



Environmentally Friendly Building with LONWORKS® Open Systems

Background

The Toyosu Center Building Annex is the new landmark tower of the Toyosu district in Tokyo. Opened on 1 September 2006, the 33 story building has a total floor area of 105,448 m² including two subterranean levels and a penthouse suite. Situated at the entrance to the Toyosu district, the Toyosu Center Building is an impressive welcome for visitors to the area. It also contains the head offices of NTT DATA, a leading systems integrator in Japan.

For the new annex building (the building on the right in the picture) the building owners, IHI Construction Machinery Limited, wanted a flexible, state of the art building automation system that could easily accommodate future changes and minimize maintenance costs. The efficient and environmentally friendly use of energy resources was also a key issue. The system of choice was LONWORKS, and NTT DATA were awarded the contract to carry out the system integration.

The Solution

Involved in the Toyosu Center Building Annex project from the design stage, NTT DATA was responsible for the electrical, sanitary and air-conditioning equipment as well as the information infrastructure. NTT DATA's information technology including wireless LANi, IP telephony and an open building automation system based on LONWORKS technology are used extensively in the building. A total of 19,000 management points are controlled by LON devices connected to the backbone network with more than 80 iLON600 routers from Echelon.

Since the LONWORKS technology enables devices from different manufactures to be integrated into a single building management system, the owners were able to choose the "best of breed". Devices from 10 different manufactures were integrated into the system at the Toyosu Center, including I/A Series HVAC controllers from TAC, I/O controllers from Watanabe Electric Industry Co., Ltd. and lighting control from Matsushita Electric Works Ltd. This level of flexibility also makes it easy to extend and change the system in the future.

Taking Care of the Environment

By using a compound heat source, NTT DATA were able to reduce both installation costs and CO₂ emissions. The main heat source is a gas-burned hot and chilled streams source machine and, as a part load, an electric turbojet chiller was installed in the building. The result is an environmentally friendly heat source system.

An energy management system (EMS) supplied by Sumitomo Densetsu Co., Ltd. has been linked to the building automation system. The LNS-based system collects energy usage data from the electrical, sanitary and air-conditioning systems as well as equipment operation time. This data is used to optimize daily management and for diverse estimations and analyses. This will lead to a significant reduction in energy consumption and, therefore, substantial financial savings. The building automation system developed by NTT DATA also actively makes use of the iFIX SCADA software developed by GE Fanuc Automation. This software includes web screens for super ordinate control and improved high level usability and expandability.



Alternative Air-conditioning System

The air-conditioning system allows the operators to choose between perimeter return stream temperature for feedback control and natural ventilation for feed forward control. Operators simply press a button on a client PC to switch between the two modes. The benefits are two-fold: adjusting the system to the indoors load ensures comfortable working conditions within the offices for workers; and for the owner, optimal energy consumption leads to a reduction in costs.

Summary

The Toyosu Center Building is set to remain a landmark building for years to come. Not merely because of its impressive outer appearance, but also due to the flexible and environmentally friendly technology of its LONWORKS building automation system that provides lasting benefits for occupants and the building owner.

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