

# Drive & Control profile

## Architectural Firm Exhibits New Use of Aluminum Structural Framing in Smithsonian Cooper-Hewitt National Design Museum Show



Aluminum structural framing offered the strength, ease-of-assembly, and aesthetic requirements for a complete, multi-functional SmartWrap exhibit structure.

Rexroth product employed as innovative armature to display SmartWrap transfer technology. Aluminum structural framing is no longer just for common factory structures like machine bases and workstations. Now, it is also finding its way into new, innovative applications in the medical industry and, most recently, even in museum exhibits. In fact, more and more

architects like Philadelphia-based KieranTimberlake Associates LLP are developing new ways to incorporate this modular, flexible, reusable structural component into unusual, interactive displays of new architectural technology.

KieranTimberlake, an award-winning and internationally published architecture firm noted

### Challenge

Develop new ways to incorporate aluminum framing into interactive displays of new architectural technology.

### Bosch Rexroth Solution

- Aluminum structural framing
- Rexroth FMSsoft AutoCAD®-based software

### Benefits

- Building time significantly reduced
- Greater ease of use
- Aesthetically pleasing design
- High-strength, scratch and corrosion resistant surface
- Maintenance free
- Improved efficiency
- Software made exhibit design and construction easier

for its research, innovation and inventive design and planning services, was founded in 1984 by partners Stephen Kieran, FAIA and James Timberlake, FAIA. Today, the firm is comprised of fifty professionals whose projects include the programming, planning and design of all types of new structures and interiors and the renovation, reuse and conservation of existing structures. The firm's clients include arts and civic



SmartWrap is a composite that integrates the currently segregated functions of a wall and compresses them into one composite.

organizations, cultural and educational institutions and private residential clients. When KieranTimberlake committed to developing SmartWrap—an innovative printable building façade utilizing transfer technologies—for the Cooper-Hewitt National Design Museum, the firm

investigated several options for the armature before selecting aluminum structural framing and requesting a donation of materials from the Linear Motion and Assembly Technologies business unit of Bosch Rexroth Corporation.

### Framing the Concept

The catalyst for the SmartWrap exhibit using aluminum structural framing was KieranTimberlake's transfer technologies research initiative. The initiative is intended to evaluate a wide range of technologies, including both process innovations and cutting-edge material applications used beneficially in other industries, such as automotive manufacturing, aerospace and shipbuilding, for their potential transfer to the building realm. Principal investigators are aided in their work by a full-time core research team, and the entire KieranTimberlake staff is encouraged to contribute to the research program. The substantial experience and varied backgrounds of this group provide critical feedback and insight as the research progresses from conceptual ideas into practical applications. Fundamental to the research is the participation of industry experts like Bosch Rexroth, representing the various disciplines involved in the design and production of buildings, as well as of those industries being studied for potential technology transfer.

“Collaboration with representatives from all fields is essential to the identification and development

of these new approaches, as is the integration of knowledge from the four disciplines involved in the construction process: architecture, construction, materials science, and product engineering,” explains Timberlake. “The non-linear, symbiotic interrelationship among these entities—a ‘new world’ of building—could be said to represent transfer technology number one, as it will enable many subsequent innovations, both transferred and primary.”

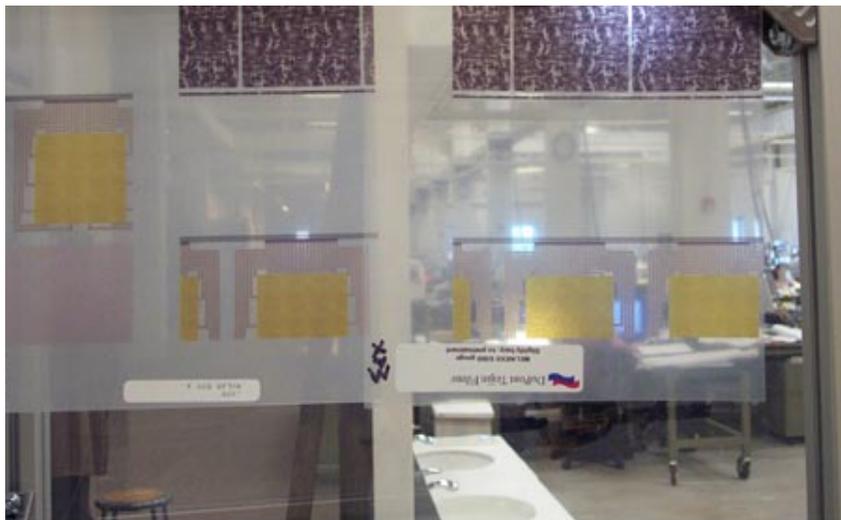
One of those transfer technologies is SmartWrap. SmartWrap, a mass customizable print façade, represents what Timberlake calls “the building envelope of the future”—a composite that integrates the currently segregated functions of a wall and compresses them into one composite. SmartWrap replaces the conventional wall with a composite on the millimeter scale that can be erected in a fraction of the typical building time and with greater ease. The material can also be produced for an infinite number of conditions and desired aesthetic programs.

