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Solatube case study: Beijing Science and Technology University Stadium

Using their latest daylighting innovation, the Solatube 750 DS Daylighting System, Solatube have helped make the green theme of the 2008 Beijing Olympics become a reality.

The Beijing Science and Technology University Stadium was designed to host the Judo and Taekwondo Olympic competitions, as well as the Paralympics wheelchair rugby and wheelchair basketball events. The multipurpose indoor sports facility features a 2400m^2 competition arena and seats over 8,000 spectators. Suitable for a range of fitness, aquatic and competitive sports activities the gymnasium will continue to be frequently used well after the Olympics have finished.

To uphold the 'World's First Green Olympics' theme, the Architecture Design Institute of Qinghua University needed to design a facility that would meet stringent environmental standards, as well as suit the needs of athletes and spectators.

One of the key issues in fulfilling this design goal was to find a way of effectively transmitting daylight into the facility to reduce the need for artificial lighting. Using the latest addition to the Solamaster series, the Solatube 750 DS Daylighting System, the architects were able to meet their design requirements and dramatically decrease reliance on artificial lighting.

'Compared with traditional lighting systems, Solatube Daylighting Systems have a unique advantage with better progressed view and a wide application field. They reduced usage and exceeded our environmental design goals,' says Architect Weimen Zhuang.

Combining Spectralight Infinity Tubing and Raybender 3000 Technology with an insulating dome, the Solatube 750 DS Daylighting System provides superior lighting performance. In total, 148 Solatube 750 DS Daylighting Systems, each with a diametre of 530 mm, were installed in the Olympic venue.

In addition to producing four times more light than similar products, it was the flexibility of the system that allowed the design challenges to be overcome.

'Skylights were not an option due to building obstructions, such as a steel-frame roof and a diffusion plane of 17 metres, which would negatively impact light transmission and delivery,' says Solatube General Manager, Mark Peall.

'The high light transmission and flexible properties of the Spectralight® Infinity Tubing meant it could be angled around construction obstructions and allow daylight to be successfully transmitted over eight metres.'

The installation of the 750 DS Daylighting System was complemented with Optiview® Open Ceiling Diffusers, which evenly disperse the light throughout the 2400m^2 space, while Daylight Dimmer™ Kits allow the amount of daylight transmitted to be adjusted anywhere from 100 percent to two per cent for maximum user comfort and increased energy efficiency.

The benefits of replacing the need for artificial light with natural daylight extend beyond decreased power bills and improved energy efficiency. Introducing daylight into any indoor environment, particularly workplaces, can result in decreased absence rates, stress minimisation and increased worker productivity.

Research undertaken by Massachusetts Technology Collaborative, the US state's development agency for renewable energy, found that by improving indoor air quality, increasing daylight and controlling temperatures productivity can be boosted by 7.1% annually.

Similarly, a 2003 office worker productivity study conducted by the California Energy Commission, found exposure to daylight was consistently linked with higher levels of concentration and better short term memory.

European countries have been aware of the link between natural light and improved health for some time. Many nations' building codes specify the maximum distance a worker can be from a natural light source and how much of a building's light must come from outdoors. In Germany, workers must be stationed no further than six metres from a natural light source and windowless offices are not permitted.

According to Mark, thorough testing is carried out prior to installation to ensure the lighting will perform in a way that will suit the occupant's needs.

"All testing is done using computer software. The client will brief us on the floor plan and tell us where partitions and furniture such as desks will be located. From that we are able to advise them how many daylighting systems they will need, what lighting performance will be like and even where shade and brightness will occur,' says Mark

'Due to the magnitude of the project and the number of daylighting systems being installed, the process for the Beijing Science and Technology University Stadium was slightly different. We consulted with the architects from day one to ensure that the roof space wasn't too crowded.'

While the Beijing Science and Technology University Stadium was the first public installation of the Solatube latest innovation, it is the first of many for Solatube, particularly in China. Mark says that the company needed to expand manufacturing capabilities in order to accommodate a 200% increase in demand internationally.

'China was the obvious choice and with the nation currently increasing their focus on more energy efficient products it has turned out to be a sound decision. In the next three months over 1000 Solatube products will be installed in China alone.'

For further information contact Solatube on 13 16 19 or visit www.solatube.com.au

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