

## EXECUTIVE SUMMARY

The following document is a report of the work that was completed during the spring 2010 semester by the IPD / BIM thesis team 3, which includes Matthew Hedrick, Kyle Horst, Casey Leman and Andres Perez. The purpose of this report is to introduce alternative concepts in the design and construction of the New York Times Building by utilizing both an integrated project delivery method and building information modeling. The alternative concepts have focused on achieving an overall team goal of increasing the profitability and marketability of the building while maintaining its iconic and sustainable image.

In order to achieve this primary goal, the following three strategies were identified:

1. Decrease the floor to floor height with the intension of adding additional rentable floors.
2. Redesigning the core configuration structurally and architecturally in order to add additional rentable space to each floor while maintaining the efficiency of the lateral system.
3. Improve the sustainability profile of the spaces to add marketability and possibly charge a higher rent.

To achieve a decreased floor to floor height several the design team has modified the structural floor configuration to a castellated composite steel beam system. In addition the underfloor air distribution system was replaced with an active chilled beam system which has been coordinated with the castellated beam system. A feasibility study has been done in order to determine the viability of adding additional rentable floors.

The redesign of the core configuration involved an investigation of alternative architectural layouts in order to increase rentable floor area. When changing the architectural configuration of the core the layout of the lateral system was an important consideration. Therefore, the opportunity of redesigning the lateral force resisting system with an alternative solution was presented. The alternative solution involving a concrete core with outriggers on the mechanical floors was explored and analyzed. The investigation of the core also involved an analysis of necessary infrastructure such as elevators and MEP risers.

Improving the sustainability profile has shaped two main redesign tasks. The first involved the façade which currently contributes to a large portion of the overall building cooling and heating loads. The team worked toward developing an alternative design which will optimize energy usage and maintain acceptable daylighting of the space. The second task involved a redesign of the cogeneration system in order to decrease energy costs and associated emissions for the building. The goal for this redesign was to supply The New York Times Company floors with 100% of its power needs, but ultimately cost, energy use and emissions were the driving factors.

It was the responsibility of all of the team members to update a central BIM file that the group used. This model was used to coordinate the different redesigns and efficiently organize the interior spaces of the New York Times Building. It was important to analyze the ways that BIM and an integrated project delivery design approach contributed to the project. Integrating the efforts of each of the team members was of high importance during all phases of this project, and it was essential to keep open the lines of communication between all of the team members. The utilization of BIM to aid methods of analysis has supported an overall integrated project delivery approach to design.

In the eyes of the design team a successful redesign of the New York Times Building has been achieved. The success of the redesign can be measured by how well the original goal of increasing the marketability and profitability of the building was met. In terms of energy cost savings, a reduction of roughly \$2.23 million per year was achieved by the collective redesign. In regards to environmental sustainability, an overall reduction in energy use associated emissions of 50.1 million lbs CO<sup>2</sup>e has been reached. Furthermore, with the addition of one rentable floor area the potential to earn \$1.26 million per year for the building owner has been achieved. Ultimately, the redesign has increased rentable space, decreased operating costs and given the building a more environmentally sustainable profile.