SMART, GREEN AND IN BETWEEN - RE-THINKING THE OFFICE TOWER

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First prize, Architecture Contest, SITQ Immobilier, Montreal Canada 1997/8

Introduction
The towers that paint Montreal's skyline are relics of the 20th century. Towers that express the power of capital on the outside turn out to be almost empty from within. It looks like there was a race to reach the skies - to touch the Mount Royal peak.

I remember an attorney working in one of those skyscrapers telling me "the windows are for the lawyers and here in the dark open space is where you can find the *slaves*." His words took my imagination to think of a boat in the ancient times where slaves where rowing to the rhythm of the drums. But then I realized the contradiction here - I told him "you should place your 'slaves' next to the windows if you want them to be able to row and bring your boat to safe land."

Program
The office tower is a multifunctional building that has a hotel, public facilities like conference rooms, mail rooms, libraries, spa, gym, cafe, restaurant, auditoriums and exhibition space. Public facilities are located at different levels of the tower, creating continuous activity from ground level to rooftop.

The rooftop functions of the building includes a helicopter landing dock, a rooftop restaurant with a planetary skylight that by night shows the star map, an exhibition loft and auditoriums. The communication center is located on the rooftop along with antennas and transmission relays.

A big atrium serves the top floors of the building. The structure of the curved truss that creates the atrium is also used to support private staircases between office floors.

The floor plan is based on a hierarchy of privacy and job functions. There is a separation of the workspace with its conference rooms and the shared/public functions.

Thinking Green
The concept of the tower is derived from a flower that reacts to environmental stimulation and changes its form and adjusts to its surroundings. The tower is conceived as a smart building in terms of structure, envelope, functionality, work environment and technology.

A natural ventilation system located in the core of the building and its envelope makes it possible to create a comfortable microclimate. Computerized passive and low energy systems control the natural ventilation and route ventilation through the main ducts in each floor according to climate conditions. In winter the system is used to distribute the warm air from the lower floors and in the double skin envelope to other spaces. In summer, the double skin is used to shade and protect the workspace from direct sunlight and to cool the tower with natural ventilation. Solar panels on the roof generate power for the vents on the outer skin of the building and other building services. An HVAC system supplements the passive solar system.

Structural Concept
An exposed vertical system is a part image of the flower, the core of the flower - the stem – that connects all parts of the flower and is the communication channel between them.

A steel truss in the core of the building serves as a structural element from which other parts of the building are cantilevered. The steel truss is also used for vertical circulation and ducts for services. The core connects all the elements of the project into a one complex structure that work together.

The 4 meter floor to ceiling height allows for a floating floor and a suspended ceiling system that can be used for electrical and HVAC systems as well as communications network. Sky lobbies placed every six floors have a 6 meter height of which 2 meters are used for a technical floor. Two 3-floor groups share each sky lobby. The sky lobby that separates each 3-floor group sits between two truss modules. The 15 meter structural module of the steel truss goes together with the floor divisions 4+4+4+6+4+4+4 = 30 = 15 x 2.

Smart
The project's architecture is based on solar energy use and bioclimatic considerations that creates a "smart" building. This architectonic concept along with the flexibility to adjust to changes in technology and accept new systems, makes the project a "smart" building.

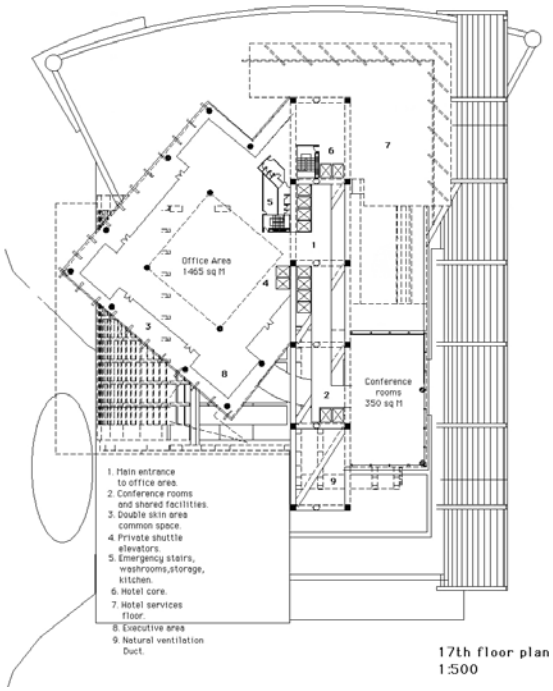
The structural concept of the tower allows executing it in phases. Building the truss core and the main office function constitute the first phase. Functions like the hotel and the supporting public functions can be built as a second phase without disturbing the function of the office area.

