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Times Square Skyscrapers: Sustainability Reaching New Heights

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Abstract

Times Square has seen the development of more than 15 new high-rises in the past two decades. The firm that has designed the most of them, Fox & Fowle Architects, will present an overview of the recent development and highlight case studies of two key projects: The Conde Nast Building @ Four Times Square and the New York Times Building, designed in conjunction with Renzo Piano Building Workshop. Both buildings have received international acclaim and are praised for both their innovative design and their environmental responsibility. These projects have showcased the firm's commitment to environmental responsibility and the challenges and opportunities of greening large scale developments. These issues will be further examined through a brief discussion of the large-scale projects "on the boards."

Keywords : Fox & Fowle, Times Square, Sustainable Design, Green Design, High-rise buildings

Introduction:

Times Square has seen the development of more than 15 new high-rises in the past two decades. Guided by the Times Square Master Plan, the Interim Plan, and zoning and signage regulations developed by 42nd Street Development Corporation, this neighborhood has been completely revitalized as a vital corporate community and a tourist destination.

The Conde Nast Building at Four Times Square :

In the mid 1990s, while the area was still very much in transition, the Durst Organization, one of New York's established development families, began plans to build the first speculative office building in New York City in 10 years: Four Times Square. The project is the centerpiece of the 42nd Street Master Plan prepared by the 42nd Street Development Corporation, a public/private consortium created to promote the redevelopment of this traditional heart of Manhattan. In an economic climate where most were hesitant to engage in speculative development, the Durst family

understood that this was the next key development area in New York City. Initial meetings between the Developer (the Durst Organization), the Architect (Fox & Fowle Architects) and the Construction Manager (Tishman Construction) revealed a commitment on all sides to what was just beginning to be called sustainable design. That mutual belief in designing and building responsibility developed into a cornerstone for this project, which in turn, has become the benchmark for sustainable commercial development in the United States.

Fox & Fowle led a large team that included Rocky Mountain Institute, Natural Resources Defense Council, NYSERDA, Steven Winter Associates, Earth Day New York, Green October, and Consolidated Edison. The project was a model for its integrated process from the start. The team analyzed a large number of on-site energy systems, including wind turbines, fuel cells, gas turbines, thermal storage and more.

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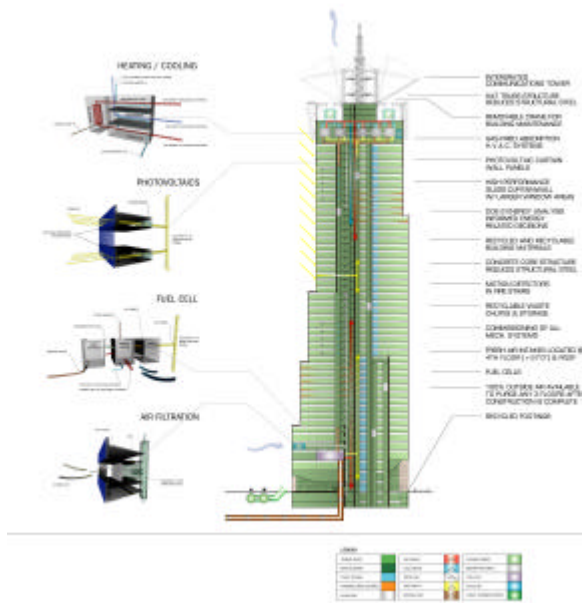


Fig.1. Sustainable Components of Four Times Square

A portion of the energy for the building is generated from two 200-kilowatt fuel cells as well as a 60 foot wide area of photovoltaic panels. When first considering using pv's, it was a challenge to justify the high first costs – especially because this was a developer building. Creative thinking led to the integration of the pv's into the spandrel of curtain wall – thereby reducing the first costs and making it financially viable. Mechanical systems have been optimized through the use of gas-fired absorption chillers.



Fig.2. Photovoltaic Spandrel Panel, Four Times Square

Another key 'green' element in it has come to be known as the Conde Nast Building at Four Times

Square is the sophisticated air filtration system which provides cleaner-than-outside air to all tenants and allows for floor-by-floor air purging. Fox & Fowle also developed tenant guidelines so that interior installations and operations complied with green standards as well.

In addition to raising the bar on skyscraper efficiency and effectiveness, the Conde Nast Building at Four Times Square is an example of sensitive attention to physical context. Its west and north facades are clad in metal and glass, and literally and figuratively reflect the visual activity of Times Square. The east and south facades are composed of stone and glass and present a refined personality, addressing midtown Manhattan and Bryant Park. The building engages its two divergent contexts, rather than trying to blend them into one. We were concerned about the building's bulk overpowering Times Square, which inspired stepped massing and finer-scale articulation on that side.

