

ECOroof

CASE STUDY



COOL ROOF PROJECT SUMMARY

A cool roof is a roofing system with high solar reflectivity and thermal emissivity to reduce the urban heat island effect and can be either a coating applied over an existing roof system or a new waterproofing membrane.

Building Type: Commercial

Total Cost: \$426,000 (including \$100,000 in mechanical to raise gas lines, reconfigure ducting and relocate HVAC and air handling units)

Eco-Roof Incentive Program funding received (2009): \$25,040

Size of cool roof: 5009 m²

Cost per square metre: \$85 (including maintenance and \$100,000 in mechanical to raise all gas lines, reconfigure ducting, and relocate HVAC and air handling units)

Project timeline: 3 months

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Spring 2011

Toronto Cricket, Skating and Curling Club

The Toronto Cricket, Skating and Curling Club (TCS&CC) was born out of the 1956 amalgamation of the Toronto Cricket Club, the Toronto Curling Club (1836), and the Toronto Skating Club (1824). The facility contains tennis bubbles, a skating rink, six sheets of curling, seven squash courts, 10 cricket pitches, locker rooms, kitchens and dining lounges.



Toronto Cricket, Skating and Curling Club's cool roof reduces energy consumption and GHG emissions

“We spent more to do the right thing. The initial cost will be offset by a reduction in utilities costs over the years and the avoidance of replacement costs. In addition to reducing the urban heat island effect, we will benefit the environment by using less natural gas in the winter with high R-22 value [insulation], and reduce peak electricity use in the summer.”

Steven Pataki, Facilities Manager, Toronto Cricket, Skating and Curling Club

Quick Facts: Cool Roofs

- extend the lifespan of a roof by minimizing the extreme temperature fluctuations that cause wear and tear on traditional roofs;
- have the potential to reduce energy consumption on hot summer days by between .27 and 3.16 kWh per square metre of cool roof coverage;

Reference: Akbari, H. and Konopacki, S. (2004). "Energy effects of heat-island reduction strategies in Toronto, Canada." *Energy* 29: 191-210 (LBL Study).

- have the potential to reduce GHG emissions annually by an estimated 50 to 590 g of CO₂ equivalent per square metre of cool roof coverage;

Reference: Based on energy savings in Akbari, H. and Konopacki, S. (2004). "Energy effects of heat-island reduction strategies in Toronto, Canada." *Energy* 29: 191-210 (LBL Study).

- have the potential to reduce the ambient air temperature by .6 to 1.7 °C on hot summer days, thereby decreasing the urban heat island effect.

Reference: Akbari, H. and Konopacki, S. (2004). "Energy effects of heat-island reduction strategies in Toronto, Canada." *Energy* 29: 191-210 (LBL Study).

*The City of Toronto's Eco-Roof Incentive Program (ERIP) provides funds for green or cool roof retrofit projects on existing commercial, industrial and institutional buildings.

The program also provides funding for green roofs on new industrial buildings with a Gross Floor Area of 2,000 m² (21,528 sq ft) or greater, and new institutional and commercial buildings of less than 2,000 m².

Eligible green roof projects receive \$50 / square metre up to a maximum of \$100,000. Eligible cool roof projects receive \$2 - 5 / square metre up to a maximum of \$50,000.

Funding recipients must meet program eligibility criteria.

Building Characteristics and History

The 3-storey, 18,581 m² building was constructed in 1956. Energy efficiency concerns of the building include the lighting, motor efficiency, the insulation of the building envelope, and the fact that the HVAC units were individual split units.

In 2009, the TCS&CC installed a cool roof, changed some of their HVAC roof units to more efficient models, and installed REGEN swarm logic controllers to reduce their peak electricity load. The TCS&CC also began a full lighting retrofit to reduce energy consumption.



Before Eco-Roof installation

Project Process

When the Toronto Cricket, Skating and Curling Club needed to replace their roof, they wanted an eco-friendly roof. The TCS&CC found contractors through a Request for Proposal process and received three quotes, the most unique and attractive solution being the toughroof system with DuROCK's TioCOAT white reflective roof system.

DuROCK's patented TioCOAT white roof coating is applied as a liquid and dries and bonds to the roof, creating a seamless, highly reflective roof surface.



“Socially, we will be able to teach the membership about our stewardship, and we will have a Ryerson University Building Technologies professor and students study and model our roof system. Eventually, we will be able to market our stewardship model. The Club’s Management and Board of Directors embrace the triple bottom line, always weighing social and environmental considerations when making our economic decisions.”

Steven Pataki, Facilities Manager,
Toronto Cricket, Skating and Curling Club

Outcomes

- Lower utilities and costs
- Reduction in the urban heat island effect
- Ability to market the TCS&CC’s stewardship
- Ability to use the cool roof as an educational tool
- Extends roof life, avoids landfill
- Reduced capital costs of replacing a conventional built up roof every 15 or 20 years
- Favourable media exposure

The roof coating, which reflects 89% of the sun’s rays, lasts for more than 10 years with proper maintenance. The TCS&CC specified that the roof have three inches of ISO insulation, which necessitated raising and altering all 40 rooftop air handling units’ ducts, gas lines and electrical connections on the roof – a massive undertaking. However, the TCS&CC will realize a return on investment through less heat gain and lower air-conditioning costs in summer due to the highly reflective TioCOAT, and less heat loss and lower heating costs in winter as a result of the extra thick R-22 ISO insulation.

The Toronto Cricket, Skating and Curling Club’s commitment to the triple bottom line (economics, environment and social measures) is ingrained in their corporate culture. All operational and capital decisions are weighed against this philosophy.

Cost Breakdown

Tear-off of existing roof, design fees, materials and installation	\$318,000
Engineering reports	5,000
Maintenance plan re-coating every 11 years extends the warranty another 11 years	60,000
Other mechanical to raise gas lines, reconfigure ducting, and relocate HVAC and air handling units	100,000
Total Cost	\$426,000