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## Cost optimization between brickwork and precast panel

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**Abstract :** *Times, money, skilled labour's are most important and powerful things in civil engineering. The aim of project is to reduce cost, time and achieve economy. It also maintains the quality of work and increase the productivity. The structures is constructed of R.C.C. and another work of masonry is replace by panels which reduce cost up to 30% and increase the carpet area. It required less water than any other structure. Panels are pre-cast, soquality of work maintained. Length of panels is fixed as per site condition up to 1750mm length, 500mm height and 50 mm to 65mm thickness as per need .The panels is made up fromcement, crush sand and flyash with ratio 1:5 and 1:6, which follows 3R principle. It reduce Co<sub>2</sub> consumption up to 50%. Dead load of structure reduced upto 30%. It is applicable for "Pradhan Mantri Awas Yojna", building construction, shop's, restaurant's, government offices and any structure for partition wall purpose. This pre-castpanel's made up from fly ash controls the air pollution and also provide good fire resistance properties. It is "GREEN PRODUCT".*

**Keywords** -Pradhan MantriAwasYojna, pre-cast R.C.C. panel's, 3R, fly ash, GREEN PRODUCT.

### I. INTRODUCTION

Development increased rapidly day by day new material and technology involve in construction industry. Concrete structures are very popular and widely use for construction of buildings .The aim of project is to reduce cost, time and achieve economy. It also maintains the quality of work and increase the productivity. The structures are constructed of R.C.C. and another work of masonry is replace by panels which reduce cost up to 30% and increase the carpet area. Demoluted material also use for panel construction. Wastage of water also controlled. To decorate rooms by constructing various design on moulds for panels, beam and columns. By providing proper knowledge of constructions by using government schemes we skilled the labors and create job opportunities. As per sub-soil strata pile foundation is use as per design. Now a days the precast concrete has been used extensively in many residential and commercial construction projects. It is because of the property of the precast concrete. It has higher durability, thermal properties and very easy to handle and so on. Also the quality of the precast concrete is higher as it is manufactured under great control. But there is lack of awareness and knowledge regarding the precast concrete in our country. This has to be changed and more study has to be done regarding precast. The connection details of the precast members also should be studied well. In this journal various literatures are studied and the results of various studies have been given here.

## II. OBJECTIVES

1. Rapid and economic construction than masonry work.
2. By providing government schemes job opportunities are created.
3. Demoluted materials are reused for construction of panels which helps environment.
4. Wastage of materials is controlled.
5. By providing designable molds decoration of rooms is done and it also reduced external and internal plaster work and its charges.

## III. SCOPE

1. House is constructed with panel which is also constructing in scheme of “PRADHAN MANTRI AWAS YOJNA” and which makes identical.
2. No river sand is use for construction which saves natural resources.
3. It is useful for individual housing and multi storied construction which increases sizes of rooms.
4. Reuse of Demoluted material is possible and is economical with R.C.C structure.
5. It saves time.
6. It reduces various construction operations.
7. The panels are precast, light in weight and provide designs for decorative purpose.
8. By proving modern formwork we decorate structure and panels externally as well as internally.
9. No curing required for panels on site.
10. It is also use-full for public and commercial buildings.

## IV. MATERIALS

1. Cement
2. Crush sand
3. Coarse aggregate
4. Fly-ash
5. Steel
6. Chicken mesh

## V. TESTS

- 1) Material test
  - 1.cement
  - 2.fine aggregate
  - 3.coarse aggregate
  - 4.fly-ash
- 2) Concrete Cube test
  - 1.Water absorption
  - 2.compressive strength
- 3) Panel test
  - 1.flexural test

