

# IPRO 315: Design of a Large Scale Structure

## Purpose

IPRO 315 asks architectural and engineering students to design a large-scale structure, incorporating the technical knowledge learned in the classrooms.

## Background

- The Spring 2009 semester started the current project recreating the design of a 22-story building located in Oak Brook, IL.
- In the previous semester, the building had torsion problems due to wind and seismic loads, making the building unstable.
- This caused the building to twist off its foundation.

## Objective

- The team's goal is to recreate the design of The Phantasy Hotel, fixing the previous semester's problems.
- At the end of the IPRO semester, the team is to have completed drawings that can be sent to contractors and developers for construction.



The Phantasy Hotel

## Methodology

- As a simulation of a real team from a design firm, this was the first time that team members were asked to work on a "real life" project.
- It was important for both groups to be able to work together to achieve the goals ahead of them, so a big emphasis was put on management, ethics, teamwork, and leadership.
- An AutoCAD standard for project drawings was created to prevent confusion.

## Progress & Conclusion

- The team moved the concrete "core" of the building five feet towards the center.
- This is a better placement as the center of mass is closer to the geometric center, reducing the twisting in the building.
- After an 3D analysis of the building on the computer modeling program, SAP2000, the Engineering group determined that this change fixed the torsion problem.
- The Architectural group produced a set of plans from AutoCAD for each story of the hotel including a ballroom, cafe, hotel suites and green roof. Using SAP2000, the Engineering group was able to find the service, axial, dead & live, loads on the individual members at each floor so a complete steel and foundation design could be performed while adhering to the relevant building code.
- The Engineering group also created construction plans to show the structural design of the building.



