

# banners & flags

**Banco Popular**, the leading bank in Latin America, is using the entire west facade of the Banco Popular Building in San Juan, Puerto Rico as an in-house advertising campaign billboard.

## BANCO POPULAR

This bold step in advertising uses a fabric mesh banner 15.24m wide by 51.81m long (50 ft. by 170 ft.), as its pallet. The structural system and installation method, developed by our team, allows the fabric banner to be easily and economically changed for future advertising campaigns.

ALL PHOTOS COURTESY A. FORM ARCHITECTURE



Banco Popular's banner is a unique ad: It provides shade and was designed to withstand hurricane winds.

The existing 20-story building has a rectangular floor plan with 12 massive structural columns located along the building perimeter. These columns also house existing mechanical ventilation equipment. The existing concrete office tower was built in 1962 and is still one of the tallest structures on the island. The owner, Banco Popular, dictated our architectural/structural design criteria as, "not visually impacting the architectural integrity of the building while the fabric banners were not in place."

Buro Happold reviewed the original construction documentation and worked closely with the Banco Popular Consulting Engineer, Danes and Moore Consulting Engineers.

The exterior structural columns are offset from the corners and protrude from the building face from 0.91m (3 ft.) at the top to 1.52m (5 ft.) at the building base. The West

facade (short side) has two columns 16.46m (54 ft.) apart creating one potential signage bay. The South facade has four columns 14.94m (49 ft.) apart creating three potential signage bays.

The existing window mullion system protrudes from the building face 0.3m (1 ft.). The protruding mullion system forces the fabric away from the building face, thus making the project unique. Most large fabric signage systems are placed directly on flat surfaces allowing for perimeter frames and simple attachment methods.

We designed the fabric banners to withstand hurricane force winds, as it is unrealistic to expect the banners to be manually removed within a 24-hour notice period of an approaching hurricane. Current ANSI (American National Standards Institute) codes specifies a wind loading of 55.88mps (125 mph) or 2.39kPA (50 psf) of wind pressure, for San Juan Puerto Rico. Our final design met this requirement.

The fabric banner is approximately 0.91m (3 ft.) off the facade of the building, thus allowing airflow behind the banner. To withstand hurricane force winds and pressures, we designed a system of high strength polyester belts, factory applied, approximately every 1.68m (5 ft.-6 in.) on center horizontally, to the underside of the fabric. The high strength polyester belts are affixed to discrete concrete anchors, which attach directly to the existing building superstructure. The belts are then ratcheted into place and locked. Horizontal support is provided by an aluminum truss system attached along a series

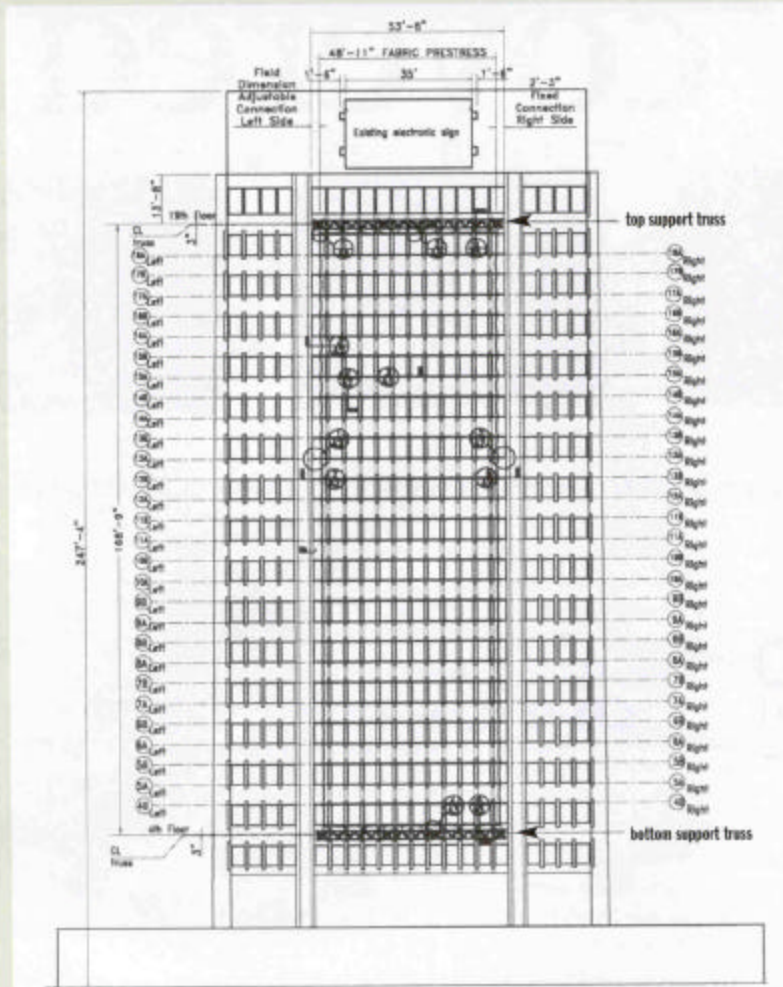
**A new hanging method for banners makes a Puerto Rican skyscraper a sign in itself**

BY ANDREW FORMICELLA



By using mesh, the architects were able to cover over windows while allowing occupants a view out.

