

# **I PRO 315 Final Report**

## **Abstract**

The purpose of this I PRO is to design a 22 story hotel located in the western suburbs of Oakbrook, IL. The group used their skills in Architectural, Structural, and Mechanical engineering to efficiently design this structure. We applied knowledge gained through prior coursework to design the large structure according to AISC, IBC, and ASCE-7 code. Additionally, we designed the building for sustainability.

## **Background**

This was the first semester for this I PRO project, and no previous research or preparation had been done. The project will be continued during fall semester, when another team of architects, civil and mechanical engineers will focus more on the sustainability. The frame of the hotel was given and it looks similar to the one of an existing hotel in Chicago, IL. This I PRO was a simulation of a real team from a design office, and no sponsors or clients were involved.

## **Objectives**

The main objectives of this project were to design the foundation, the superstructure of the hotel, and the HVAC, plumbing and electrical system. The programs used by the team were SAP 2000, MathCAD, AutoCAD, Microsoft Publisher and Adobe Illustrator.

## **Methodology**

In order to divide the work best, we divided the 23 member group into 3 teams, each of which then had sub-teams. This was done in order to make sure that all of the teams were able to accomplish the many varied tasks assigned from the initial division of work. Each team then also had a liaison with the other teams to ensure that there was no duplication of work and to insure that all of the information that needed to be shared was passed from team to team. Each group's work was then approved by the professors before moving on to the next step. All of the work was uploaded on to igroups so that each member of the team had access to all of the work. The conclusion of the project involved combining the various aspects of work into one coherent plan that incorporated all of the research that was done.

## **Team Structure and Assignments**

Please see attached

## **Budget**

	<b>Total</b>	
<b>Presentation:</b>	Estimate:	\$100
Posters		
Printing		
Misc. Supplies		

	Total	
<b>Team Party:</b>	Estimate:	\$100
Food/Pizza		
Drinks/Misc.		
Snacks		
	Total	
<b>Model:</b>	Estimate:	\$300
Construction Supplies		
Glue/Nails		
Misc. Supplies		
	Grand Total:	\$500

## Results

We produced a set of plans from AutoCAD for each story of the hotel which included architectural details. The architectural team also made a model of the large structure. The design of the structure was analyzed for both efficiency of design as well as safety of the design. This analysis was performed in SAP 2000.

## Obstacles

One major obstacle we encountered was that our team had 23 members and we had to find a way to work together while at the same time not duplicating any of the work performed

### **Recommendations**

The research for this project takes so much time, so we would like to recommend for the next IPRO to have the research only done in one semester before the design phase begins. In this way the engineers can make the best decision in order to design a safe and cost efficient building.

### **Acknowledgements**

We would like to thank Dr. Jay Shen, Dr. Jeff Budiman, and Assistant Jorge Cobo for their help and counsel during the entire semester.

IPRO 315  
Design of Large  
Scale Structure



