THE BOBSLEIGH TRACK AT WHISTLER

REFRIGERATION AND ICE SPORTS

by Gaetan Tremblay

The bobsleighs will reach speeds approaching 140 km per hour and subject the sled crews to centrifugal forces up to 5Gs in some corners.

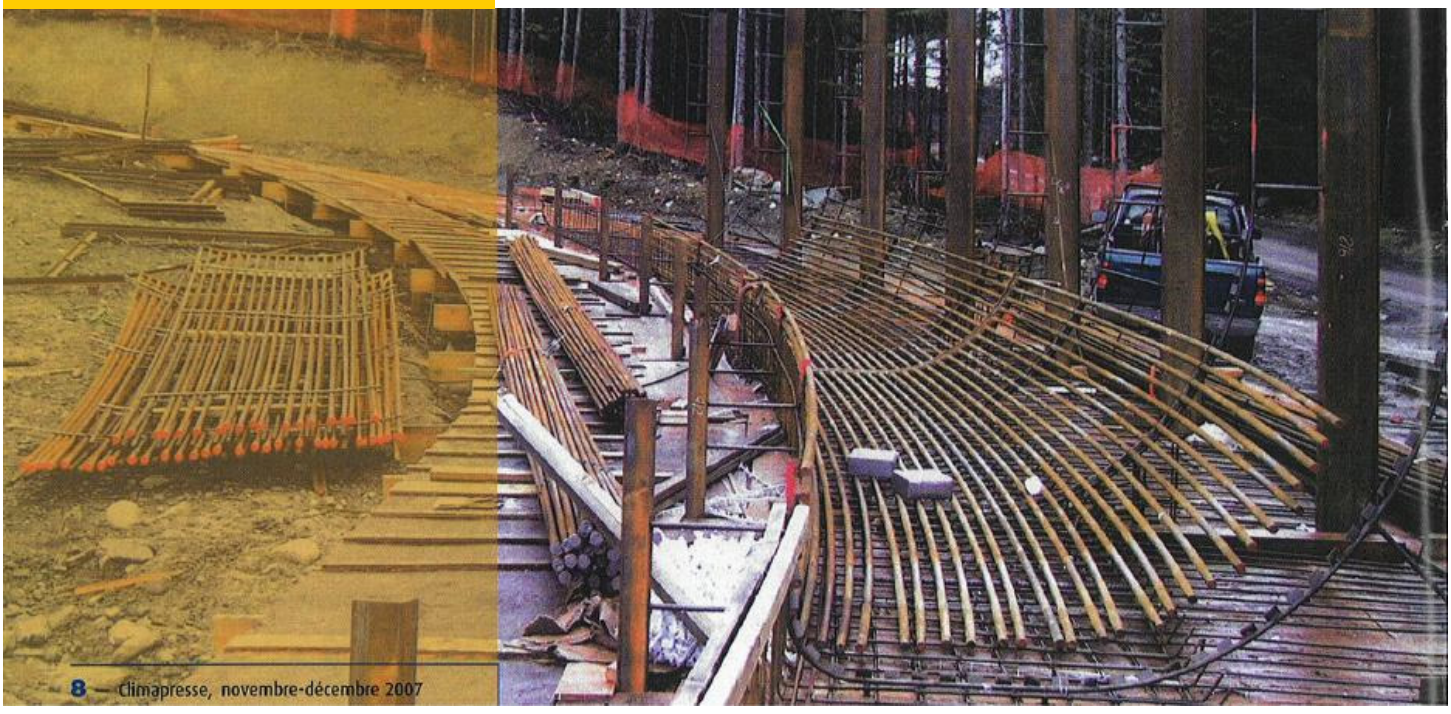
Such performance requires an exceptional ice quality. The track at the Whistler Sliding Centre, constructed by CIMCO Refrigeration, will provide this quality.

One of the spectacular, new facilities constructed for the upcoming 2010 Winter Olympics in Vancouver is the Whistler Sliding Centre for the bobsleigh, skeleton and luge. The 1,450 metre long track has been designed to be fast, with speeds approaching 140 km per hour. Of the 16 corners that the competitors will have to negotiate, several turns will have a pull of up to 5Gs in force.

Engineered, manufactured and installed by CIMCO Refrigeration and its partners, the Whistler Sliding Centre is just one element of the contract awarded to CIMCO by VANOC (Vancouver Organizing Committee). The firm is responsible for the design and installation of all the sports venue refrigeration equipment, which includes: the UBC Winter Sports Centre (men's and women's hockey), the Pacific Coliseum (figure skating and short track skating), the Hillcrest Park (curling), the Richmond Oval (long-track speed skating) and the Whistler Nordic Centre (ski jumping). Of notable interest, for the first time the "in-run" tracks of the K95 and K125 ski jumps will be refrigerated to ensure consistent track conditions throughout the competitions.

