COMPARATIVE ANALYSIS OF THE BUILDING COMPONENTS IN STAAD PRO & ANSYS SOFTWARE

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ABSTRACT

We are proposing our journal about the comparative analysis of the building components in manual method and ANSYS software .It gives the knowledge to the students about the upcoming software in civil engineering field.Building are mostly classified based on the occupancy and based on the type of the construction. A layout plan of the proposed building is drawn by AUTO CAD 2010. The structure consists of ground floor plus three floor. The construction of the structural building by using many standard code books such as IS 456, SP16, IS875, etc., For the analysis of bending moment ,shear force, deflection, end moment and foundation are calculated. The structure are further comparatively analysed by ANSYS.

INTRODUCTION

In this project we are

FEATURES OF STRUCTURE

Framed R.C.C. Structure

Material used

- Cement: 43 grade(for brick work and plastering)
- Grade 53 for R.C.C works
- Concrete:M20 grade for R.C.C
- Steel :HYSD Bars ,TMT rods
- Brick :1st classbrick(19cm x 9cm x 9cm)
- Type of flooring :white marble flooring.

DESIGN OF MEMBERS

- Design of slab
- Design of beam
- Design of column
- Design of footing
- Design of staircase

METHODOLOGY

The method we are design the entire structure is limit state method.

LIMIT STATE OF DESIGN

Limit state method of design in a factor improvement of ultimate load design. In this method,a structure is designed to withstand all loads act in the duration of its life span also to satisfy the serviceability requirements like deflection, limitation and crack width .

GEOMETRY OF THE STRUCTURE

For Slab

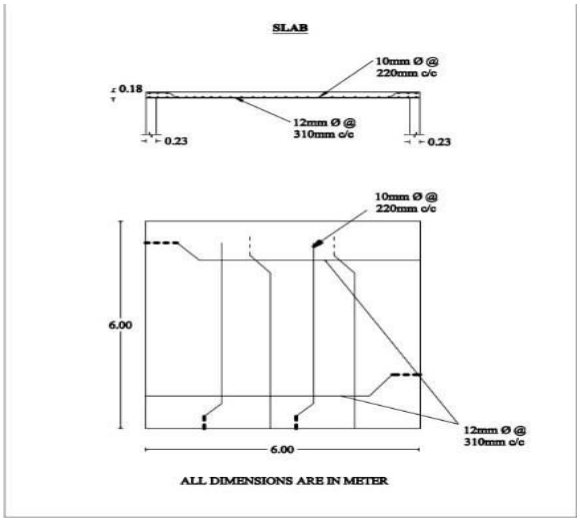
lx = 6m, ly=6m,fck = 20N/mm^2 , fy=415N/mm2,ly/lx< 2 hence it is two way slab, overall depth =180mm,effective depth =150mm, effective span =6.23m,design ultimate load wu= 14.25KN/m^2.

main rod dia = 12mm dia bars @ 310 mm c/c

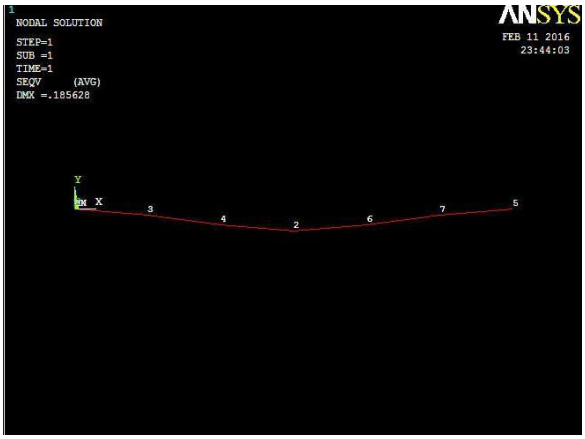
distributer =10mm dia bars @ 220 mm c/c

All the checks are ok Hence it is safe.

