RENOVATION AND REDESIGNING OF "VISHWASADA MANE" ORPHANAGE WITH SUSTAINABLE MATERIALS

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***Abstract*— This article deals about the "Renovation and Redesigning of 'Vishwasada Mane' Orphanage with sustainable materials. Vishwasada mane is an orphanage located near innanje, Udupi.it provide shelter for around 150 people who are mentally disabled, handicapped and also for the people who are thrown away from their family members.**

Due to lack of maintenance, proper washroom facilities, congestion in rooms the people are facing many problems. Hence we mainly aim to redesign the building using the sustainable materials under the guidance of Udupi Nirmithi Kendra, Manipal.

***Index Terms*— Sustainable materials, AutoCAD, Cype CAD, Revit Architecture**

I. INTRODUCTION

"Devine Generation Ministries, Bethel Church" is an international ministry founded by Pastor Sunil John D'Souza with a divine vision to heal many broken hearted, drunkard, sick people through lord Jesus Christ

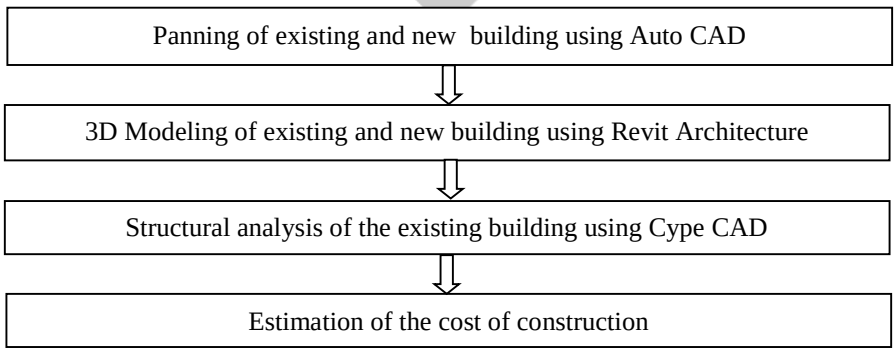
In 2003 one rented house just next to bethel church was arranged. nearly 14 persons who were picked up from the road side being looked after in this rented house. Some of them were orphans, support-less, homeless and mentally challenged persons.

Later they found an orphanage named 'Vishwasada mane' near shankarapura, which now provides shelter for more than 133 peoples. Constructing with sustainable material is not only good for the planet but also it can save the client money, helps to preserve our heritage. Sustainable materials are those which does not deplete non-renewable resources and also, they do not have adverse impact on the environment used. Nowadays construction of the building is major work of the social progress of the country. Daily new techniques are being developed for the construction of building economically, quickly and fulfilling requirements of the community engineers and architects to do the design work, planning and layout, etc of the building. In this project various software's like Auto CAD for 2D planning, Revit Architecture, Cype CAD for structural analysis of building is used.

II. OBJECTIVE

- To redesign the existing building using sustainable materials, Under the guidance of Udupi Nirmithi Kendra, Manipal.
- Cost comparison between normal construction methods and construction using the sustainable materials will be carried out.
- To give the proposal for the new building using the sustainable materials.
- Making construction process easy, economical and ecofriendly by the use of sustainable materials.

III. METHODOLOGY



IV. DATA COLLECTION

Firstly, data like total population of the entire orphanage, dimension of the existing building, road connectivity are collected.

➢ **Problems faced in the orphanage**

- Improper building designs.
- Improper arrangement of beds and also the orphans.
- Improper wash room facilities.
- Unhygienic condition.
- Absence of ramp for the handicap people.
- Improper boundary/ compound facility.

V. PLANNING

The layout of the existing building is drawn using Auto CAD software. Considering the present site conditions as per the data collected.

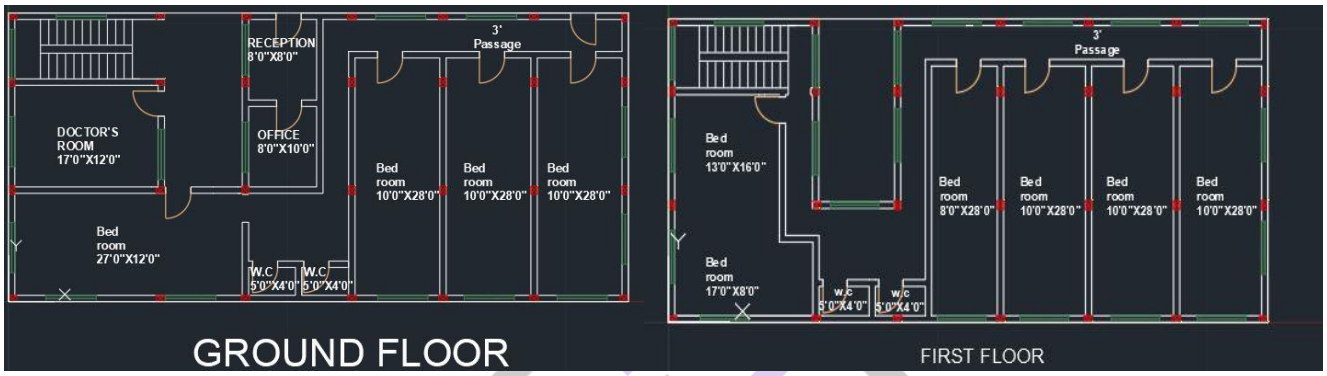


Fig 1: Floor plan of the existing building

The layout of the new building is designed using Auto CAD software. Considering the problems faced by the people in the orphanage.

