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WHY MODELING AND DETAILING IS REQUIRED FOR STEEL STRUCTURES

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Abstract - *Now a days the scope of steel is increasing day by day in construction instead of concrete. This is by the fact that handling of steel structure is easy than the concrete structure also resistance to natural disaster like earthquake, floods, landscape is more in steel than concrete, so steel structures are more safer and economical than the concrete structure. If steel structure is fabricated by a proper process only then they will be economical otherwise cost of scrap can be too high if it does not fabricated by proper process that's why modeling and detailing plays vital role in the fabrication of steel structures.*

1. INTRODUCTION

Building Information Modeling (BIM) is a process of designing a building collaboratively rather than designing separately which brings other departments like Mechanical, Electrical, Plumbing (MEP) and Civil engineering in to one roof. The whole building is virtually modelled on software and can be visually visible in 3D. Through BIM if there is any collapse in a building or structure then it will be clearly visible and hence rectification can be done due to which it is economical. If any collapse in a building or structure is found at site then there will be huge loss of money, time and waste will be too much.

1.1 3D ANALYSIS OF A STEEL STRUCTURE IN PLAN:-

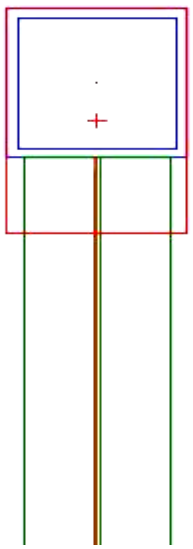

Fig -1: Plan View of Column, Beam & Plate in 2D wireframe

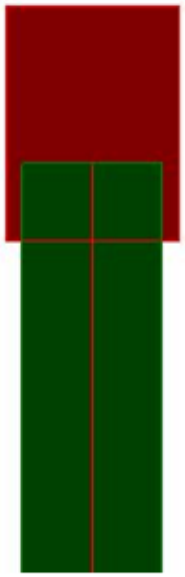

Fig -2: Plan View of Column, Beam & Plate in shaded view

Fig -1 shows the plan of a column and beam connected together on field in 2D wireframe. Green color line shows an I-beam, Blue color line shows HSS(Hollow Structural Section) column and magenta color line shows plate over HSS column. Here it is clearly shown that some part of the plate is overlapping beam. However to get the clear view of the plate, beam and column elevation view has been shown in **Fig -3.**

Fig -2 shows the shaded view of the column, beam & plate. However column is not visible as it is just below the plate. Elevation view of the column, beam and plate in shaded view is shown in **Fig -4**.

Through 3D BIM software a building or structure can be seen **360**°. So if there is any collapse this may be possible that from one view it is not clear but from another view or angle it clearly shows the overlapping. From different-different angles a structure can be visualize and analyzed.

1.2 3D ANALYSIS OF A STEEL STRUCTURE IN ELEVATION:-

A structure can be seen from various views but three views are generally used.

a. Top View (Plan View)

b. Front View (Elevation)

c. Right View (Elevation)