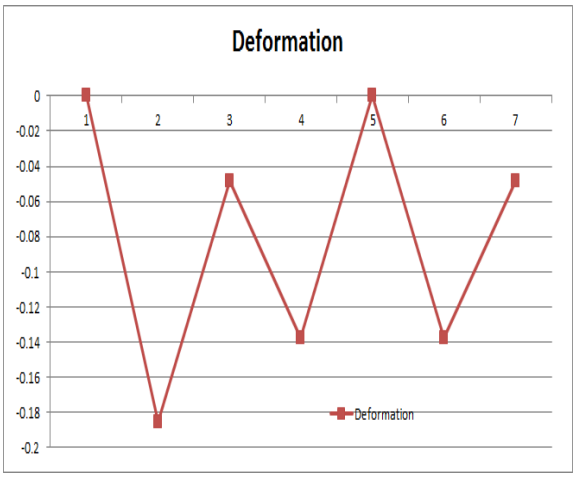
2D DRAWING OF SLAB IN AUTO CADD



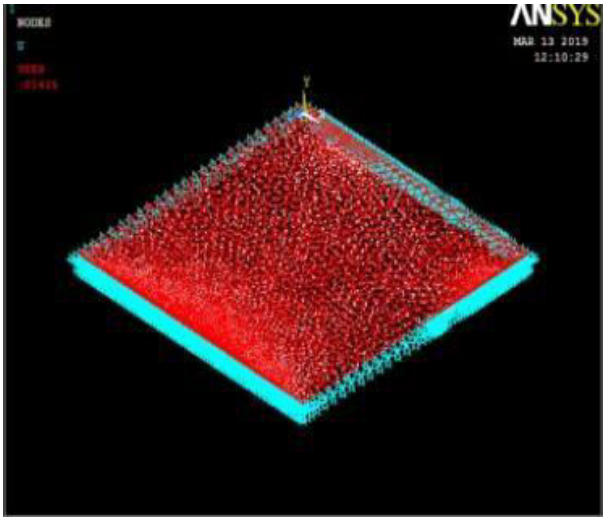
DEFORMATION OF BEAM IN ANSYS



GRAPHICAL REPRESENTATION OF DEFLECTION IN ANSYS



PRESSURE APPLY IN SLAB BY ANSYS

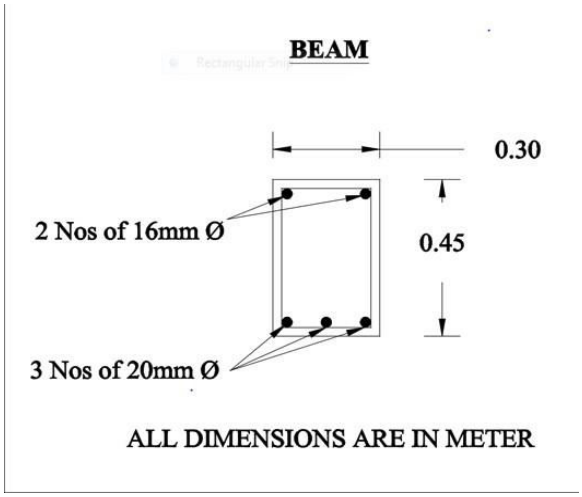


For beam

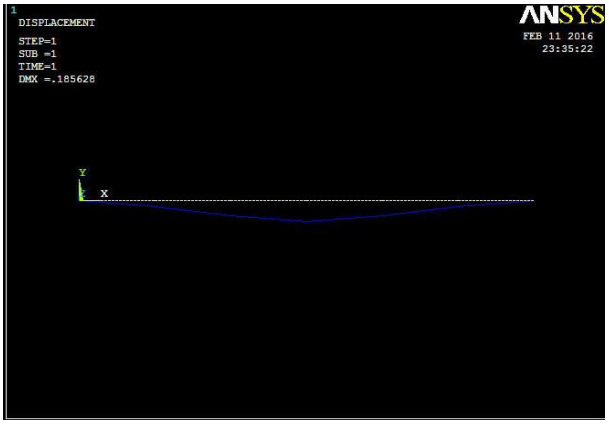
effective span = 6.23m,breadth of beam=300mm, overall depth=500mm,effective depth=450mm,factored load = 27KN/m^2,provide 3nos of 20mmdia bars and 2 nos of 16mm dia bars

