ENTRY FORM

DVASE
2018 Excellence in Structural Engineering Awards Program

PROJECT CATEGORY (check one):

Buildings under $5M	X	Buildings Over $100M	
Buildings $5M - $15M		Other Structures Under $1M	
Buildings $15M - $40M		Other Structures Over $1M	
Buildings $40M - $100M		Single Family Home	

Approximate construction cost of facility submitted:	$2.5M
Name of Project:	American College of Physicians - Parking Structure Repair
Location of Project:	Philadelphia, PA
Date construction was completed (M/Y):	May, 2018
Structural Design Firm:	CVM Engineers
Affiliation:	**All entries must be submitted by DVASE member firms or members.**
Architect:	None
General Contractor:	Pullman SST - Swedesboro, NJ

Company Logo (insert .jpg in box below)

Important Notes:

- Please .pdf your completed entry form and email to bsagusti@barrhorstman.com.
- Please also email separately 2-3 of the best .jpg images of your project, for the slide presentation at the May dinner and for the DVASE website. Include a brief (approx. 4 sentences) summary of the project for the DVASE Awards Presentation with this separate email.

- Provide a concise project description in the following box (one page maximum). Include the significant aspects of the project and their relationship to the judging criteria.

The American College of Physicians headquarters building, located on North Independence Mall West in Philadelphia, PA was completed circa 2002. Less than 15 years after opening, CVM Engineers was asked to assess and develop repair plans to address widespread, structurally significant, corrosion damage to the elevated parking levels. The 10 story building (with one story below grade) was constructed using steel beams / columns and composite metal deck slabs. The parking levels for the facility are located on the west side of the building and occupy 1.5 stories of above grade (framed) construction and one level of slab on grade. The parking structure accommodates approximately 125 regular and 6 ADA spaces, and includes approximately 27,000 square feet of elevated construction.

The structural system for the parking decks was 3 ¼" of lightweight concrete atop a 3" composite metal deck. No supplemental reinforcing steel was specified in the composite deck and no details were provided in the design to mitigate concrete shrinkage. Since construction, widespread cracking in the parking deck resulted in extensive leakage and corrosion of the composite deck. Prior to the assessment by CVM, the owner attempted to stem the tide of damage by sealing cracks and adding supplemental decking to replace sections with thru-deck corrosion. The owner asked CVM to initially perform a comprehensive assessment and then based upon the assessment results, develop long-term solutions to provide a safe, low-maintenance parking facility.

The assessment by CVM started with an explanation to the owner that a composite metal deck system, though allowed by code, was not an appropriate structural system for the service environment. Based upon the extent of contiguous damage and loss of composite deck section, calculations were performed to estimate the current capacity of the parking decks. The calculations indicated that sections of the parking deck were unsafe, and supplemental timber sub-framing was needed to keep the structure in-service prior to repairs.

The owner was interested in a long-term repair program that minimized the impact of the repairs on the operation of the facility. CVM reviewed several strategies for possible repairs and performed limited testing to assess the viability of possible corrosion mitigation measures. The resulting repair program, developed consistent with the requirements of ACI 562-16, involved total replacement of large sections (approximately 50%) of the parking deck with isolated full-depth repairs in other heavily damaged locations. To mitigate the impact of the repairs on the operation of the facility, phasing plans were developed to minimize the loss of parking to a maximum of 40 spaces. Further, all repairs were limited to night and weekend periods to minimize impact on occupants of the building.

The following strategies were used to provide for long-term durability:

•All new reinforcing steel was epoxy-coated

•The replacement concrete was a lightweight concrete with 4 gal. / cy of corrosion inhibitor

•A penetrating vapor-phase corrosion inhibitor and concrete sealer was applied to remaining concrete deck areas

•Cracks in the remaining deck areas were routed and sealed

•A comprehensive long-term maintenance plan will be provided to ACP upon project completion

The $2.5M repair program will be completed in May 2018.

1. ACI 362.1R-97 – Guide to the Design of Durable Parking Structures (Reapproved 2002) – Section 2.3.3
   Steel Deck Institute –Code of Standard Practice, Section 4.14

- The following 5 pages (maximum) can be used to portray your project to the awards committee through photos, renderings, sketches, plans, etc…

Figure 1. Supplemental decking added to supplement metal deck that corroded through.

Figure 2. Extensive cracking on parking deck surface.

Figure 3. Corrosion damaged metal deck after removal of concrete.

Figure 4. Supplemental shoring / work area support.

Figure 5. Formwork for isolated full-depth repairs.