The top of the building evolved from a highly efficient hat truss. Topped with a cubic frame to contain a satellite dish farm and a communications tower, the truss takes a German-cross plan form that is marked by 70-foot square super-sign armatures on each face. This solution allowed for a distinctive skyline presence and an unexpected revenue stream for the building owners. As is often the case, the commitment to an integrated process, which can at times be difficult to organize and execute, resulted in a design that achieves much more than one goal.



Fig.3. View of Four Times Square from Bryant Park

The 48-story, 1.6 million-square-foot tower relates to the ephemeral signage and energy of Times Square

while maintaining a solidity that engages masonry towers nearby. Signage is celebrated at the tower's base as both an integral part of the architecture and as a series of planes and icons layered over the facades in the Times Square vernacular.



Fig. 4. View of Four Times Square from Times Square

This project has received dozens of awards – from environmental organizations such as the Audubon Society and the Alliance to Save Energy, to design institutions including the American Institute of Architects and the Society of Registered Architects. Published in literally hundreds of magazines and newspapers, the project continues to demonstrate that you can build ‘big and green’ – and that it can be beautiful.



Fig. 5. Four Times Square in Manhattan Skyline

The New York Times Building

As the next generation of New York City landmark, also located in Times Square, the New York Times Building links design and environmental excellence with a vital corporate mission, while seamlessly balancing its speculative other half. The project is a dichotomy in many ways; the most basic is the building's need to serve two different clients groups

with two very different ambitious agendas. The New York Times, who will occupy the lower half of the building, wanted a memorable, yet timeless new home that would very distinctly express its mission of service to the public for the next hundred years. Forest City Ratner, the developer of the project, planned to lease out the other half of the project's 1.2 million square feet and needed a marketable speculative development that would be viable in the city's currently challenging economic environment.

The approach to meeting this programmatic challenge began with a multi-faceted design team. Renzo Piano Building Workshop, the winner of the initial design competition for the project, brought a sensitive and exemplary concept, a spirit of European innovation, and an artisan-based approach to the project. RPBW looked to Fox & Fowle Architects for large-scale urban experience, knowledge of the New York City construction industry, and leadership in sustainable design. The team was bonded through a synergy of working styles and a steadfast dedication to design excellence.



Fig. 6. Model of New York Times Building

In the winning competition entry, RPBW imagined a slender, diaphanous tower with several innovations untested in the American market. The main challenge was materializing a feasible, economically viable building, while preserving the nobility of the concept and carrying it through the details of the design. Creating a building that maintains environmental responsibility within the urban constraints presented another challenge. In translating the concept to the scale of a 50-story building, the team was able to unitize the building materials, control the cost, and provide constructability within the rapid construction

processes of New York City. The team’s unwavering dedication to elegant, innovative, and mission-oriented design resulted in a building that balances design, programmatic, and environmental excellence.

In contrast to the solid aesthetic of many urban office buildings, the New York Times Building is sheathed entirely in layers of clear glass. This transparency—revealing the activity occurring within—embodies the paper’s mission of transmitting an unclouded, lucid report of the news to its public.



Fig. 7. Drawing of New York Times Building entrance

As one of the building’s innovations and a key feature of the curtainwall design, an exterior veil of ceramic tubing functions as both an aesthetic device and critical sunshading. Aesthetically, the tubing serves as a canvas for the environmental conditions, changing color with the sun and weather. This extra exterior layer allows for the use of floor to ceiling clear glass, by shading the sun and mitigating the loss of energy efficiency expected in an all-glass building. The shape of the tower floorplate—a rectangle with four notched corners and a maximum distance of 42 feet from perimeter to core—allows daylight to penetrate deeply into every floor. Determined by extensive testing, the tubular layer is critical to limiting the building’s energy consumption, reducing solar heat gain by 30% and energy costs by approximately 13%. There will be an automated roll-down window shade system to supplement the tubes and control early morning and late afternoon direct sunlight and glare.

A full solstice-to-solstice analysis of this system in tandem with daylight dimming systems is nearing completion in a full-sized mockup of one fifth of a typical tower floor. The mockup was constructed outdoors with the same orientation as the actual southwest corner of the building.

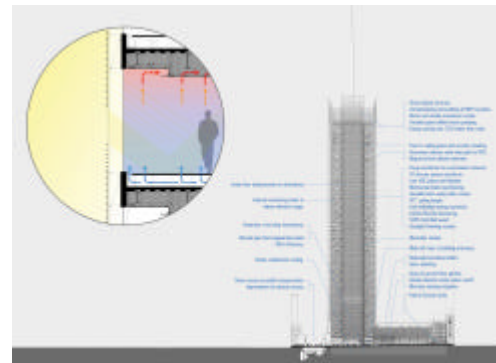


Fig. 8. Sustainable Components: New York Times Building

The team tested many different types of materials for the tubing system, including traditional terra cotta, clay, aluminum and various ceramics from around the world. Aluminum silicate, an extremely dense and high-quality ceramic used for special manufacturing purposes, was chosen for its long-term durability and cost-effectiveness. The silicate tubes will be glazed with a finish similar to the material used on terra cotta to reflect light, self-clean, and ensure its resistance to weather. The team also conducted testing to determine the distance necessary between the glass curtain wall and the tubing to allow for efficient window washing and façade maintenance.