To complete all of these projects will require 40,000 hours of work, including 12,000 hours of welding. Already 60% of the work is complete. Everything should be finished by 2008.

One of the key elements required by VANOC in awarding the contract to CIMCO was the protection of the environment in the operation of all the refrigeration equipment. Incorporating their energy efficient ECO CHILL® system, CIMCO's refrigeration equipment will recover and re-use the heat from 1,100 tons of refrigerant, saving the equivalent of 7 metric tons of greenhouse gas or equal to the removal of 2,000 vehicles from the roads.



THE CHALLENGE

A major challenge was to design and engineer a system that would provide a consistent, high quality ice surface able to handle the weight and punishment of the bobsleighs. Adding to the challenge are the ever-changing climate conditions - sun or cloud, day or night, wind or calm, snow or rain all effect the temperature throughout the day. However to ensure that all competitors have an equal opportunity, the refrigeration system must be able to compensate for all these elements.

An ammonia refrigerant was chosen to meet this challenge because it provides maximum efficiency and instant response time. A Refrigerant 404 system would have been two and half times larger and more expensive. A glycol system, commonly used in ice rinks, would not provide the heat transfer efficiency necessary for this type of application. Only a very efficient ammonia system ensures the consistent quality of ice required by the competition.

THE SYSTEM

Before undertaking installation, CIMCO and its partners provided experts with three prefabricated sections that were put through a wide variety of quality evaluation tests. The sections were approved and construction began almost immediately.

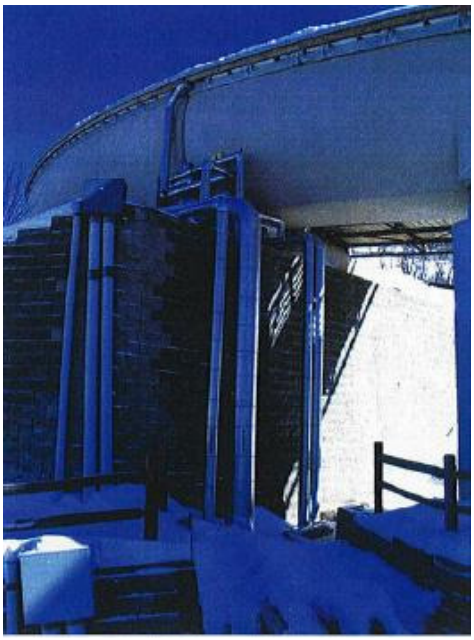
Divided into four main sections, the track is refrigerated by 500,000 linear feet of 1 1/4" steel pipe buried in the concrete. Each main section is connected separately from the engine room at the base of the run by five pipes (four supply and one return). The system feeds 122 evaporators segments, each servicing 50 to 75 feet of track length. Four 700 hp compressors provide a total capacity of 1,400 tons of refrigeration at an operating temperature of -20^0 C. The installation is equivalent to big industrial systems used in the food industry and far exceeds the size used for ice skating rinks. The 150,000 pound ammonia refrigerant charge has a value of about $300,000. It is contained in two low-pressure receiving tanks, each 12 feet in diameter by 27 feet long. To ensure an efficient flow of refrigerant, four 3-stage pumps were installed to handle the pressure requirements of the different track sections and their varying elevations.

Looking at the supply pumps there is one pump rated 135 GPM @ 325 foot pressure head; one rated 55 GPM @ 453 ft; one rated 65 GPM @ 554 ft and one rated 50 GPM @653 ft. The total flow rate is 305 GPM. The nominal capacity of the evaporative condensers is 2000 tons, mounted on the roof of the plant. The equipment is managed by a digital control system supervised by an operator. The ECO CHILL system provides heat for the 9000 ft^2 building at the base of the run. A special ice resurfacer is used to prepare and repair the ice surface.

STARTUP

The project is now at the startup stage, which will allow the Canadian men's and women's bobsleigh, luge and skeleton teams to have the advantage of two winters of practice and competition at this venue before the Games. Following the 2010 Winter Games, the Sliding Centre will be used both for competitive athlete training and for recreational purposes, using different starting points for each.

The Olympic and Paralympic Games in Vancouver will not take place for another two years, but as a world leader in refrigeration technologies CIMCO Refrigeration is already involved in the preparation of the upcoming 2014 Winter Games to be held in Sochi, a resort location in the Caucasus of Russia. CIMCO has been contracted to consult on refrigeration systems for several of the sports venues.



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