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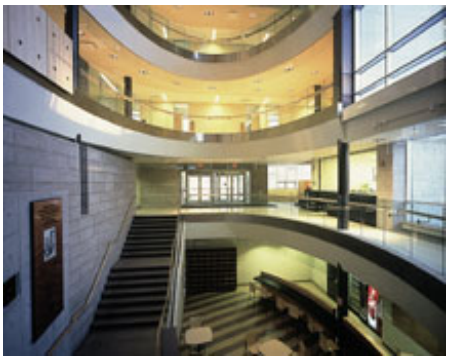
Features

Intelligent Focus Yields Winning Design

Chernoff Hall Chemistry Facility promotes multi-disciplinary adaptability and interaction between various research groups through an imaginative use of space.



Dramatic open spaces offer visual connections and a pleasant, bright facility. (All photos: William McElligott)

The "Wow Factor" is the phrase coined by the staff at Chernoff Hall Chemistry Facility, Kingston, Ontario, to describe newcomers' experience. Situated on the historic campus of Queen's Univ., this chemistry building provides a sense of modernity, while reflecting the tradition and historical continuity of the school. Its limestone exterior was especially selected to harmonize with the stone used on the neighboring buildings and the campus.

Named in appreciation of "leadership gifts" from two generations of the Chernoff family, Queen's alumni, Chernoff Hall has been awarded Laboratory of the Year High Honors by R&D Magazine. The award was conferred on this facility for its multi-disciplinary approach to the labs, incredible working conditions, as well as how it addressed safety issues through cost-effective measures.

Vital stats
Project: Chernoff Hall Chemistry Facility, Queen's Univ., Kingston, Ontario
Size: 14,247 m2 (5,038m2 labs)
Budget: $59 million ($27 million from the Ontario Superbuild Corporation, $3.7 million from the Ontario Innovation Trust, and the Canada Foundation for Innovation, each; the rest is from private donations)
Architect/Engineer: Brisbin Brook Beynon Architects (lead architectural/engineering firm) and Sauvé Boucher Associates(structural engineering), both from Ottawa, Ontario; Crossey Engineering (electrical engineering), North York, Ontario; Keen Engineering (mechanical engineering), Toronto, Ontario
Completion Date: November 2002

Intelligently adaptive design

The beauty of Chernoff Hall lies in a multi-disciplinary conformability that does not have one branch of chemistry forcing its will upon another. This unobtrusive versatility stems from the "intelligent service module" design achieved by the architects, which translated into the labs being built around a core space, allowing adaptability to future needs. The use of this module in an academic structure is unique because it is usually only seen in industrial buildings. "By bringing all the services to one point in each module allows the future reconfiguration of each lab to meet changing requirements at minimal expense," says Rick Boswell, dept. manager at Chernoff Hall. "This allowed us to create labs that are entirely different in function within the same generic space. For example, we have an advanced laser lab in the same type of space as an organic synthetic lab with virtually no customization to either space other than fume hoods and casework."

Thought to safety

Fume hoods are another distinguishing feature of Chernoff Hall. Low flow fume hoods, which use 40% less air in a constant air volume (CAV) system, were installed to lower ongoing cooling and heating expenses. Although these deeper hoods take up more space99 cm compared to the standard 74 cm to 84 cmthe cost was compensated for by a decrease in size of the mechanical systems, as well as a reduction in the shaft/duct sizes. In addition, energy was conserved by operating these hoods at a face velocity of 18

m/min, instead of the industry norm of 30 m/min.

This long-term energy and fiscally sound approach to fume hoods was not attained at the expense of the safety of students and personnel. Analyses were performed to ensure that the use of low flow fume hoods will not sacrifice safety. It was discovered that the facility"s low flow fume hoods behaved as modified hand-operatedpositiveenergycontrol (HOPEC) IV type hoods, which are usually constructed to comply with the Americans with Disabilities Act. "This thought and care to the safety of the students and staff who will occupy the building is a large factor as to why this building is an award winner," says judge Victor Neuman, director of TekAir Systems, San Diego, Calif.

Further innovations within the fume hoods include elevated cup sinks to avoid spills from seeping into the waste water system. A side window enables individuals to observe experiments even when not standing immediately in front of the fume hood. Also to be found are integrated vacuum pump cabinets with special ports for vacuum hoses in the floor of the fume hood.

Environmentally kind

Clarity, transparency and openness are key features of Chernoff Hall providing a humane working environment.

Rather than administer bench vacuum by the inefficient method of water aspiration, a compressed air venturi system was used. 250 venturi valves, driven by two large type compressors housed locally, were integrated into the various labs, providing 40 mm Hg of vacuum. Unlike water aspiration-driven vacuums, where the vacuum fluctuates with the changing water pressure, this venturi system provides consistent vacuum. Moreover, besides saving water and being easy to service, an inoperative unit does not affect other researchers since the vacuum is delivered locally. Finally, contaminants drained into the system do not impede other scientists, and shutdowns to maintain the units are not needed.

Collaborative working conditions

Using these fume hoods and venturi valves are twenty-three research groups that are conducting studies in four main areas of research ranging from environmental, theoretical, materials, to medicinal/pharmaceutical. The labs are stratified with theoretical chemistry research being conducted in the "office" part of the building, analytical and physical chemistry labs on level 3, and synthetic chemistry studies being performed on levels 4 and 5 (the lower two levels house teaching labs).

In order to offset this isolating stratification, "community" spaces meant to facilitate interaction without compromising the quality of the clinical environment were included. These connection areas are spread out both horizontally and vertically throughout the facility. "The buildings' primary components are organized around a series of interconnected spaces. Some formal with a program use (lounge, reading room); and others informal, as in staircase bulletin boards and mailbox foyers. Each is designed to spatially connect people and departments with one another," says Ritchard Brisbin, architect at Brisbin Brook Beynon Architects, Ottawa, Ontario.

Science on display

Brisbin Brook Beynon Architects managed to achieve the desired clarity, transparency and openness by constructing a multilevel rotunda that offers a view to all circulation routes and floors. Additionally, open spaces, walls and visually linked glazed planes were used to connect compartmentalized activities. The undergraduate laboratories, for instance, were set alongside glass corridors to the exterior, which "not only provided natural light but also served as a safety feature by allowing outside observation of the labs. This is rarely done, even in top-of-the-line corporate labs," says Richard Rietz, competition judge and design consultant. "I liked that this group had done their homework. They took a holistic, non-linear approach and thought their way to their answers. They just didn't accept what others had done or what people told them."

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