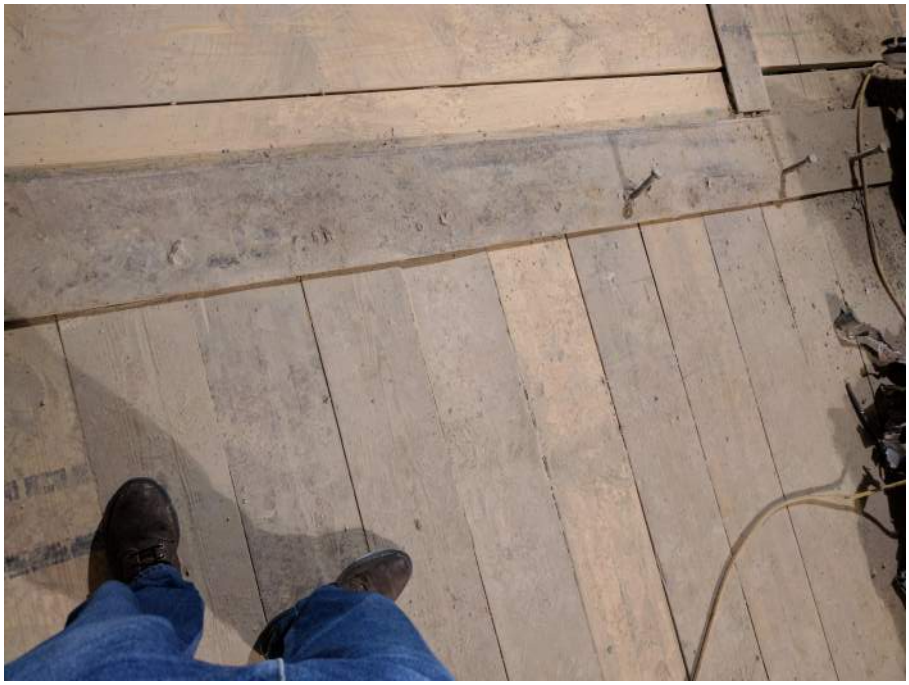


Figure 6. Formwork in progress (note missing shear studs).

