BicentennialHall

Middlebury College's Science Center



Environmental Design Features

Site Considerations

- Views to the surrounding environs were enhanced by making them a focal point of the design
- Designed with topography, constructing into the hillside gaining additional square footage without height
- The master plan calls for open corners to the college quads, and this was respected
- Location near largest residential structures encourages pedestrian campus

Connections with Campus and Regional Sustainable Systems

- Ample bicycle racks and shuttle stop to encourage use of alternative transportation networks
- Porous paving used where appropriate to filter runoff and return water for aquifer recharge
- Plants and landscaping selected to minimize care and chemical application
- Night sky light pollution minimized through use of automatic shades on windows at dusk and capped, down directed lighting in the parking area
- Large percent of local, green certified wood for paneling from Vermont Family Forest (FSC certified)

Efficient and Alternative Energy

- The roof design combines substantial insulation with continuous air/vapor system and ventilated "cold roof" for energy efficiency and durability
- Six-inch air/insulation space between shell and structural exterior walls provides good insulation and effective drainage. A carefully detailed air barrier provides a long lasting (designed to last at least 100 years) and efficient wall structure
- Triple glazing in windows, with R-value of 6-8, provide 2-3 times the insulating value of typical thermal windows
- Daylight penetrates the vast majority of spaces
- Combination of effective frame and high R-level eliminates condensation tendency while eliminating standard perimeter (below window) heating in 90% of the building which reduces capital costs, operational costs and maximizes space at interior

- Size of the building mechanical equipment was reduced by about 50% from what a run-of-the-mill design process would provide
- Re-use of "contaminated" air as make-up air. This strategy allows the use of air from clean spaces like the Great Hall to be used in labs that have larger fresh air demands
- Glycol heat exchangers in laboratory venting reduces substantial heating and cooling losses
- Process cooling system for the laboratories in place of once-through water cooling provided in the labs
- Solar-powered lights illuminate the Bicentennial Hall parking area
- Building systems commissioned after Bicentennial Hall opened to assure greatest efficiency in operations

Building Materials

- Loading docks made of recycled materials
- Insulation containing CFCs was designed out of the building and HCFC's were minimized
- Linoleum floors used instead of vinyl floors, and some flooring was kept as sealed concrete
- Exterior shell walls of Adair limestone provide near-zero maintenance and a long life span
- Finished woodwork (125,000 board feet) from green, certified wood
- Natural cork used for display boards
- Vermont slate roof provides reduced maintenance, as compared with any other roof type. Additionally, slate is a local material, reducing transportation impact
- Recycled plastic lumber used on the flat portions of the roof
- Insulation and mortar screen made from recycled materials
- All excavated rock was crushed and re-used on site

Waste and Recycling

- Construction waste was separated on site, monitored and recycled
- Recycling bins throughout building designed for high visibility easy access and aesthetics

Design philosophy

- The payback from environmental enhancements to the building was considered across a 10-15 year period, rather than the more typical 5-year period. This allowed for more unique design strategies.
- The building was intended, through flexible and modular design, to be just as useful to the college's future needs as well as its current needs. This means less future construction, less future waste, and less future environmental impact.
- In addition to utilizing state-of-the-art technologies, the design minimizes maintenance and repair costs. If a surface doesn't need to be repainted or a tree fertilized, considerably less pollution is put into the environment.