Inspired by material science and the printing industry, SmartWrap utilizes innovative products rolled and printed onto fabrics and plastic films in roll-to-roll processes. The idea was realized through the transfer technologies of industries to provide shelter, climate control, lighting, information display and power. The printable skin is made up of a substrate, and applied or imbedded layer and various printed layers. The intention of the exhibit and the aluminum framing

armature will be to display and explain the concept of the wrap in its architectural and artistic context, to describe its various components and to demonstrate the transfer technologies associated with it. Just as a printable building façade could be customized, the intention of the exhibit is interactivity with the curtain. Once inside, museum goers will be able to input variables into a computer and customize their own ideas of the wall.

“The SmartWrap display represents a truly innovative use of the Rexroth framing product, which is not normally used as a principle component of exhibit structures,” notes Timberlake. “We hope the exhibit puts aluminum structural framing in a new light and opens the eyes of the design community. No other product provided us with quite as elegant a venue. Its modern, well-designed, modular features allowed us to incorporate architectural and design elegance while still functioning as the armature for display of this innovative skin.”

Design flexibility and the possibility to customize height and width of components also factored into the firm’s decision to use the Rexroth framing. Timberlake selected Rexroth aluminum structural framing because the brand offered the most aluminum profiles—83 different high-strength, anodized aluminum profiles with dozens of different connectors and accessories—satisfying the strength, ease-of-assembly, and



The SmartWrap exhibit utilizes innovative products rolled and printed onto fabrics and plastic films.

aesthetic requirements for a complete, multi-functional SmartWrap exhibit structure.

Comments Timberlake: “The software supplied by Rexroth to design the aluminum frame helped us to ensure that we had properly accounted for all the pieces and connectors needed. This was imperative for this project where we had less than ten days for the entire pavilion construction. The Bosch frame was fully assembled on-site in a day and a half. We test-assembled half of the exhibit in our office to familiarize ourselves with the system, and a number of smaller modules were pre-assembled to reduce on-site construction time.”

Pioneered by Robert Bosch GmbH in Europe over 20 years ago, aluminum structural framing

features a simple T-slot design, allowing assemblers to simply insert a T-bolt into a T-slot and tighten. The high-strength, extruded aluminum profiles also have a natural color and anodized surface that is scratch and corrosion resistant, never needs painting, and is maintenance free. A similar design using welded steel would take several days to build compared to aluminum structural framing, which can be easily assembled in a matter of hours.

In addition to the framing’s physical characteristics and benefits, Rexroth’s FMSsoft AutoCAD®-based software reduced engineering time by providing product visualization and generating a bill of materials. FMSsoft is a suite of programs for layout, planning, and design of

structures made with Rexroth aluminum structural framing. FMSsoft simplifies common tasks, improves efficiency, and reduces the time needed to assemble structures. With AutoCAD 2002 functionality, FMSsoft provides automatic parts list generation, integrated calculation, a 3-D system library, and fast-functioning macros.

KieranTimberlake's SmartWrap Museum Garden Pavilion using Rexroth aluminum structural framing will be displayed at the Cooper-Hewitt National Design Museum in New York City on the corner of Fifth Avenue and 90th Street opening August 5th, 2003.

**Rexroth**  
Bosch Group