Fig 2: Floor plan of the redesigned building

VI. STUCTURAL ANALYSIS

The structural analysis of the designed model was carried out using software called CYPE-CAD. Various checks were performed and drawings were derived from the software.

- **Job data report:**
  - Utility of the building: Orphanage building
  - No o stories: G+1
  - Shape of the building: Rectangular
  - No of staircase:1
  - Type of construction: R.C.C framed structure
  - Type of wall: Cement blocked wall
- **Materials:**
  - Concrete type: M25-Column
    M20-Slab and Footing
  - Steel grades: Fe 415 grade
  - SBC of soil: 200KN/m^2
- **Designing of new building:**

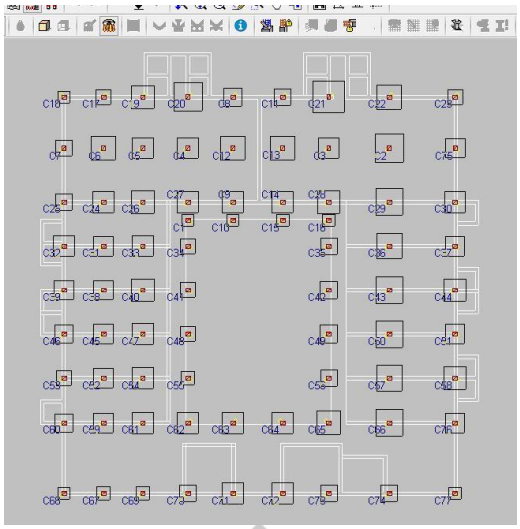


Fig 3: Footing details of the new building

- **Detailing:**

➢ **Foundation:** the detailing of each column in the structure is obtained. Below figure shows the detail of the specific column

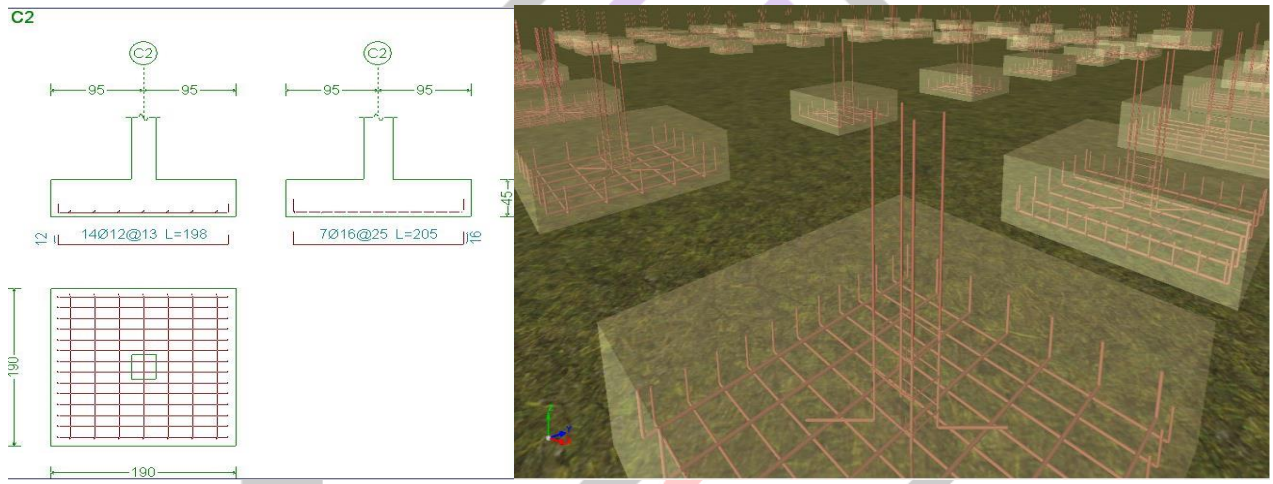


Fig 4: Dimension and Reinforcement details of footing

➢ **Column:** This software gives all the reinforcement details of the column member like dia of the bar spacing number of the bars etc.