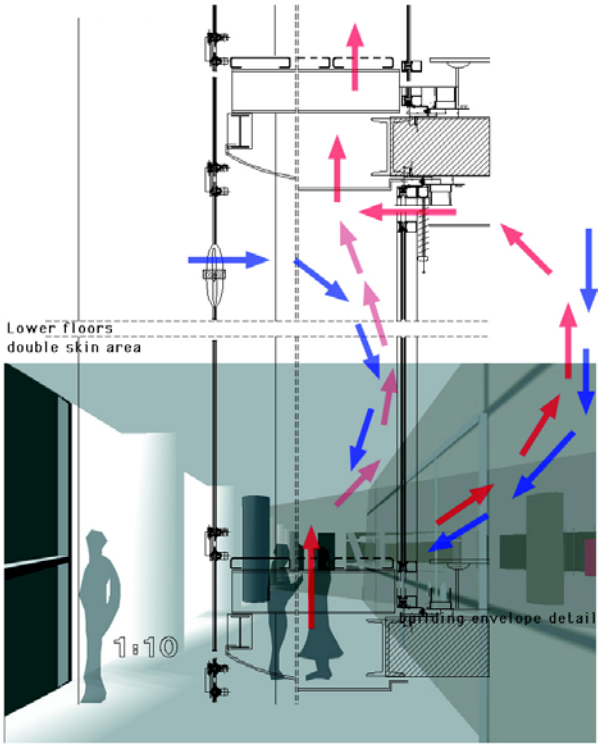
The tower is divided into groups of six floors separated by a sky lobby and technical floor. The division is used for improving the vertical circulation system, natural ventilation, fire safety issues, and the hierarchy of the tower. Each sky lobby/technical floor serves two groups of three floors in either vertical direction and is used as a changing station to go from the express elevators to the shuttle elevators. The core of the building separates the main office area and the shared/public functions.

The orientation of the project is designed such that the glazed truss of the core becomes a wind barrier and serves as a buffer for the main office area. The office area is shifted towards the south in order to expose the double skin envelope to the sunlight most of the day in winter and to have efficient shading for it in the summer to maximize energy savings. The double skin area also serves as a space for activities like lunch breaks and as social meeting place for employees.

Eyal Nir graduated with honors (B.Arch) from the Technion, Israel Institute of Technology in July 1999. Eyal Nir was a visiting student at McGill when he designed the tower.

Instructors:
Prof. Bruce Anderson, McGill University School of Architecture
Prof. Shraga Kirschner, Technion, Israel Institute of Technology


Office Area
1465 sq ft
Conference
rooms
350 sq ft
1. Main entrance
to office area.
2. Conference rooms
and shared facilities.
3. Double skin area
common space.
4. Private shuttle
elevators.
5. Emergency stairs,
washrooms,storage,
kitchen.
6. Hotel core.
7. Hotel services
floor.
8. Executive area
9. Natural ventilation
Duct.
17th floor plan
1:500


Lower floors
double skin area
1:10
Building envelope detail


Eyal Nir , © 1998
a proposition for SITQ Immobilier architecture contest


Eyal Nir , © 1998
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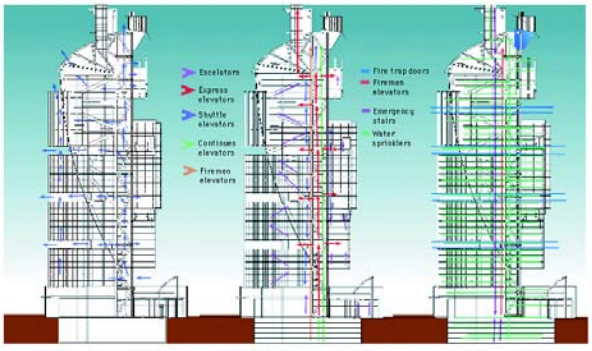
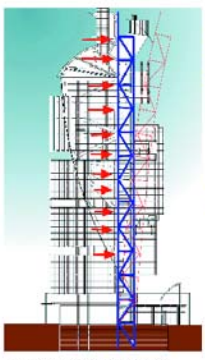
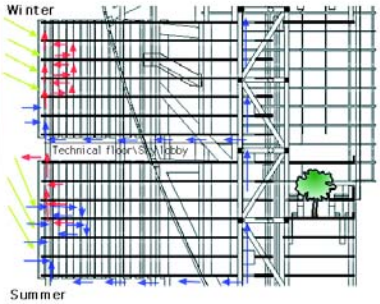

Escelators
Express
elevators
Shuttle
elevators
Contieues
elevators
Firemen
elevators
Fire trap doors
Firemen
elevators
Emergency
stairs
Water
sprinklers
Natural ventilation
Vertical circulation
Fire safety


Truss static scheme


Winter
Technical floor
Lobby
Summer