Holcim Awards 2005

Library and Classroom Building Langara College, Vancouver, Canada

Project data
Type of project: Institutional project
Start of construction: June 2005

Project description by author
Completion: September 2006
Project Cost: $27 million CAN

Environmental sustainability is the driving force of the this project, as well as the conceptual idea and fundamen-
tal spatial experience of the design. This new 80,000 s.f. library and classroom building, one of three new facilities to be added to the campus over a 20 year period, defines an entirely new sequence of outdoor spaces on the Lan-
gara College campus, including a hard surfaced forecourt and reflecting pool and new landscaped student quad.

This building was conceived as the defining element of a master plan which foresees the development of the cur-
rently ad hoc campus, surrounded by surface parking lots, to a sequence of new, well defined exterior and interior student spaces, framed by the three future buildings.

The project is envisioned as an urban form, informed by the environmental conditions to which it is subjected. The new campus public spaces are registered into the mass of the building. The roof is a warped concrete roof that is shaped in such a way as to increase the velocity of cross winds at this level. Air pulled across the top of the roof creates a negative wind pressure at a series of "wind towers" and garden courts that are displaced vertically from the volume of the building. Roof gardens push inward, creating sources of daylight, greenery and ventilation within the building’s interior.

The building is ventilated entirely through natural "stack effect" ventilation, facilitated by the wind towers that pull air upward through the building. This methodology elimi-
nates the need for conventional air conditioning while it also becomes the expressive force underlying one's experi-
ence of the architecture. Fresh air is brought into the build-
ing through wind scoops that become iconic elements in the new student quad. This air, contained in a duct ring, is tempered by passing through the underground parking structure prior to entering the building. Temperature control is further achieved through the building's extensive concrete thermal mass and is heated through its radiant slabs via ground source heating and cooling. The impact of these measures on energy use is significant. Energy modeling has demonstrated an improvement of 72.8% over the Model National Energy Code.

In combination with other factors, including the innovative approach to achieving a sensible urban ecology, it is to be highly commended in that it actively pursues a sustainable, low energy design, yet is not functionally or aesthetically compromised. Unique to these efforts is the incorporation of fly-ash into the concrete frame of the building, designed in such a way as to increase the thermal mass at this level. Effectively ventilated throughout, cooling is facilitated by the wind towers that pull air upward through the building, thereby eliminating the need for costly conventional air conditioning. Temperature control is further achieved through solar shading. Not only offering a strong aesthetic identity and refined public amenities to the local context, such measures are particularly valuable in promoting communal awareness of ecological issues at large. While acknowledging the initially high "hard" cost of certain high-tech solutions, a commendable effort is made with life-cycle calculations to demonstrate the potential long-term benefits of such investments. A clear vision for community improvement is evidenced at both the planning and architectural levels of design.

Relevance to target issues (by author)
Quantum change and transferability
Through an integrated design process, this innovative de-
sign considers building location, orientation and shape. Thermal mass and envelope performance are maximized, as are passive, semi-passive and active mechanical sys-
tems to provide reductions in energy and water usage. The energy performance of this project will be monitored as an education tool and research project for the college.

Ethical standards and social equity
As part of a 25-year campus master plan, this building will set a precedent for all future buildings for sustainability. Also key to the form of the master plan and the library is accessibility. The design extends and connects an existing continuous level pedestrian link across campus to its new west entry gate. A variety of seating along this route pro-
vides places for students to study and meet.

Ecological quality and energy conservation
Langara College and the design team are extremely aware of the global issues with respect to the depletion of fossil fuels and the need to design buildings that do not rely heavily on purchased energy. It has been estimated that this building will save 53.8% of energy compared to a si-
milar building not using efficient measures. This will be achieved through the use of natural/wind driven ventila-
tion, geothermal energy sources and energy efficient gla-
zing. The sources and types of materials, water and land use practices, have all been carefully considered to meet or exceed LEED "Gold" certification.

Economic performance and compatibility
In order to help finance these "new" technologies, Langa-
ra is accessing various public and private funding sources. Although the initial "hard" cost of some of these tech-
ologies can be high relative to more conventional techno-
lologies, a life-cycle costing process was used to prove the long term economics of these systems.

Contextual response and aesthetic impact
As the design and project worked from a simultane-
ous Master Plan for the Campus the careful integration of this building into its context was considered. The library becomes the new focal point and gateway to the cam-
pus, oriented to a new pedestrian entry served by a future light rail transit station. Surface parking is removed and put underground to be replaced by student amenity.

Comment of the Holcim Awards 2005 jury for North America
The project is distinguished by the innovative effort to produce a building that reflects the environmental forces to which it is subjected. A new perspective to enterprising approaches to achieving a sensible urban ecology is to be highly commended in that it actively pursues a sustainable, low energy design, yet is not functionally or aesthetically compromised. Unique to these efforts is the incorporation of fly-ash into the concrete frame of the building, designed in such a way as to increase the thermal mass at this level. Effectively ventilated throughout, cooling is facilitated by the wind towers that pull air upward through the building, thereby eliminating the need for costly conventional air conditioning. Temperature control is further achieved through solar shading. Not only offering a strong aesthetic identity and refined public amenities to the local context, such measures are particularly valuable in promoting communal awareness of ecological issues at large. While acknowledging the initially high "hard" cost of certain high-tech solutions, a commendable effort is made with life-cycle calculations to demonstrate the potential long-term benefits of such investments. A clear vision for community improvement is evidenced at both the planning and architectural levels of design.

Further authors
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