## VI. TESTS ON MATERIALS

1. **Fineness of cement**  
**Result:** Fineness of cement is = 4%
2. **Standard Consistency Test**  
**Result:** Percentage of water required to produce a paste of standard consistency is 29.25%.
3. **Setting Time test**  
**Result:** Initial Setting Time is 30 minutes and Final Setting Time is 600 minutes.
4. **Compressive Strength Test**  
**Result:** Compressive strength of cement is =52 mpa
5. **Fineness Modulus Test**  
**Result:** Fineness modulus of Fine Aggregate is = Total % cumulative weight/100
6. **Specific Gravity of Fine Aggregate**  
**Result:** Specific Gravity of Fine Aggregate is = 2.56
7. **Water Content in Fine Aggregate**  
**Result:** % of Moisture Content =  $\frac{W_2 - W_1}{W_1} \times 100$   
= 0.02%
8. **Silt Content**  
**Result:** % of Silt Content =7.6%
9. **Fineness Modulus Test**  
**Result:** Fineness modulus of Fine Aggregate is = Total % cumulative weight/100
10. **Specific Gravity of Fine Aggregate**  
**Result:** Specific Gravity of Fine Aggregate is = 2.56
11. **Water Content in Fine Aggregate**  
**Result:** % of Moisture Content =  $\frac{W_2 - W_1}{W_1} \times 100$   
= 0.02%
12. **Silt Content**  
**Result:** % of Silt Content =7.6%
13. **Crushing Value Test**  
**Result:** Crushing value of Coarse Aggregate is = 41.92 %
14. **Impact Value Test**  
**Result:** Impact value of Coarse Aggregate is = 14.45 %
15. **Water Content in Fly Ash**  
**Result:** % of Moisture Content =  $\frac{W_2 - W_1}{W_1} \times 100$   
= 68.09%

## VII. MIX DESIGN

1. **RATIO OF MIX – M15 (1:2:4)**  
Ratio of fly ash – 0.6  
size of cube – 15 x 15 x 15 cm  
w/c ratio - 0.5  
3 DAYS                      3.92 N / mm<sup>2</sup>  
28 DAYS                     12.41 N / mm<sup>2</sup>
2. **RATIO OF MIX – M20 (1:1.5:3)**  
Ratio of fly ash – 0.6  
size of cube – 15 x 15 x 15 cm  
w/c ratio - 0.5  
3 DAYS                      7.01 N / mm<sup>2</sup>  
28 DAYS                     14.65 N / mm<sup>2</sup>
3. **RATIO OF MIX - 1:5**  
Ratio of fly ash – 0.6  
Size of cube – 7.07 x 7.07 x 7.07 cm  
w/c ratio - 0.5  
3 DAYS                      7.25 N / mm<sup>2</sup>  
7 DAYS                      4.95 N / mm<sup>2</sup>  
28 DAYS                     21.33N / mm<sup>2</sup>

4. RATIO OF MIX - 1:6  
 Ratio of fly ash – 0.6  
 Size of cube – 7.07 x 7.07 x 7.07 cm  
 W/c ratio – 0.5  

3 DAYS	5.18 N / mm <sup>2</sup>
7 DAYS	4.46 N / mm <sup>2</sup>
28 DAYS	16.8 N / mm <sup>2</sup>
  
5. RATIO OF MIX - 1:6  
 Ratio of fly ash - 1  
 Size of cube - 7.07 x 7.07 x 7.07 cm  
 W/c ratio - 0.5  

3 DAYS	4.76 N / mm <sup>2</sup>
7 DAYS	3.66 N / mm <sup>2</sup>
28 DAYS	9.46 N / mm <sup>2</sup>
  
6. RATIO OF MIX – 1:5  
 Ratio of fly ash -1.5  
 Size of cube – 7.07 x 7.07 x 7.07 cm  
 W/c ratio - 0.5  

3 DAYS	2.38 N / mm <sup>2</sup>
7 DAYS	3.04 N / mm <sup>2</sup>
28 DAYS	5.20 N / mm <sup>2</sup>

### VIII. ADVANTAGES

1. The total time of construction can be saved up to a minimal of 20% when compared with conventional method of construction.
2. Quality is assured more in precast construction.
3. The dependency of work force is less in precast concrete construction.
4. The speed of construction is higher.
5. The ductility of precast concrete is higher when compared with monolith concrete.
6. The precast concrete is light in weight and has a higher thermal insulating property.
7. The topping slab in precast improves the cracking moment.

### IX. CONCLUSION

We conclude that The structures are constructed of R.C.C. and another work of masonry is replace by panels which reduce cost up to 30% and increase the carpet area. It saves time. It reduces various construction operations. No curing required for panels on site. It is also use-full for public and commercial buildings. Rapid and economic construction than masonry work.It reduces various construction operations.The panels are precast, light in weight and provide designs for decorative purpose. . By providing proper knowledge of constructions by using government schemes we skilled the labors and create job opportunities. As per sub-soil strata pile foundation is use as per design.

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