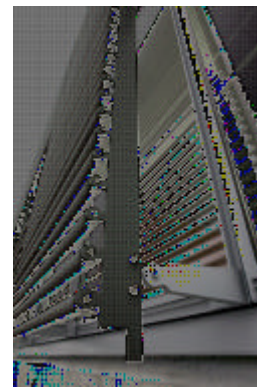


Fig. 9. Detail of curtainwall mock up

At the building’s four-story “podium” at the base, a large skylight brings daylight into an atrium at the center of the newsroom’s large floorplates. Featuring another element of the advanced sunshading system, the skylight is shielded by an external automated louver system that adjusts to the solar angle and intensity, thus minimizing solar radiation and glare and reducing the cooling loads of the space below.

In the notched corners of the building, the structure is exposed to the exterior, contributing to the aesthetic and furthering the display of transparency. The team was challenged to find a method to fireproof the steel and make it exterior appropriate without expensive cladding. Through collaboration with steel fabricators and many other related trades, the problem was solved by using exposed steel members with intumescent coating and careful detailing of the connections.

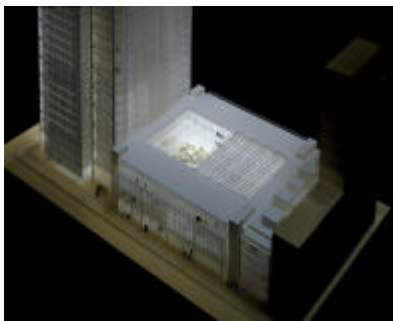


Fig. 10. Model of New York Times Building

In an effort to place less pressure on the region's power supply, the New York Times Building incorporates a cogeneration plant to power its 24-7 operation. Located in a mechanical room at the far end of the podium's top floor, the cogeneration plant consists of two natural gas fired reciprocating engine driven generators with a total generating capacity of 1.5 megawatts of electrical power. The cogeneration plant recovers the heat produced by combustion and converts it into useable energy in the form of hot water.

The recovered hot water serves the building's heating loop to provide warmth during the winter. In summer, it will serve the hot water absorption refrigeration machine to provide cooling during the cooling season. The overall efficiency of the cogeneration plant is 89%, and two on-site generators will provide the remainder of the building's power. The building will use power from the grid solely as a backup source, a situation which required extensive negotiation with Con Edison, the City's power supplier.

As part of the team's effort to enhance the interior environmental quality and the building's energy efficiency, the project will incorporate the first whole-building underfloor air distribution system in

New York City. Investigations of existing installations of underfloor air convinced the Times that the system would benefit the company and the employees, though enhanced air quality, comfort, individual control, and increased energy conservation.



Fig. 11. Interior mock up

Beyond underfloor air, the design of the interior environment, developed in collaboration with Gensler, the project's interior architects, contributes meaningfully to the project's embodiment of the New York Times' mission. Accessible interconnecting stairs between office floors promote interaction among employees, eases internal movement, and reduces elevator load. Positioned at the exterior walls, movement along these stairways will be visible from the exterior and adds to the feeling of openness as one moves through the space and views the building from street level. The assembly of the stairs was studied as part of the full-scale mockup; since they are an integral component of the building, the lessons learned from the pre-construction mockup continue to unfold exponentially—justifying its cost many times over.

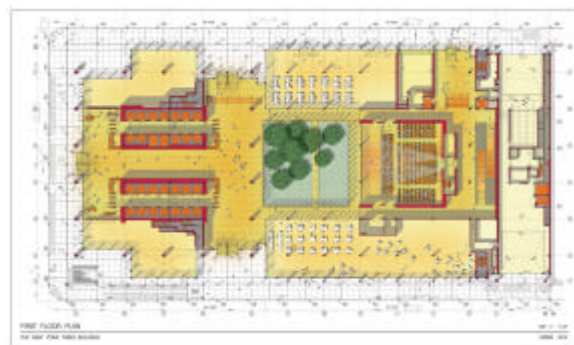


Fig. 12. Ground floor plan

A ground floor garden provides a wide range of environmental benefits to the project. The 4,000 square foot space set in the center of the podium emulates a moss glen indigenous to New York State. Besides enhancing the working environment of the newsroom and the lower floors, the garden reduces stormwater runoff and heat island effect. A high-efficiency moisture-sensing drip irrigation system provides water when necessary.

Visible from three sides of the building, through the multiple layers of the lobby's transparent glass, the garden contributes a calming community amenity to a neighborhood with little public space. When complete in early 2007, the New York Times Building will bring a fresh new character to the New York City skyline—a vibrant piece of crystalline architecture that treads lightly on the natural environment and provides inspiration for many years to come.