All the checks are Ok hence it is Safe

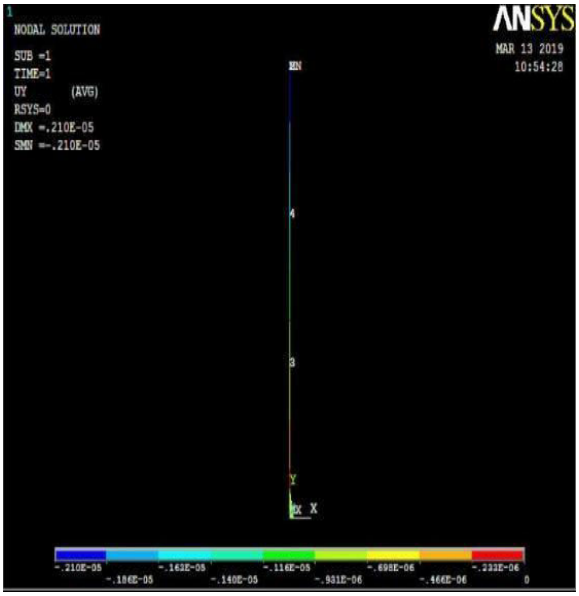
2D DRAWING OF BEAM IN AUTO CADD



DEFLECTION OF BEAM IN ANSYS



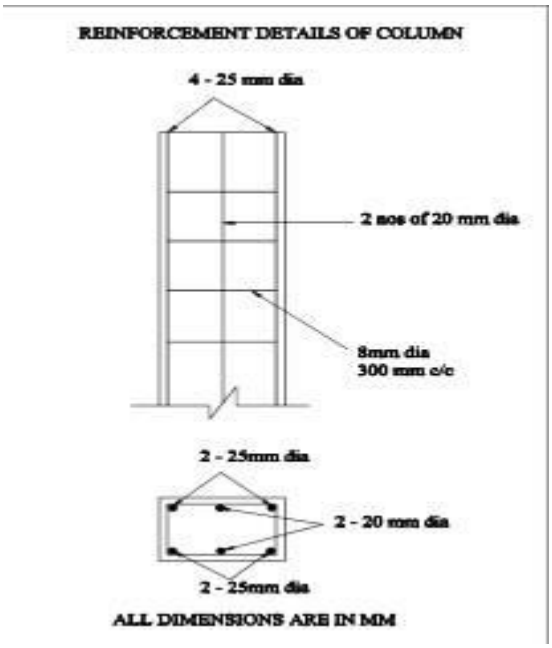
DEFLECTION OF COLUMN IN ANSYS



For column

Type of column : Rectangular column,factored load=2235KN,size of the column=400 x 300mm,provide 4nos of 25mm dia bars and 2nos of 20mm dia bars,lateral ties= 8mm ties @300mmc/c

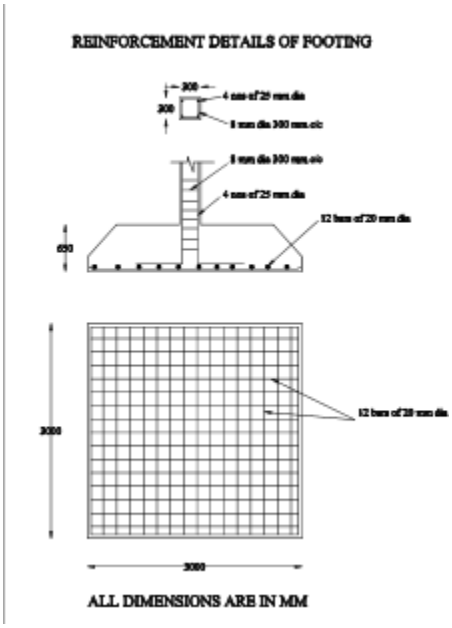
2D DRAWING OF COLUMN AUTOCADD



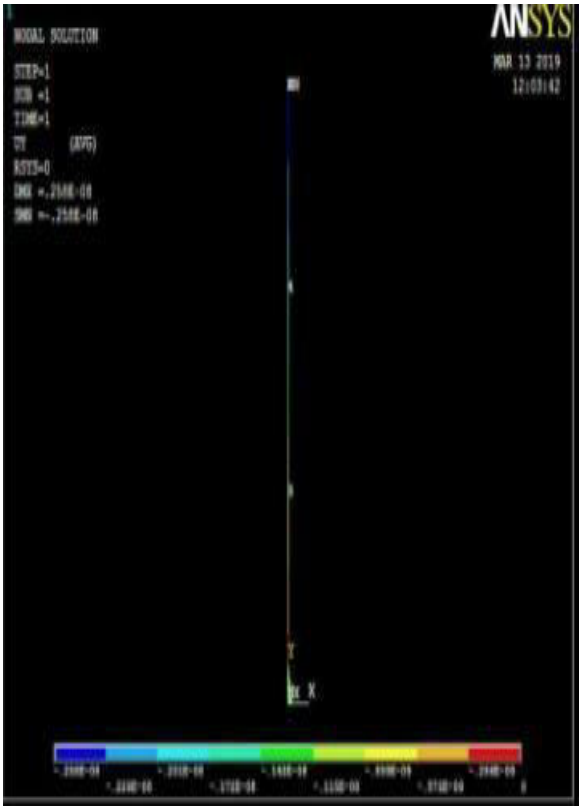
For Footing

size of the column= 400 x 300 mm ,total load on footing=2460KN,size of footing=4.6x 1.3m,overall depth=675mm,SBC=150

2D DRAWING OF FOOTING IN ANSYS



DEFLECTION OF FOOTING IN ANSYS



RESULT

1. In this project a institutional building is designed by manual method and apply in ansys software.

2. Using this software analysis of bending moment, shear force , deflection are calculated.

3. Using this calculated bending moment, shear force and reaction the slab, beams, columns and footings are designed.

4. By using the auto cadd we can design the components

5. Detailed drawings of all RCC members such as slab, beam, column and footing are also shown.

6. Comparative analysis of the same components are discussed clearly.

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