columns so that the entire structure can endure severe ground motions and dissipate a considerable amount of seismic energy.

Recently, composite columns are finding a lot of usage for seismic resistance. In order to prevent shear failure of rc column resulting in storey collapse of building, it is necessary to make ductility of columns larger.in this project introducing plastic tubes in column structures .in this plastic pipes filled by concrete at place of columns .in plastic tubes are used in different diameters for checking which is best in strengthening of concrete.in this project used 10.5cm,7.5cm,4.5cm and 2.5cm inner diameter pipes are placed in columns.

It may increase the compressive strength and flexibility of concrete .it also increase durability ,stability and mechanical property of concrete .

## II. EXPERIMENTAL INVESTIGATION

### *A. Preparation of Specimens*

In cubes are used in 15x15x15 cm size of dimension. M40 grade of concrete was used to fill the tubes for the casting of CFPT column specimens. In different diameter of pipe tubes are used in cubes. the concrete mix was poured in plastic pipe and making of cubes.

### *B. Test Instruments*

The tests were conducted using a 1000kN capacity Universal Testing Machine. The bearing surface of the testing machine and the bearing plates were wiped clean and any loose sand or other material removed from the surface of the specimen. Which were to be in contact with the bearing plates. The specimen was placed between the bearing plates.then the loading applied on specimen noted the value of each specimen.

### *C. Dimensions of pipe used :*

In this case four type of diameter pipes are used in cubes .there are follows

Table 1.dimensions of pipe used

| pipes | Diameter of pipes | Length of pipes |
|---|---|---|
| **1** | 2.5cm | 12cm |
| **2** | 4cm | 12cm |
| **3** | 7.5cm | 12cm |
| **4** | 10.5cm | 12cm |

## III. RESULTS AND DISCUSSION

The compressive strength of concrete is compared in different diameters of pipes. There has been significant research conducted on the investigation of behavior and performance of Concrete Filled plastic Tubes (CFPT) under axial loading the strength to varied in different diameter of pipes .thus the test readings are shown in following table

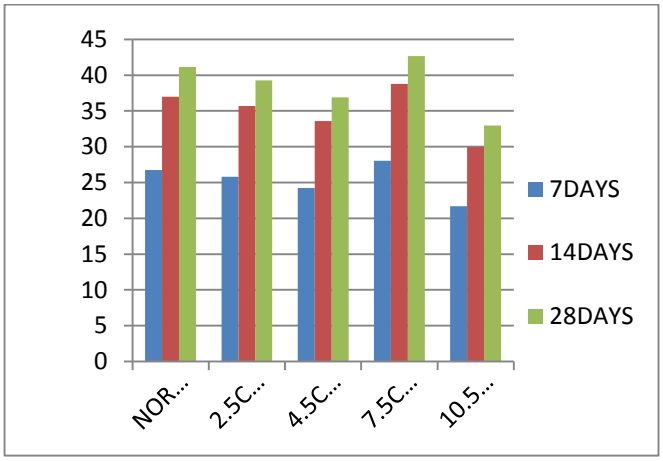
| **Compressive strength of concrete (kgf)** | | | | | |
|---|---|---|---|---|---|
| **Days\dia of pipes** | **Normal** | **2.5cm** | **4.5cm** | **7.5cm** | **10.5cm** |
| **7 days** | 61400 | 59200 | 55600 | 64300 | 49800 |
| **14days** | 84900 | 81900 | 77000 | 88900 | 68700 |
| **28days** | 94400 | 90100 | 84600 | 97900 | 75600 |

Table 2.compressive strength of concrete (kgf)

| **Compressive strength of concrete (N/mm$^2$)** | | | | | |
|---|---|---|---|---|---|
| **Days \ dia of pipes** | **normal** | **2.5cm** | **4.5cm** | **7.5cm** | **10.5cm** |
| **7 days** | 26.77 | 25.81 | 24.24 | 28.03 | 21.71 |
| **14days** | 37.01 | 35.70 | 33.57 | 38.76 | 29.95 |
| **28days** | 41.15 | 39.28 | 36.88 | 42.68 | 32.96 |

Table 3.Compressive strength of concrete (N/mm$^2$)

## IV. GRAPH



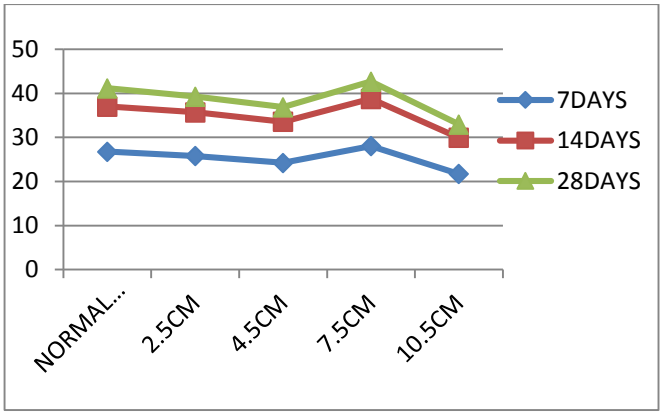




Fig1.Graphical View Of Results

## V. CONCLUSION

In this investigation 7.5cm pipes are increase the strength of concrete . it can be used in columns to improve the strength.

Confinement of concrete columns with PVC tubes improves their compressive strength. The improvement in strength is dependent on the concrete strength and geometrical properties of the tubes. Higher compressive strength of UPVC column can be obtained by using smaller coarse aggregates.

In this investigation explained in small diameter of pipes increase the concrete strength.in this structure increased strength in 2.5cm ,4.5cm and 7.5cm diameter of pipes used in columns .In small aggregate concrete is filled in concrete pipe to develop the strength of concrete columns.

The bonding between concrete and pipe is improve by formation of cracks on pipe or create other idea to improve the bonding .it is important one for this method.It also improve the flexibility of columns under loadings.

### A. *Conditions*

- The pipe must not be shown in outer of concrete structure of columns.
- The cover must be provided top on concrete structure .
- The strength of concrete increased depends on thickness of pipe variations**.**
- In small size aggregates used to improve the more strength.

## VI. PROJECT FIGURES

Fig2 (a) 2.5cm pipes in concrete cube

Fig2 (b) 4.5cm pipes in concrete cube

## VII. REFERENCE

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## REFERENCE CODE OF PRACTICE

- IS: 456-2000 Plain and reinforced concrete code of practice.
- IS: 10262-1982 Recommended guidelines for concrete.
- IS: 10262-2009 Recommended guidelines for concrete.
- IS: 383-1970 Indian Standard Specification for Coarse and Fine aggregates from natural sources for concrete.