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View of Lobby



View of Green Roof

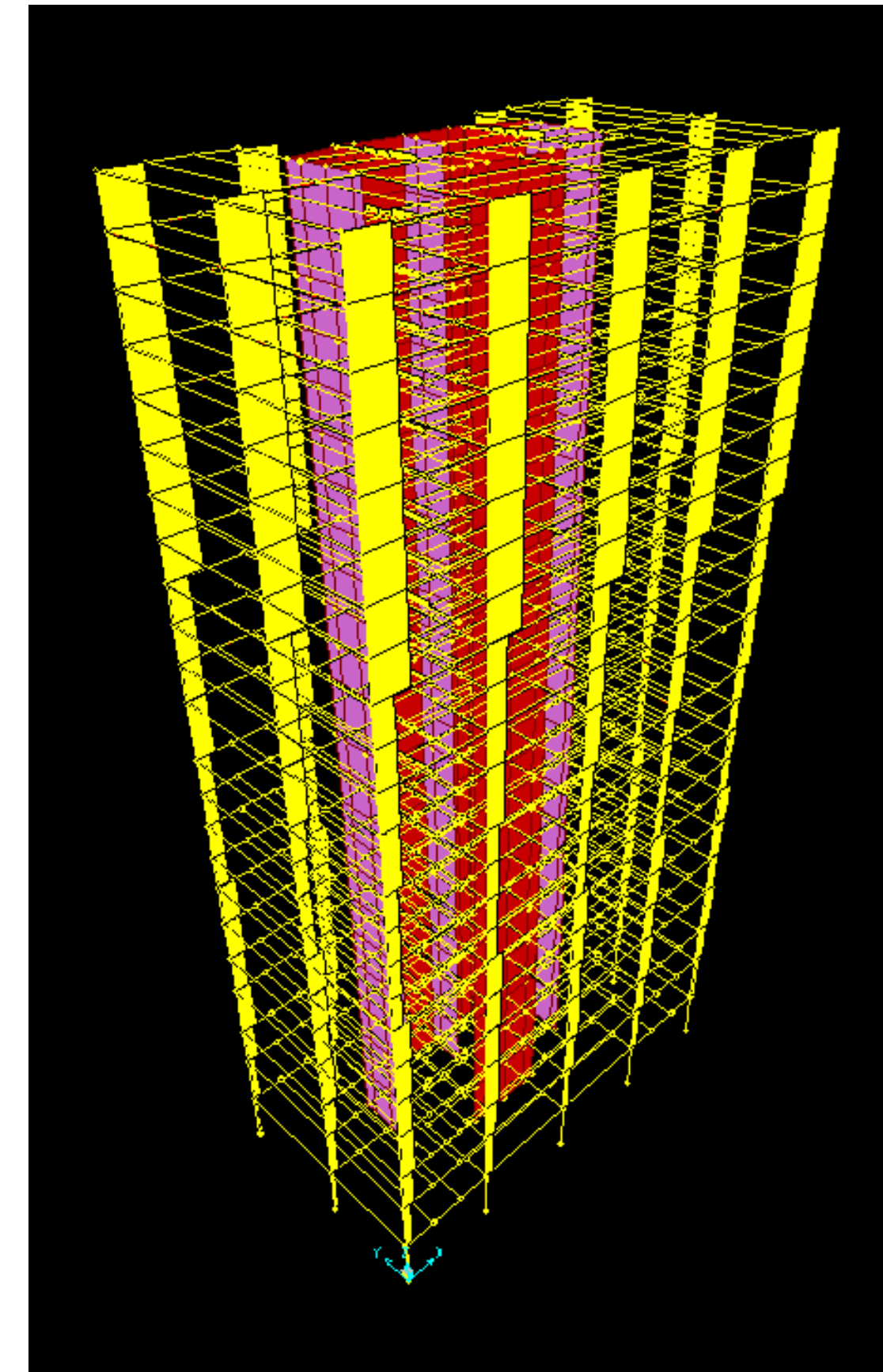


Site Overview of Phantasy Hotel

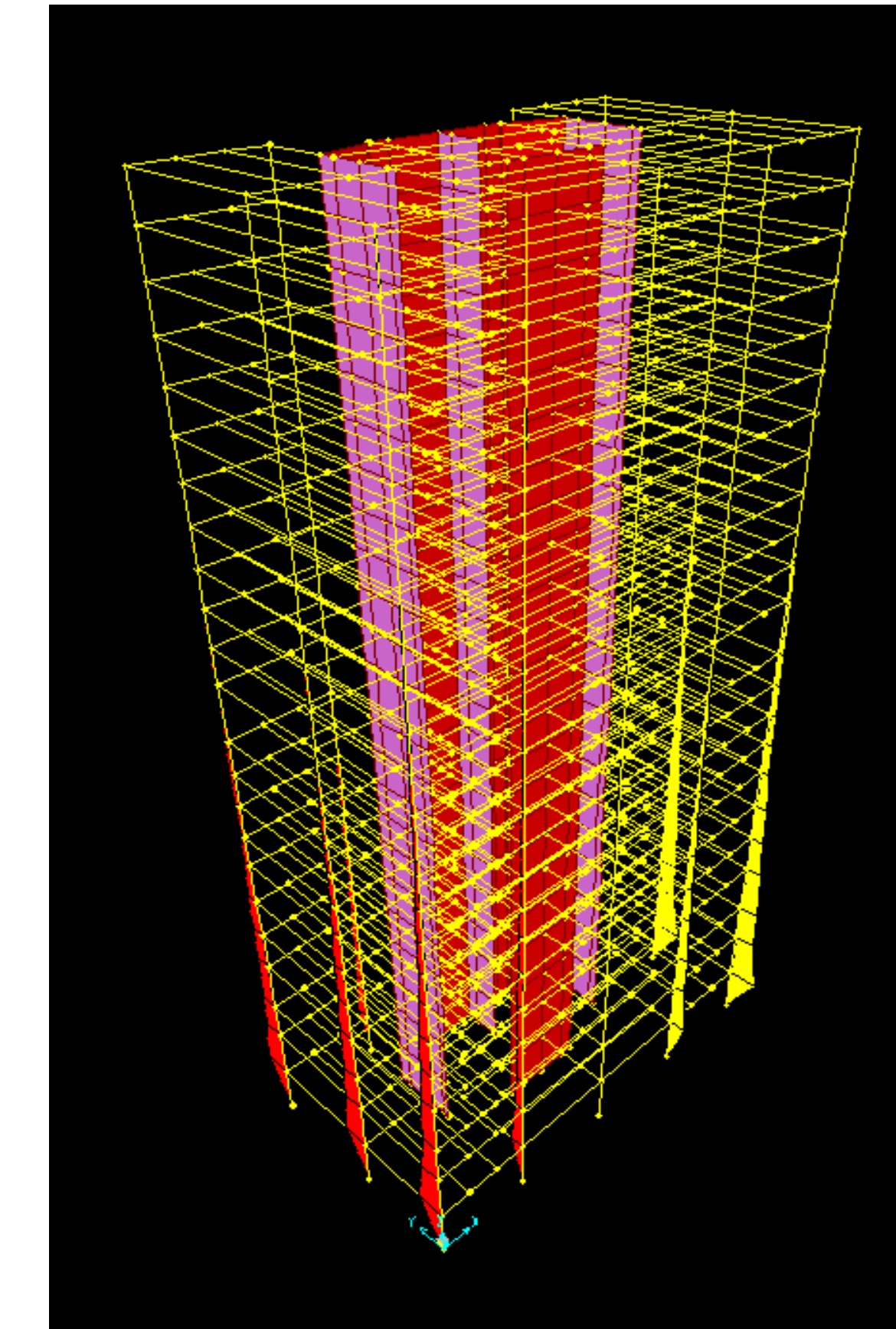


View of a Hotel Suite

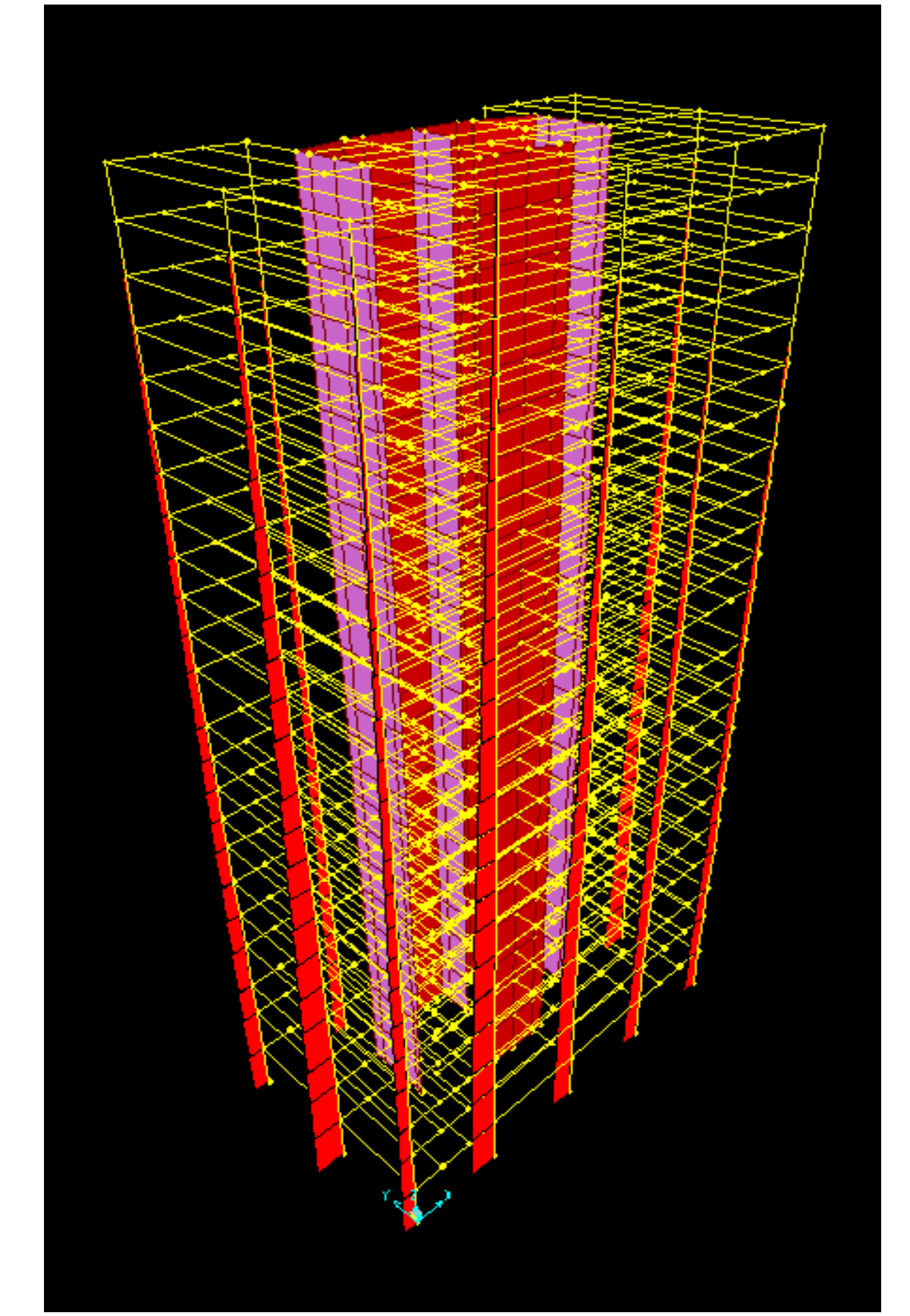
## SAP2000 Computer Modeling Result



Torsion Forces



Moment Diagram



Axial Forces

IPRO 315 TEAM ORGAINZAION	Faculty Advisors	Architectural	Engineering -Computer Analysis	Steel Design	Foundation
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