

A BRIDGE OF ART – INCORPORATING A COMMUNITY’S VISION INTO THE DESIGN OF THE BROADWAY BRIDGE

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ABSTRACT

The Orlando Sentinel has referred to the Broadway Bridge as “Daytona Beach’s newest permanent art exhibit.” This variable depth concrete box girder bridge with 262’ spans crosses the Intracoastal Waterway over the Halifax River with a 65’ vertical clearance. The twin spans are 3,008’ long. The arch-like flowing curves of the superstructure and the elliptical shaped piers fit into the natural harmony of the site. To accomplish the community selected theme of “timeless ecology”, colorful glass tile mosaics featuring wildlife from the region, and water life in the Halifax River were integrated to the bridge design, communicating the ecology to everyone experiencing the bridge, including drivers, pedestrians and boaters. The bridge aesthetic elements were determined with significant community input through two design charettes with 35 participants and using consensus voting for the selection of approximately 40 items.

Keywords: Precast, Concrete, Segmental, Aesthetics, and Community Participation

INTRODUCTION

Downtown Daytona Beach, like other coastal towns, had suffered from development fleeing to the malls. In the early 1990's, the City began plans to redevelop the city center in order to attract new development. A key feature in the center of town is the Broadway Bridge – 50-year old lift span bridge that was functionally obsolete and expensive to maintain.

The bridge site location links the famed Speedway (west of the city) to the beaches – an area of extensive redevelopment and the county convention center. Florida Department of Transportation recognized the need to replace the deteriorated bridge and was ready to utilize an innovative process to gain input from the community early in the process to create a unique structure. They also agreed to provide funding for bridge aesthetics that would help create a landmark structure in the city center.



Image 1. Beach Street, at the western landing of the Broadway Bridge.



Image 2. Beach Street, leading onto the new Broadway Bridge.

PRELIMINARIES

On direction from FDOT, FIGG prepared a Bridge Development Report from which the FDOT selected “balanced cantilever precast concrete segmental” for the bridge type. In the Bridge Development Report, seven structural alternates were evaluated. Balanced cantilever precast concrete segmental was preferred by FDOT due to:

- Suitability of precast concrete for the harsh coastal environment. The flat slab at the western landing of the bridge (which provides a transition from the street elevation to the first segment) and any segment within ten feet of the saltwater would have calcium nitrite added as a corrosion inhibitor.
- Quick erection – The existing bascule span bridge had to be replaced soon. Annual events such as Bike Week, Speed Weeks, etc. swell the local population by more than a factor of ten and traffic congestion during these events was becoming a nightmare for local law enforcement officials. Previous construction experience indicated that the contractor should be able to erect an average of four segments per day. (This was achieved and a maximum of eight segments per day was accomplished at one point.)

- There were existing locations along the Intracoastal Waterway where a pre-casting yard could be established, allowing segments to be barged to the bridge site – saving time and money for FDOT.
- Of the seven structure alternates, the balanced cantilever precast concrete segmental was the most cost-efficient.

THE PROCESS – PART ONE

With this decision made and the new bridge alignment determined, an open invitation to the community was issued. The invitation was to spend a day in a design session focused on the bridge. The first community input session, known as a charette, was held in April of 1994. Participants included employees of local governmental agencies, representatives of business associations, recreational and cultural association members and residents with a special interest in the bridge project. During the first charette, Linda Figg, now president of FIGG, led the group through an explanation of various bridge types and terminology associated with bridge design and construction. Most participants were not versed in engineering terms, thus needed a basic understanding in order to make decisions on the design elements. One of the first topics that the group addressed was theme of the bridge. The theme provides a foundation on which the bridge aesthetics are developed. Voting by participants indicated the most favorable theme was *Timeless Ecology*” - with a score of 8 out of a possible 10. During charettes, options for each element are explained in detail, discussion follows, then participants vote on a scale of one to ten. A vote of one conveys a negative feeling towards that option, five is neutral and ten is a very positive vote. Vote scores are then averaged and the option with the highest average vote is selected. The Florida Atlantic coast was important to the charette participants – they wanted the world to know just strongly they link their identity to this by selecting “ecology” as a part of the theme. Equally, participants wanted a timeless structure - the design elements should be appropriate over the service life of the bridge and not become dated.

During the first charette, participants also voted in favor of long spans (typical span is 262’), a variable depth superstructure (ranging from 13’ at the piers to 7’-9” at mid-span), submerged footings, elliptical pier shapes, an open railing, the use of colorful aesthetic elements on the piers and superstructure fascias and for the use of attractive light poles and decorative lighting on the bridge surface. Due to the bridge realignment, ten acres of land along the Intracoastal Waterway was made available for the city to redevelop into a new riverfront park. In keeping with this new park setting, charette participants voted for freeform landscaping at the bridge landings, a “statement” at the western landing and for aesthetic features at the western landing of the bridge visually linking to the Beach Street streetscape.



