

## CK Choi Building

*A building that teaches respect for the environment*



### Participants

<b>Owner:</b>	University of British Columbia, BC
<b>Project Manager:</b>	Brian Murfitt, John Anderson
<b>Architects:</b>	Matsuzaki Wright Architects Inc.
<b>Structural:</b>	Read Jones Christoffersen Ltd.
<b>Mechanical:</b>	KEEN Engineering Co. Ltd.
<b>Electrical:</b>	Robert Freundlich & Associates
<b>Landscape:</b>	Cornelia Hahn Oberlander

### Building Statistics

<b>Address:</b>	UBC
<b>Floor Space:</b>	3,000 m <sup>2</sup>
<b>Budget:</b>	\$4.5 million
<b>Description:</b>	Offices, workstations, seminar rooms.
<b>Complete:</b>	1996

All pictures courtesy of Michael Sherman Photography.

## Building Construction

### Energy Strategies

- ⇒ The building consumes approximately 23% less energy than ASHRAE 90.1
- ⇒ The use of natural ventilation, assisted by small local fans, eliminates the need for large, expensive mechanical air systems. The atria enhance stack ventilation: warm air rises to louvers in atria while cool, fresh air is brought in through small ventilation channels in window frames.
- ⇒ Steam from the UBC system is the primary heat source. Domestic hot water was designed to be preheated using waste heat from the UBC steam system. However, in reality this supplies little heat, relying largely on the electric tank.
- ⇒ Suspended direct / indirect luminaires allow a lower overall lighting level. Daylight and occupancy sensors reduce the use of artificial lighting. The lighting load is 0.9 watts / sq. ft.
- ⇒ The roof has been designed to be able to add photovoltaic cells when they become feasible.
- ⇒ Efficient water use reduces energy use in filtering, pumping and treatment.
- ⇒ Low-e, double-glazed windows, exterior insulation reduces thermal bridging.
- ⇒ Annual energy costs 50% less than average (ASHRAE prototype), and save \$7,000/ yr.

### **Water and Landscape Strategies**

- ⇒ Low water use fixtures are used throughout the building.
- ⇒ Composting toilets (Clivus Multrum) reduce water use by as much as 1,000 litres [264 gal.] of water / day.
- ⇒ Water reductions enable the project to exist without a sewer connection.
- ⇒ The gray water system uses a subsurface constructed wetland to filter and clean water naturally.
- ⇒ Wastewater from sinks and the composting “tea” from the toilets are filtered through the grey water trench. The plants and microbial life clean the water naturally.
- ⇒ The Vancouver Health Department has tested the fecal coliform of the water and found it to contain 10 parts per 100 ml (swimming is allowed up to 200 parts, and storm water varies from 1000 to 2000 parts).
- ⇒ A 7,000 gallon cistern below the stairs collects rainwater to irrigate the landscape in summer months.
- ⇒ The extensive tree coverage on site was preserved.



### **Materials Strategies**

- ⇒ Seventy-year-old timbers salvaged from a building demolished across the street make up approximately 65% of the heavy timber structure.
- ⇒ One hundred percent of the exterior brick cladding is salvaged from a street in Gastown (an older area of Vancouver).
- ⇒ The following materials were salvaged and reused: main stair handrail, atrium guardrails, all doors, sinks, toilet accessories, and some electrical conduits.
- ⇒ The following materials have recycled content: concrete, steel, insulation, drywall and ceramic tile.
- ⇒ The following materials were eliminated where possible: decorative finishes like suspended ceilings, paint, floor finishes and cabinetwork.

### **Waste Strategies**

- ⇒ UBC is developing a large scale composting system for the campus.

### **Construction Management Strategies**

- ⇒ The public tender included a construction site materials separation and recycling program as a requirement of the contract.
- ⇒ GVRD studies show that roughly 95% of construction waste was diverted from the landfill.



### Indoor Environmental Quality Strategies:

- ⇒ Air pollutants are reduced through construction sequencing and material selection that included eliminating adhesives on the carpets, and using formaldehyde-free millwork and solvent-free finishes.
- ⇒ There is direct venting of photocopying machines.
- ⇒ Extensive windows and atria provide maximum daylighting.
- ⇒ All workstations are located close to operable windows for health and comfort.
- ⇒ The natural ventilation strategy includes grilles below operable windows which provide 9.4 litres per second (20 cfm) per person of outdoor air.

### Capital Cost Accounting Strategies:

- ⇒ The project came in under the original UBC budget (established as if for a standard building).

## Project Process

“In March, 1993 a workshop was planned that would involve the entire project team in the setting of objectives for the project. Bob Berkebile (founding chair of the American Institute of Architects' Environment Committee) was brought in to facilitate the workshop. Bob led the team in an inspirational and intensive two days of learning and exploration, concluding with a joint statement of goals and principles for the project.



...The workshop was a critical step in establishing a shared vision of the project ... The architects worked closely with their sub-consultants from the outset of the project. The implementation of a team approach to all work sessions facilitated an early and comprehensive understanding of the cross-disciplinary relationships of different aspects of the project. Both synergies and conflicts were identified, which in turn assisted the team in determining design options with the greatest impact. Identifying and focusing on the synergies also helped to build momentum and commitment within the team that became invaluable during the difficult aspects of implementing the design objectives.”

From: *Process Makes Product: The C.K. Choi Building for The Institute Of Asian Research At The University Of British Columbia* by Jorge Marques, Freda Pagani, Joanne Perdue.