# banners & flags



A Form Architecture designed a system of support trusses attached to spandrel beams.

of concrete anchors along the top and bottom of the banner assembly. These anchors are affixed to an existing spandrel beam.

During hurricane force winds the banner assembly will flutter and hit the facade of the building, although no damage is expected to the existing facade due to the resilience of the assembly. The fabric may tear, tatter and flutter during hurricane force winds, but this will not effect the high strength polyester belts or the banner assembly's structure.

We do not expect any fabric to completely detach from the banner assembly, but if this situation should occur, we designed the largest piece to be approximately 1.52m by 6.09m (5 ft. by 20 ft.). Tear, tatter and flutter of the fabric "proper" during high winds is beneficial to the wind resistance of the entire banner assembly during hurricane force winds, as the torn fabric will not take a wind load. By designing the banner system to incorporate a light fabric, we are reducing costs associated with shipping, handling and installation. Relatively new fabric printing techniques and equipment are able to transfer studio produced photography, digitally enhanced artwork onto large fabric panels.

The use of a mesh fabric allows us to directly cover over windows, while not totally blocking the building occupant's view out. In fact, the banner is providing solar shading for almost the entire West façade of the building. Our preliminary calculations show about a 30 percent reduction in solar gain for this region of the building.

The view out of the office windows is greatly improved by pulling the mesh fabric approximately 0.91m (3 ft.) away from the vertical surface. The exterior plenum created between the building face and the back of the fabric is presently under an internal environmental study.

The fabric banner concept was conceived and project managed by Jose Stella of VA Media of San Juan, Puerto Rico. The design/build contract was held by A Form Architecture by creating a strategic alliance with the following companies: A Form Architecture pc (architectural design/build), Buro Happold Consulting Engineers (structural engineering), Ocean State Production Services (rigging and installation), Event Promotional Supply (Fabric supplier and color printing), Slick Systems Inc. (aluminum truss supplier) and Fabric Structures Inc. (fabric testing and webbing supplier).

The fabric we specified (12 oz S.I. Tex Sign Mesh) is specifically developed for color printing process and is not structurally suited for such spans and hurricane wind loading 55.88mps (125mph) required for this application. Our design integrates a system of horizontal webbing belts connected to the building superstructure. The fabric is treated in our calculations as nonstructural; the webbing belts disperse the structural loads.

A specially designed mounting bracket placed the banner fabric about 0.91m (3 ft.) away from the vertical surface, creating a plenum air space.



# banners & flags

Fabric lifting and stabilization are provided by the top and bottom aluminum trusses, bracketed off to the building superstructure. Lighting could have taken three very distinct directions: **Lighting Option A:** Simply wash the banners with an even white light. Color changes could be made manually at the luminaires. **Lighting Option B:** Use a state of the art computer controlled intelligent luminaire system. Automated color changes to a pre-programmed color sequence. **Lighting Option C:** Large format projection system. The projection system could become an integral part of the ad campaign's graphic design. In practice, the banner could have minimal printed graphics for daytime viewing. The projection system could have multiple overlays for night viewing. Source height and distance is critical and needs to be analyzed. This could be a temporary system for specific campaigns. The owner picked Option A.

## Conclusion

The excitement in our office stems from the fact that this project represents a future for fabrics in architecture. In truth, we hung a "membrane" onto the face of a 1960s office tower. From our perspective, the future of membranes is limitless.

Are we on the brink of introducing "intelligent fabrics" that retrofit an existing architecture? Programmable fabric "skins" could interface with a building and its occupants and adjust to the relationship between the artificial and natural climatic conditions. What's next? Will video projection technology evolve to allow daylight projection clarity? Imagine, one day we may be able to change the entire character of a building by digital projection. ■

*Andrew Formicella is a principal in the firm A.Form Architecture PC, New York City.*

## Project data

**Client:** Banco Popular

**Architectural design/build:** A.Form Architecture PC

**Structural engineering:** Buro Happold Consulting Engineers

**Rigging & installation:** Ocean State Production Services

**Fabric supplier and color printing:** Event Promotional Supply

**Aluminum truss supplier:** Slick Systems Inc.

**Fabric testing & webbing supplier:** Fabric Structures Inc.

**Fabric:** S. I. Tex Sign Mesh