Letter to Chairman Sumwalt from Mr. Lee Moak regarding FHWA Assessment

Miami, FL

HWY18MH009

(3 pages)

REASONS WHY THE "FHWA ASSESSMENT OF BRIDGE DESIGN AND PERFORMANCE" IS FLAWED AND INCOMPLETE

The FHWA Assessment (dated September 12, 2019) concludes that the FIU Pedestrian Bridge accident was the result of inadequate design and inadequate response by the designer to address the cracking that appeared in the days before the collapse. Additional information was submitted to the NTSB on September 20, 2019 that was not available to FHWA when they were preparing their document. That information proves conclusively that the design did not cause the collapse. Rather, the cause was due to the Contractor's failure to follow the design and Florida State Specifications. The FHWA Assessment is flawed and incomplete because of the following:

1. The FHWA investigation does not use common practices for investigation of major failures, including those previously conducted by NTSB. It focuses mainly on design and does not evaluate the failure based on rigorous analyses and testing of the materials and conditions at the time of the collapse. For instance, FHWA did not perform any physical tests on models of the critical bridge connection involved in the accident.

2. FHWA does not account for the results of physical tests on full-sized replicas of the critical connection which provide the best information on actual joint capacity (i.e. strength). Laboratory tests performed by the preeminent forensic structural engineers Wiss, Janney, Elstner Associates (WJE) on full-scale replicas of the bridge regarding the so-called member 11 connection show that the non-roughened construction joint caused the collapse. The tests also showed that if member 11 joint was roughened in accordance with the Florida Department of Transportation Standard Construction Specifications, the collapse would not have occurred.

3. FHWA fails to acknowledge that the "Released For Construction (RFC) Plans" by the design engineer, which incorporate the Florida DOT Standard Construction Specifications, require that **all** construction joints be roughened, including the member 11/12 joint with the deck where the failure initiated. There was no omission of the joint roughening requirements, as incorrectly alleged by FHWA, because it was required by the FDOT Standard Construction Specifications referenced in the first note of the General Notes sheet at the front of the design engineers plan set. Furthermore, the requirement to meet the FDOT Specifications was reconfirmed by FIGG in a series of emails in June 2017, prior to concrete placement.

4. FHWA's submission to NTSB of its evaluation of the submitted design calculation notes is not an evaluation of the final bridge design and is therefore not useful in determining the cause of the accident. The final bridge design is only represented by the RFC plans and specifications from which the bridge is actually built, and a true evaluation of the design is an independent review of those documents. WJE did an independent review of the RFC plans and specifications and concluded that the as-designed joint between members 11/12 and the bridge deck as shown on the Released for Construction Plans

meets the American Association of State Highway Transportation Officials (AASHTO) Design Code Requirements.

5. The evaluation of the joint 11/12 capacity (i.e. strength) by FHWA is flawed because it is contrary to AASHTO design requirements and utilizes criteria beyond the AASHTO code requirements. For instance, the portion of the connection that is under member 12 is completely discounted. However, WJE's detailed engineering analysis contained in their report and the physical evidence indicate that this portion of the connection did indeed contribute significant capacity to the total member 11/12 joint capacity. Also, FHWA's criticism of the design's consideration of vertical clamping force (that increases capacity) is contrary to AASHTO design requirements and the laws of physics.

6. FHWA's evaluation creates a possible design that could make the Florida DOT Standard Construction Specification requiring contractors to intentionally roughen the surface irrelevant. However, this theoretical design is contrary to the governing AASHTO design code. WJE analyzed the actual design of the member 11/12 joint.

7. The FHWA assessment of the damage progression at the member 11/12 joint assumes that observations made by anyone at the project site at any time were transmitted completely, accurately and without delay to FIGG, located 500 miles away. In fact, this was not the case. After additional cracking was noted the afternoon of March 10, 2018, FIGG was not notified until an e-mail was sent by the Contractor at 4:51 pm on March 12th. Subsequent phone calls the next day mischaracterized the situation, and no further photos or information were provided to FIGG until just before FIGG staff left their office on the afternoon of March 14th for a project meeting at the site the next morning.

   The Engineer of Record came to the bridge site the morning of March 15. He was escorted by the Contractor, but it was not possible to see that the construction joint was not roughened in accordance with the design specifications. Neither was he informed of any construction errors. It also should be noted that according to Florida Department of Transportation rules, the Engineer of Record is not permitted to have inspection authority at the construction site.

In addition to these items, the FHWA Assessment has many other inaccuracies that should be reconsidered as part of an overall review of the document. For instance, FHWA states that cracking observations were made immediately after destressing member 11, when in fact NTSB states that the same photographs were taken prior to that construction step. WJE's analysis and physical evidence prove that the member 11/12 joint design complies with the governing AASHTO design code and that if the surface had been roughened the accident would not have occurred.

If the FHWA assessment were to be relied on, every engineer in America could be held accountable for a contractor that does not follow the design and specifications.