

Olympic Curling ice-rink Supervision

The innovation of the Pinerolo county polyfunctional Ice rink hosted the Curling tournament in the last Winter 2006 Olympics in Turin with the winning technology of Baron Thermodynamics Spa.

Among the most interesting projects realized for the Turin Winter 2006 Olympic games was the new Polyfunctional Ice-rink of Pinerolo (Turin, Italy). The ice-rink, built with the most modern and innovative technology, hosted the Men and Women's curling tournament (Round Robin, semifinals and finals). This sport, not that well known in Italy, was in the limelight at the Turin Winter 2006 Olympics by being a big

public success. Curling originated in Scotland where it was played on frozen-over lakes. A demonstration of this game was given in the Chamonix 1924 Winter Olympics for the first time but it was not part of the Olympic program. Other demonstrations of this game were given in the 1988 and 1992 Winter Olympics and it was not until 1992 that it officially became an Olympic sport. In Curling, which was an huge unexpected success

with the success, two teams battle it out on the ice in a match very similar to the very popular Italian bowling game called 'bocce'. The athletes have to get the 'stone' which is a smooth round shaped stone with a handle on top, as near as possible to the centre, called 'home', of the target designed on the ice. The Italian men's team honorably gained seventh place while Finland, Canada and the USA each won Olympic medals.

The project, plant realization and maintenance was commissioned to Baron Thermodynamics Spa, a company based in Creazzo (Vincenza, Italy) which has been planning and producing industrial refrigerator and air conditioning and cooling systems since 1946.

Specialized in thermodynamic systems for the food industry, the company is also quite active in sport center installations, having already realized 25 ice rinks in Italy. The Pinerolo sport complex covers a surface area of 6,000 square meters (about 2,000 iced surfaces) and has four curling rinks which accommodate up to 2,300 places with the capacity to be very flexible on rearranging space after such events

as the Turin 2006 Olympic games, for local sports, recreation and sport events. The rink can also be used not only for hockey, curling, short track and artistic ice-skating but also for theatrical shows. "It was a great challenge to build and maintain this complex" admitted engineer Giuseppe Baron from Baron Thermodynamics Spa 'It had to be guaranteed that the thermohygro-metric conditions, in technical

terms, where the most sophisticated ever in an Olympic sport complex. When the ice rink was used for Hockey or ice-skating it had to be kept at a constant low temperature due to the impact of the athletes' strides made on the ice while skating. Curling, however, involves the sliding of a passive object along the ice and the consistency of the ice surface, in this case, became the key factor'.

The Baron Thermodynamics planners took on this challenge and planned a computerized control system capable of



The Ice Rink Control Room, from where the operators manage the sport complex by using the Movicon supervision system.

keeping the ice surface temperatures at least 4.8 degrees below zero, with hundredth degree precision.

The sport complex's automation system is the heart of the structure. 'Our experience' explained De Grossi, Automation manager of Baron Thermodynamics Spa, 'guarantees optimal application of standard technologies such as PLC and Scada/HMI, which unite together with the exclusive

Baron Thermodynamic Spa control systems to allow us to get full control over the regulation algorithms and complete system monitoring'

In this complex, apart from the traditional temperature sensors (Thermoresistors) on the rink and in the central refrigerator, Baron Thermodynamics Spa has applied infrared temperature sensors 15 meters

The system's supervision is guaranteed locally in the central refrigerator with an operator panel with user interface.