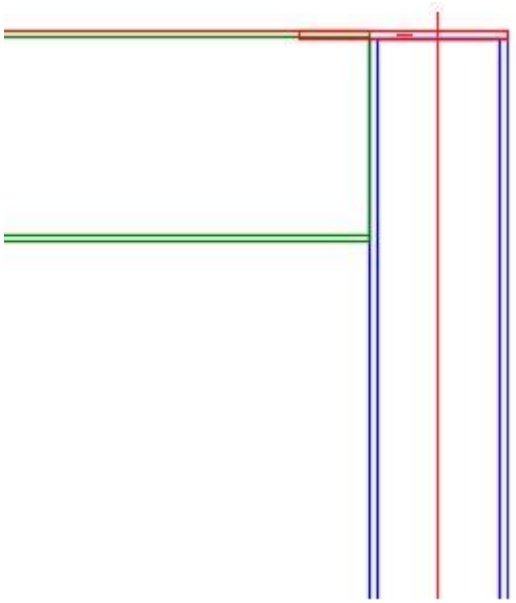

Fig -3: Elevation of Column, Beam & Plate in 2Dwireframe

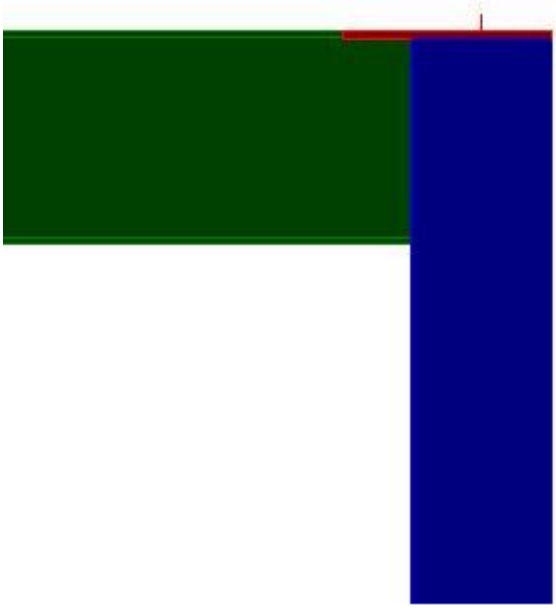

Fig -4: Elevation of Column, Beam & Plate in shaded view

In **Fig -3** it is clearly visible that some part of the plate is overlapping over beam so either beam has to be cut as per the plate or size of the plate has to be adjusted as per the beam to make a proper connection. Later method is suitable as plate can be adjusted easily. This is another view which makes everything clear. Sometimes even by 2 views things doesn't clears so 3rd view has to play the role and makes everything crystal clear.

1.2 3D ANALYSIS OF A STEEL STRUCTURE AT AN ANGLE:-

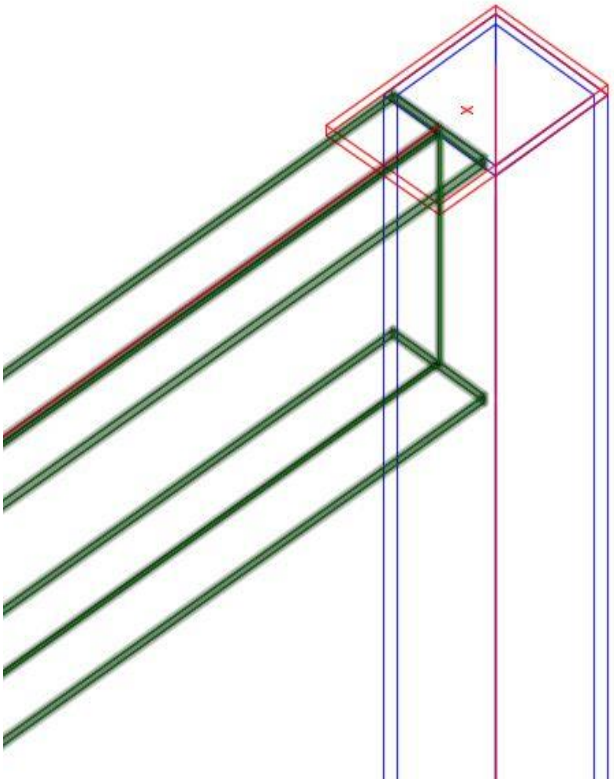

Fig -5: View of Column, Beam & Plate in 2Dwireframe at an angle

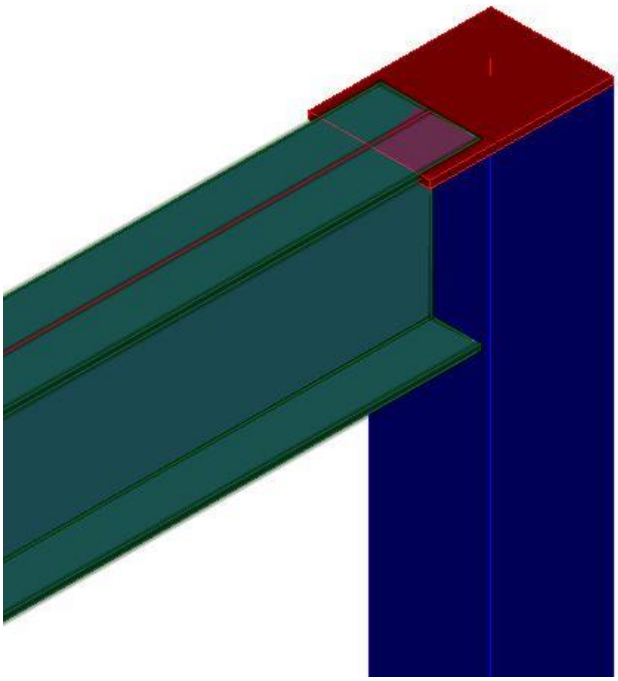

Fig -6: View of Column, Beam & Plate in shaded view at an angle

Fig -5 shows the another view at the different angle which again clearly shows the collapse. **Fig -6** is the shaded view at the same angle of **Fig -5.**

3. CONCLUSIONS

Here a steel building has been analyzed and visualized from different-different angles and views in 3D via Advanced Steel software. In the analysis collapse in the building found with the help of 3D visualization. The collapse can be rectify before it is fabricated in field and hence money, time & scrap has been saved. Dangerous incident could have happened if the building had been fabricated in the field. It is very important to model and detail the steel structure in a 3D software.

REFERENCES

[1]. S.K Duggal , "Design of Steel Structure", 3rd Edition MC Graw Hill.