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SAVE OUR BRIDGE  
Clay Tile Roofing of the Bascule Towers  
Bridge of Lions Rehabilitation Project

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Summary:

According to photographs of construction progress on the Florida Department of Transportation's (FDOT) project website, tile work on the bascule towers of the Bridge of Lions Rehabilitation Project began in June and was completed between August and September 2009 (<http://www.fdotbridgeoflions.com/progress.html>).

Theresa Segal, president of Save Our Bridge (SOB) first noticed the appearance of the tower roof hip tiles on the afternoon of 11/17/09 and took photographs the next day. Using a high quality scan from an original construction photograph dated 3/5/27 a comparison was made with images of the rehabilitated roof and some serious inconsistencies became apparent in the treatment of the hip tiling (Appendix A).

After circulating the comparison images through email with members of SOB inquiries were made on 11/23/09 to Richard Wallace, Structural Engineer with Reynolds, Smith & Hill, the lead design consultant (via phone call) and Ken Smith, Architect who consulted on historical details (via email, see Appendix B).

A reply was received on 11/24/09 from Laurie Sanderson, Public Information Officer for the rehabilitation project asking that all questions be directed through her office at which time SOB made an official request to review construction documents (Appendix B).

On 11/25/09 an email with the comparison photographs was sent to the Department of State to inform the State Historic Preservation Officer (SHPO) of the situation. It was SOB's opinion that Secretary of the Interior's Standards for Rehabilitation were not being followed as outlined in the Memorandum of Agreement (MOA) dated 3/14/02.

A letter from David Ferro, deputy SHPO, was sent on 12/2/09 (Appendix C) to Bill Henderson with FDOT officially registering concern regarding the hip tiling as not being consistent with what his office had reviewed and approved. The MOA stipulates, "Any proposed changes made after the 100% [design] phase or during construction shall be subject to review by the SHPO."

Inquiries were made with local architects as well as a representative of Ludowici tile and other tile manufacturing and installation experts. All discussions reinforced the assertion that the hip tile treatment was not correct and/or consistent with the approved construction documents (as stated in SHPO's letter).

Meeting with URS:

Segal and Nancy Sikes-Kline, both members of SOB, met with Sanderson and Jose Polo, URS Project Engineer at their offices on the afternoon of 12/02/09 to review construction documents regarding the roof tiling that had been requested on 11/24 via email. Submittals and qualifications of the subcontractor were reviewed. Specifications were provided at a later date.

Photographs of the tear-off as well as the approved mock-up dated 11/08 (Appendix D) were also reviewed. What became apparent was that the mock-up was constructed to reflect the tear-off rather than the original 1927 tile pattern.

When looking at photographs of the rehabilitated roof and discussing the massive appearance, Polo commented that they (the subcontractor) did not have enough hip tiles to properly space them, so they were spread out and mortar was used to compensate. This discrepancy can be seen in the photographic comparison where eight can be counted on the original hips and only six are incorporated in the rehabilitated roof. Sikes-Kline noted that this would explain why mortar was even more heavily used in the rehabilitation than in the mock-up.

Also noted was the missing terminal tile at the apex of the roof where the eight hips meet. Pictures of a dome-shaped element removed during tear-off didn't appear to be the same as what was seen in the 1927 photograph.

The submittal regarding clay tile materials was approved (by R.R. Wallace per Ken Smith) with the stipulation that a colorant be added to the mortar to match the tile as noted in the specifications. Documents also show that the original clay tiles were made by Ludowici and state that these tiles were to be replaced "in-kind" and from within the same time period.

Meeting at Skanska Construction Trailer:

Thursday, December 10, 2009, 10:30 a.m.

Re: Bridge of Lions Rehabilitation Project - Tower Roof Tiling

Attendees:

Theresa Segal - President, Save Our Bridge

Terri Newman - FDOT, District 2

Jeff Williams - FDOT, Project Manager

Jose Polo - URS, Senior Project Engineer

Laurie Sanderson - URS, Project Public Information Officer

Jay Maust - Ford Metal Roofing

Andrew Holbrook - Skanska, Field Engineer

David Tyler - FDOT, P.E. Trainee

Jenna Jakes - Reynolds Smith & Hill, Engineer Intern

The meeting was started at 10:40 by Jeff Williams who asked Terri Newman to recap where they had left off at a meeting two days prior with the contractor and Construction Engineering & Inspection representatives.

Newman stated that she was representing Bill Henderson with District 2. She recounted that it appears the course of the clay tile rehabilitation was based on what was observed and documented at the time the roofs were removed. Jay Maust concurred. He questioned why this finished portion of the rehabilitation was being revisited and indicated that his company's work was based on the approved mock-up. He recalled the architect Ken Smith approving the mock-up and accompanying submittals with the caveat that a colorant be added to the mortar to match the tile. Testing was done to arrive at a color that bridged the variety of clay tile colors.

Theresa Segal pointed out that the mock-up was apparently based on a repair job, which probably occurred after the State purchased the bridge from the City in the early 1950's. Records show the lease purchase agreement took place in 1945. During that time period light fixtures and railings were also replaced and aesthetically downgraded.

Segal asked why the project designers, while basing the rehabilitation of the fixtures, railings, tollgates, etc. on evidence from the original 1927 design didn't give the same attention to detail to the treatment of the tower roofs. She pointed out that the archived image provided by RS&H to the SHPO to illustrate the original bascule tower is the same photo that SOB used (cropped and enlarged) to show the significant difference (Appendix E).

