



PennDOT Scope of Work with Modjeski and Masters for the collapse of the Fern Hollow bridge

Pittsburgh, PA

HWY22MH003

(3 pages)

Modjeski and Masters (MM) has been tasked with providing the Bridge Office with additional analyses as part of the on-going Forbes Avenue Bridge collapse evaluation. This work will be performed under M&M's Open End Agreement E05190, Work Order #1. Please find below the scope of work, hours, and estimated engineering fee for this task.

Scope of Work:

- MM will develop analysis models focusing on the likely initiation location of the collapse described in the Draft Preliminary Site Report (dated 1/31/22).
- Using all available information, MM will develop a 3D analysis model of the as-built structure using LUSAS FEA software, focusing on the western inclined legs.
- In order to obtain accurate moment and shear loading on the legs at the time of collapse, excluding the western inclined legs, the model will include beam elements for all columns, girders, and bracing members, and shell elements for the deck.
- For modeling the western inclined legs, in particular the southwestern leg, the model will include refined modeling using shell and/or solid elements to capture local behaviors, use of nonlinear materials and inclusion of 2nd order effects, and additional modifications necessary to capture the behavior at collapse (e.g. deterioration, column bracing present at time of collapse). By adjusting the model at the base of the southwestern leg, the effect of the deterioration of the web and transverse stiffener(s) on the capacity will be assessed and compared with design loads and the estimated load at the time of collapse.
- The behavior predicted by the model at collapse, in particular the deformations at the base of the southwestern inclined leg (large strong-axis bending deformations), as well as the overall global bridge movements resulting from collapse initiating at the southwestern leg will be examined and compared with the field findings.
- Deliverable(s): A letter report will be developed documenting the analysis performed and MM's findings and other conclusions.
- Lehigh University will review and provide comments for 1) the Draft Preliminary Site Visit Report (by MM dated 2/2/2022) and 2) the Final Analysis Report described herein.

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