Fig. 3 - The Broadway Bridge features 262’ typical spans as it crosses the Halifax River, which is also the Intracoastal Waterway in this area.

Independent of the bridge design, the City of Daytona Beach was undertaking the redevelopment of the Beach Street area, perpendicular to the western landing of the bridge. The City had undertaken a major streetscape project that included new brick pavers, wide sidewalks, decorative lighting, wrought iron railings and signage. Charette participants wanted the bridge to be complementary to the streetscape. With the outcome of the initial charette, the design team now began to design the basic bridge and develop options for consideration at the second charette that would expand upon the selected design elements.

CHARETTE TWO

In preparation for the second charette, potential solutions for the design elements selected in the first charette were further developed. Various types and styles of decorative light poles were offered, along with options for the pedestrian handrail and bridge aesthetic lighting. For the sidewalk and superstructure fascia elements, the design team researched a variety of mediums, recognizing that the final materials needed to be durable, financially feasible and have a full range of colors from which to render the native wildlife images. Presented for consideration were:

- Concrete cast relief
- Glass tile mosaics

The charette participants were strongly in favor of the wildlife images being rendered in glass tile mosaics. The outcome was 18 – seven-foot tall precast concrete shell medallions along the walkway on each of the twin 3,010’ bridges. Each medallion houses a colorful realistic mosaic, creating an interactive gallery of native Florida Atlantic Coast wildlife along the pedestrian sidewalk. At the landings of the bridge, the mosaics are of water life (crabs and seahorses which transition to sea turtles and sailfish). As the elevation of the bridge increases, the mosaics shift to land animals, such as the Florida panther. The transition is then to birds – from flamingos and egrets to a pair of bald eagles at the apex of the bridge. The animals then appear in reverse order along the sidewalk on the parallel bridge. The featured species were selected by the FDOT from a list prepared during the charettes. The waterside of each medallion is a precast shell design, edged in deep blue mosaic tile. A custom handrail, designed to repeat the wave pattern found in the pier mosaics and the railings in the plazas at the bridge landings, link the shell medallions. The railing also provides a visual link to the Beach Street streetscape. Aesthetically pleasing light poles, selected in the second charette, line the center of the twin spans and can feature banners celebrating local cultural and recreational events. There is also feature lighting on the piers, which delicately highlights the elliptical shapes at night. And finally, the charette participants selected a soft cream-colored coating for the concrete, which provides a canvas for the bright, colorful mosaics.



Fig 4. – Ten foot tall mosaics wrap each of the 26 piers on Broadway Bridge.

With a vertical clearance of 65' and horizontal clearance of 125', the new Broadway Bridge allows for free passage for the numerous recreational boaters on the Intracoastal Waterway. In consideration of boaters' views of the bridge, each of the bridges' 26 piers is wrapped with a ten-foot high mosaic of swimming manatees and dolphins. Although the pattern is constant, it begins in a different position on each pier, imparting a sense of movement. The pier mosaics begin just above the water line. In total, over 40 elements of the bridge design were selected during two charette sessions, resulting in a strong feeling of ownership by local civic leaders, government officials and residents.

A final activity of the second charette was to rank all of the selected aesthetic elements. This would ensure the inclusion of the most desired elements, should financial constraints develop. All selected aesthetic elements were included and bids were within the FDOT budget.

THE FINISHED PRODUCT

The residents of Daytona Beach have welcomed Broadway Bridge, dedicating it on July 20, 2001 in a joint celebration with the city's 125th birthday. *The Orlando Sentinel* has referred to the bridge as "Daytona Beach's newest permanent art exhibit." During the dedication, numerous events took place, including a contest for children to name each of the species represented on the bridge, along with locating the unique star-shaped tile within each walkway mosaic. This interactive use of the walkway gallery has been repeated on numerous occasions, bringing the bridge to life for many families. Mike Snyder, P.E. District Secretary for FDOT, stated, "FIGG held two community design charettes to develop a solution that incorporated important community identity elements. The completed bridge solved our transportation goals by replacing a bascule span that delayed both vehicular and boat traffic, but the new bridge has also become a landmark to which residents, tourists, boaters and pedestrians are drawn. The equally important goals of solving a transportation challenge and providing a structure that would elicit pride in the community were met well by the design team." With a final construction cost of \$37 million, the Broadway Bridge was completed within the owner's budget. The world-class aesthetic elements were achieved for 8.3% of the final cost and within the owner's expectations. The redevelopment of downtown Daytona Beach has continued towards the beaches with a major commercial and hospitality complex. City of Daytona Beach Economic Development Administrator Suzanne Kuehn noted it; "The bridge has become a major feature in attracting and convincing players to be involved in the redevelopment."



Fig. – The completed Broadway Bridge has become a local landmark and a source of great pride for local residents who participated in the community charettes.