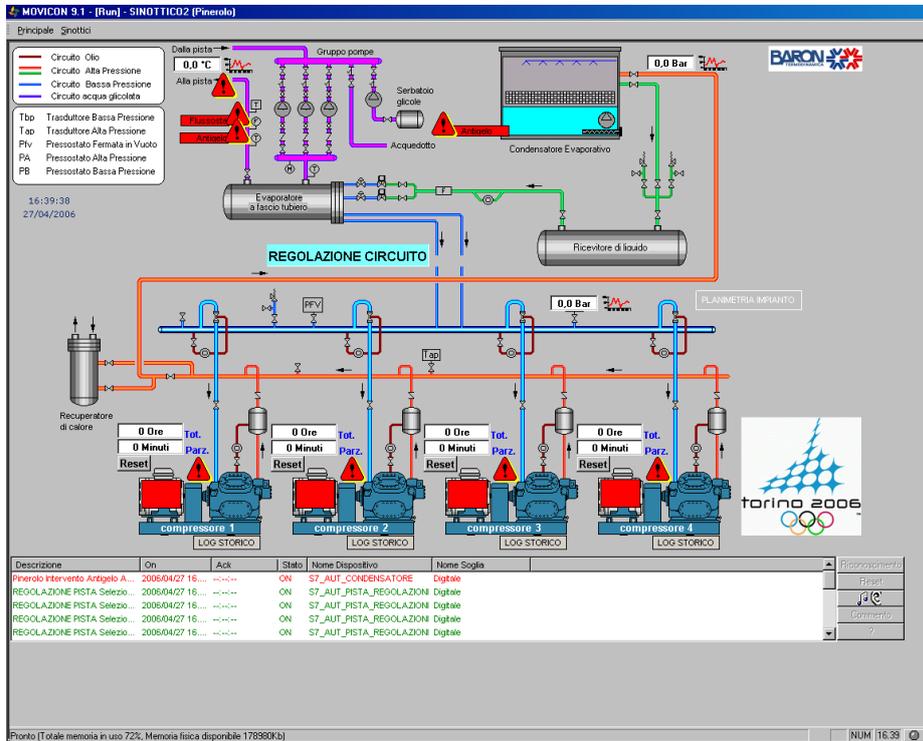
The actual supervision, based on the Movicon Scada/HMI, resides in Ice-rink's control room. The refrigeration engine-room houses the electric cabinet with the thermo regulator PLC, which controls the ice-rink system according to the working

parameters set by the supervisor and optimized by the technicians from Baron Thermodynamics Spa. Thanks to this supervision system, the operators managing this sport complex system (the Pinerolo Council took over the Ice-rink after the Olympics ended) can control the rink and the entire refrigerator engine in realtime as well as other components such as compressors, pumps and evaporative condensers.

Accurate screen pages clearly show the user the current situations and historical behavior. For many years the Baron Thermodynamics Spa refrigerator control systems have been providing supervision of entire processes capable of ensuring the user efficient management and control. In addition to the local supervision, the Baron Thermodynamics Spa systems have integrated tele-

management, an extremely important concept considering what damages the user might sustain if any errors should occur causing the refrigeration system not to work insufficiently. For this reason the Movicon supervision system comes integrated with all the functions for notifying the sport complex managers and staff (on-call staff) of every process alarm, which might be a danger to the correct running of the process.

By using the text-to-speech functions the supervisor can send vocal alarm messages via telephone to personnel who can then



One of the screens of Movicon Scada/HMI project employed on The Olympic Ice Rink stadium of Pinerolo, Turin 2006.

above the rink to control the exact temperature of the rink surface, for each one of the 4 Curling lanes. All the information deriving from the 4 rink thermoresistor sensors and the 4 infrared ones together with the parameters retrieved in the central refrigerator (including the virtual probes which calculate data values with the appropriate algorithms) allow the automation system, based on PLC, to regulate the temperature perfectly.

connect via modem to verify whether to restore immediately or decide to intervene on the process. This possibility ensures the user that company management costs can be optimized, by valuating if and who, of those on call, should intervene in the zone needing attention.

An accurate diagnostics is absolutely fundamental for optimal running the plant system, and can increase its efficiency by reducing any downtimes.

Another important task carried out by the supervisor is to historically record and log all the process variables, parameters and events occurred in the system. For instance, chart analysis of temperature and pressure trends can be used for making improvement to settings, to get an expert analysis in order to adapt the system to the specific process characteristics. In the food and beverage sectors, the historical data plays a vital role by acting as a kind of guarantee on the product's quality and storage.

"The supervision carries out a fundamental role in our plant systems" says Mr. De Grossi. "Apart from controlling the process, managed by the PLC, the user interacts with the system by using the PC supervisor, and from which they can acquire all the information necessary for optimal system management. For this reason Baron

Thermodynamics Spa has paid a lot of attention in choosing the right Scada platform, evaluating not only potentiality and user friendliness, but also the services provided with it. In addition to the PLC, temperature control tools are also connected to the Movicon supervisor, based on the exclusive Baron Thermodynamics Spa technology. The company has become a big name in the refrigeration sector also due to the numerous innovative solutions it has introduced into the proposed basic technologies: from ice-rink projects, studied for thermal expansion and homogeneity, to prefabricated refrigerator power control centers to reduce costs, bulkiness and setting up times, to computerized system to optimize service costs in function with the meteorological conditions. The products include mobile ice-rinks in various sizes, preloaded on containers, with flexible piping so that it can be moved easily. "Building a system of this type was both a great challenge and a great honor for us at the same time" highlighted the Baron engineer. "I am convinced that thanks to this event our company will be consolidated as a leadership in this sector in the international market " .