Maust suggested that the current heavily mortared hip tiling were done for safety reasons. Segal stated that according to her research the excessive mortar technique used was not necessary and over time would cause maintenance issues due to cracking. Maust disputed that the mortar would crack and asserted that Ford has done a good deal of restoration work around St. Augustine. Segal pointed out that the criteria for the Bridge of Lions rehabilitation remaining on the National Register is the outlined in the Secretary of Interior's Standards for Rehabilitation and suggested that they didn't seem to be familiar with these standards.

There was discussion about the technique for installing clay roof tiles with a central nailer board to which the tiles are anchored with a screws. Segal asserted that the number of screws could be increased to add wind-load resistance. So appearance does not have to be modified for safety. Segal suggested that the height of this nailer board might be part of the design difference.

Williams asked Segal what would it take to mitigate the tiling deviation of the bascule roofs. Segal referred to the photo-enlargement of the original 1927 roof and suggested that the rehabilitated roofs should match as closely as possible. Williams asked Maust if this could be achieved.

Maust said it would most likely require a complete redo which was possible. The factors to be considered were time, cost, and availability of material since another tear-off would damage more of the tiles. He estimated that about 10% of original tiles were used in the rehabilitation. Most of the "in-kind" replacements came from a stockpile of antique Spanish "S" tile from the same era at Florida School for the Deaf & Blind a few miles away.

Sanderson asked if it's possible that all the tiles weren't original since there was evidence of significant repairs in which case salvage might not be such a big factor. It was decided that at the end of the meeting the group would go outside to examine some of the tiles, which were in the trailer's yard.

Segal said she had communicated several times with a representative for Ludowici tile who assured her that either stockpiles of antique Spanish tile from that time period or replicas were readily available. She told Polo that she would provide contact information for him and also put him in touch with the Historical Society Research librarian who had provided the high quality scan used to enlarge the 1927 construction photograph.

Williams asked that Maust provide a quote to retile all four towers as soon as possible. Sanderson suggested that a second quote also be provided for doing the work when the bridge is open to traffic vs. under construction. Andrew Holbrook commented that a complete redo would entail scaffolding be built and would probably cause traffic issues. Maust asked in that case the scaffolding include additional safety measures for working over traffic. Andrews also pointed out that the nailer boards were installed by a different subcontractor, which would have to be addressed.

Williams suggested this was going to be costly and asked Segal if, as a taxpayer, this is what she [Save Our Bridge] wanted. Segal made several points. First, the hips of the towers make up a large percentage of the roofs' visual impact. Also, the towers being kept intact was a major factor in determining that the rehabilitated bridge would remain on the National Register. Finally, for an important, high profile project the additional expense to correct the mishandling of one of its most distinguishing features was a responsible position.

The meeting moved to the back yard of the construction trailer and the group inspected tiles from the tear-off and the first mock-up. The flat roof tile fragments had an "Imperial" stamp (early Ludiwici) as well as what appeared to be a date (9 7 26) confirming that they were original. Polo took pictures. The hip tiles examined were a different make and color and were stamped "Columbia", reinforcing the notion that they were not original.

The mock-up clearly showed that a 2x6 on edge was used as the nailer board, causing the hip tiles to sit up high, thus creating the need for excessive mortar to fill the space between the hip and flat roof tiles. Maust suggested that for reinstallation the board could be ripped down to create lower profile tiling as seen in the historic photos.

The meeting was adjourned just before noon.

#### Conclusion:

Based upon photographic evidence, meetings with the bridge owner and contractors, conversations with experts in clay tile roofs, and review of construction documents it is apparent that the current clay tile roofs on the rehabilitated Bridge of Lions were not executed according to the Secretary of the Interior's Rehabilitation Standards.

The work performed was based upon documentation of the tear-off of the original roofs at the beginning of the rehabilitation even though there were obvious clues that some of the materials were not original or missing altogether. Other features of the bridge (railings, light fixtures, etc) had been replaced and downgraded in decades prior. This work was performed in a manner contrary to preservation standards, yet when planning for the rehabilitation of the bascule roofs, only physical evidence was used as a basis without the benefit of readily available pictorial reference.

1927 photographs of the original bridge roofs were provided by the St. Augustine Historical Society to the project's design team at the start of the rehabilitation. Comparison with these images shows a clear difference between the treatment of the original hip tiling and what was being recreated in mock-ups made by the subcontractor for approval by the design team. SHPO maintains that the finished product does not concur with what was submitted for approval.

In particular, the height of the mock-up's nailer board to which the tiles are affixed caused the hip tiles to sit several inches higher than the low profile configuration seen in original construction photographs. This created a scenario where copious amounts of mortar were required to fill the gap between the hip and flat roof tiles. The use of fewer tiles and more colored mortar give the appearance that the hips are a solid mass rather than individual tiles.

The resulting massive appearance of the hip tiling and absence of the terminal tile at the apex where the hips meet gives an overall simplified and modernized appearance to the signature clay-tile roofs of the bascule towers. The hips make up a significant percentage of the roofs which are a key defining feature to the BOL.

Save Our Bridge recommends a complete re-do of the hip tiling and in-kind replacement of the missing terminal tiles on the bascule roofs of the BOL following pictorial evidence as the principal guide for design. While this work would most likely result in damage to some of the tiles, the current rehabilitated roofs are made up of mostly in-kind replacement tiles, which are readily available.

When placed in context with the cost and scope of the entire project this important corrective measure should not stand in the way of successfully completing what could otherwise be described as a diligent and significant rehabilitation effort.