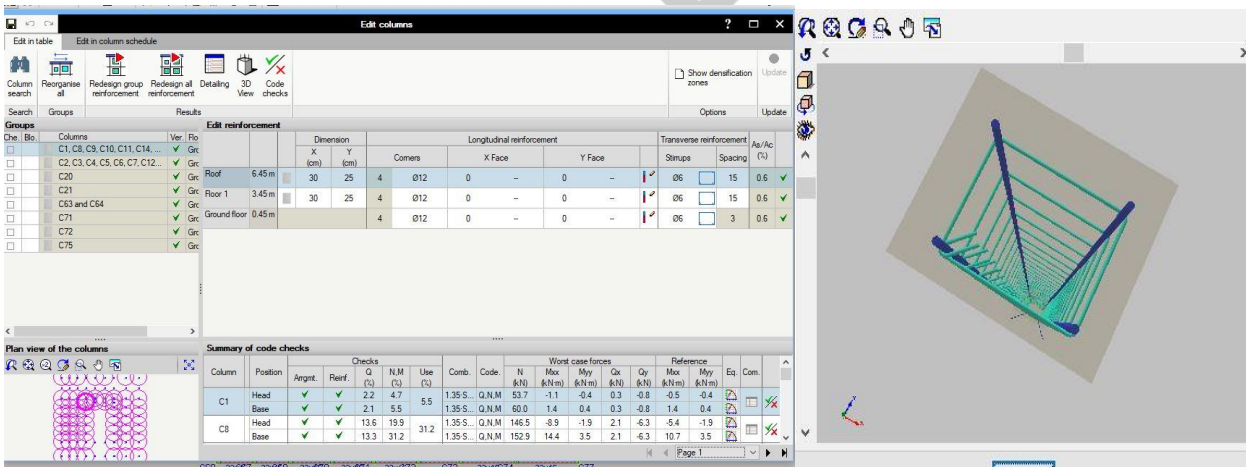


Fig 5: Reinforcement details of column and 3D view of Column

➢ **Beams:** The details of the beams can also be obtained using the Cype CAD software. We also obtain the Bending moment diagrams of the beams and deflection of the beams can also be obtained.

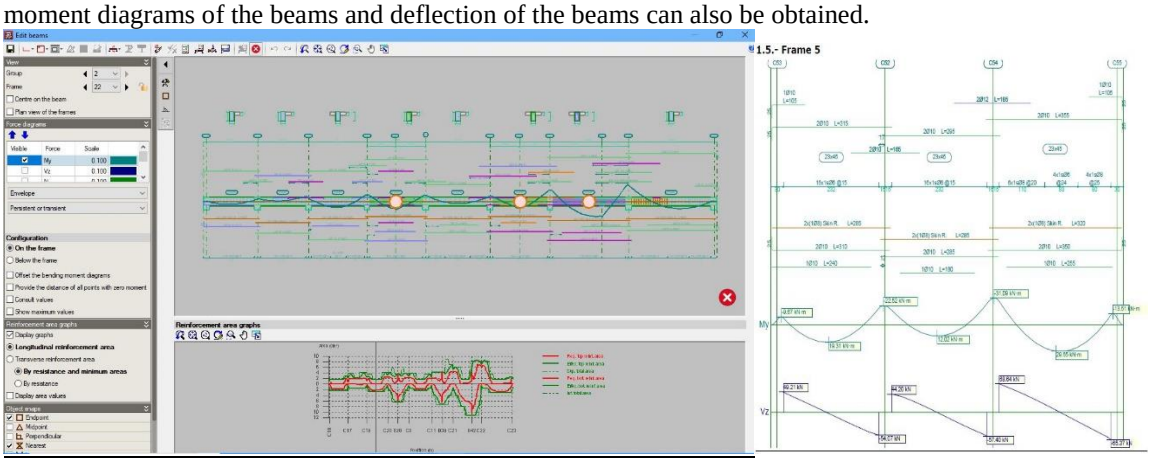


Fig 6: Reinforcement details of beam And Bending moment diagram of beam

VII. 3D Modeling

The 3-D modelling of the entire building was carried out using various software packages viz., Autodesk Revit Architecture 2015.

Fig 7: 3D model of the existing building

Fig: 8 3D model of the new building

VIII. ESTIMATION

The preparations of detailed construction estimate consist of working out quantities of various items of work and then determine the cost of each item.

Estimation of the newly designed building

a) Total cost of the new proposed building using normal construction technologies is ₹ 27330965.51

b) The total cost of construction for the new building with alternative materials under the guidance of Nirmithi Kendra is ₹ 18701453.33.

Factors affecting cost reduction:

- Using cement concrete solid blocks for the construction.
- Using fiber doors and shutters instead of teak wood doors.
- Eliminating the plastering of external wall surfaces
- Since there is no plastering no need of painting for the exterior walls
- Less maintenance of the building throughout its life span

IX. ADVANTAGES

- By utilizing the sustainable materials under the guidance of Nirmithi Kendra have following advantages
- Eco-friendly, Cost effective, modern alternative techniques.
- These buildings have a different look and have the vernacular house appearance at first place.
- These are thermally comfortable and are having less maintenance cost in its long run life span.

X. CONCLUSION

The proposed new building for the "Vishwasada Mane" orphanage promises to provide improved facilities to the peoples residing in the orphanage. In our project we mainly deal with the cost comparison of construction of the building with normal method of construction and construction using alternative building materials.

On constructing the building using various alternative materials cost reduction will be 10 to 12% compared to normal method of construction for similar floor finishing's and 25 to 30% reduction in cost compared to ordinary method of construction for different types of floor finishes.

So, we can say that using locally available alternative building materials we can reduce the cost of construction, increase the aesthetic view of building, eco-friendliness, thermal equilibrium maintained inside the building and the reduced maintenance in long run life span of the building.

XI. ACKNOWLEDGMENT

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