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Continuing Education Course #390
Ethics in Design and Oversight
Florida International University Bridge Collapse

1. The independent review of the Florida International Pedestrian Bride design violated Florida Department of Transportation (FDOT) guidelines because:

- a. The review did not consider the nodal connections to the bridge individually
- b. The review did not consider each construction phase of the bridge individually
- c. The reviewing firm was not qualified by FDOT to review the bridge design
- d. All of the above

2. Which one of the following criteria designating a bridge as a category 2 complex bridge design, requiring independent review, did the Florida International pedestrian bridge meet:

- a. New bridge type
- b. New materials used to construct bridge components
- c. New bridge construction methods
- d. Non-standard or unusual bridge component-to-component configurations and connection details
- e. All of the above

3. The American Association of State Highway and Transportation Officials (AASHTO) Load and Resistance Factor Design (LRFD) guidelines give specific redundancy guidelines for fully concrete pedestrian bridges

- a. True
- b. False

4. The following were considered by the National Transportation Safety Board (NTSP) to be design errors on the part of FIGG Bridge Design:

- a. The interface shearing force acting on the 11/12 nodal of the main span during the intermediate stage of construction when it was in place over 8th St SW but not connected to the back span of the bridge was not considered.
- b. 'Live loads' on the bridge were included in design calculations regarding vertical compressive forces that would resist interface shearing.
- c. Outputs of computer models were chosen by the design firm that did not accurately reflect the forces acting on the bridge.
- d. All of the above

5. The Post tensioning truss 11 that was underway when the bridge collapsed:

- a. Was monitored by the firm contracted to supervise post tensioning
- b. Actually increased interface shear forces at node 11/12, the cause of the failure
- c. Was properly submitted and reviewed as a change to the original design of the bridge
- d. All of the above

6. The cracks observed in the concrete at node 11/12 were within the AASHTO guidelines in size.

- a. True
- b. False

7. The following firms or agencies were aware of concrete cracking that was 40 times larger than what AASDOT LFRP considers acceptable.

- ○ a. FIGG Bridge Engineers (FIGG) - the designer
- ○ b. Magnum Construction Management (MCM) - the contractor
- ○ c. Bolton Perez - the firm contracted to oversee construction of the bridge
- ○ d. All of the above

8. The engineer of record was aware of the history of cracks in the concrete and the remedial plan to re-tension the PT rods in truss member 11.

- ○ a. True
- ○ b. False

9. The NTSB agrees with FIGG that roughening the surfaces of the 11/12 nodal connection cold joint would have prevented the collapse.

- ○ a. True
- ○ b. False

10. The NTSB recommends the following based on its investigation into the FIU pedestrian bridge collapse:

- ○ a. FDOT should revise local agency program agreements to specify that when structural cracks are initially detected during bridge construction, the engineer of record, construction engineering inspector, design-build firm, or local agency that owns or is responsible for the bridge construction must immediately close the bridge to construction personnel and close the road underneath; fully support the entire bridge weight using construction techniques that do not require placing workers on or directly under the bridge during installation; and restrict all pedestrian, vehicular, and construction traffic on the bridge until the complete support is in place and inspected.
- ○ b. AASHTO should add a discussion about redundancy in the design of concrete structures to its bridge specifications.
- ○ c. FIGG should train its staff on the proper use of the permanent net compressive force normal to the shear plane when calculating nominal interface shear resistance.
- ○ d. FIGG should institute a company policy to obtain a pre-qualification letter before finalizing any peer review contract with any engineering firm or company being considered to conduct peer review services.
- ○ e. All of the above