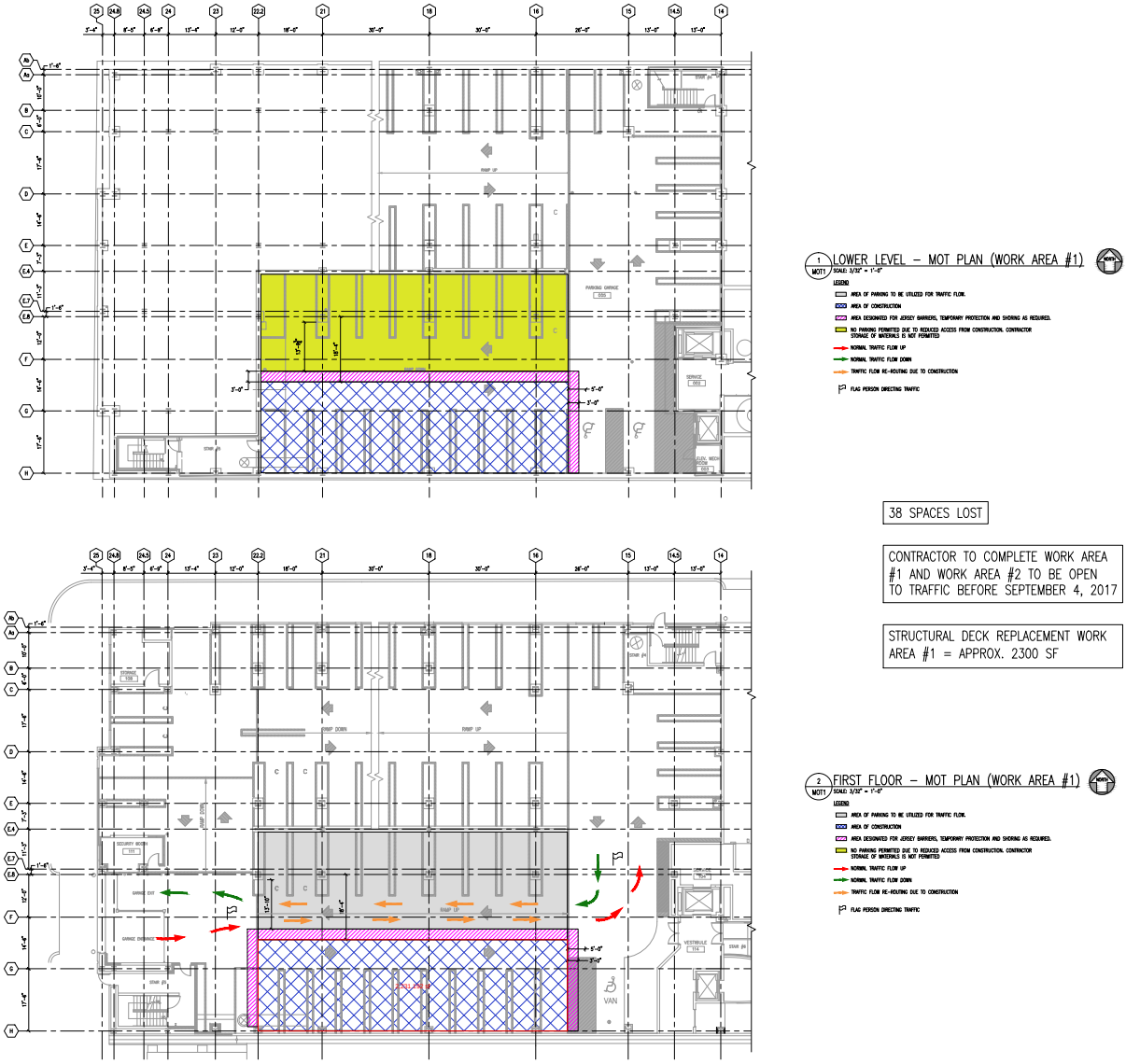


Figure 7. Phasing / MOT Plan.

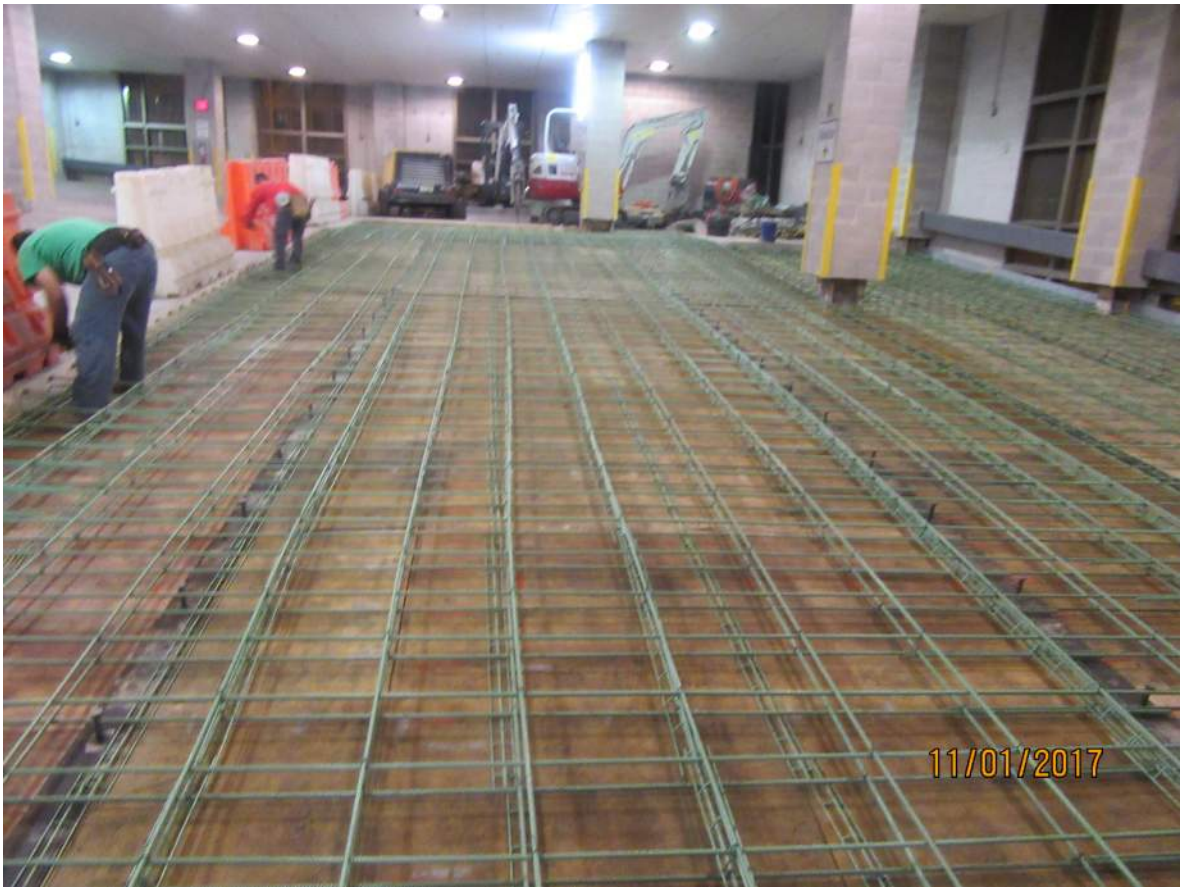


Figure 8. Deck reinforcement in place prior to concrete placement.

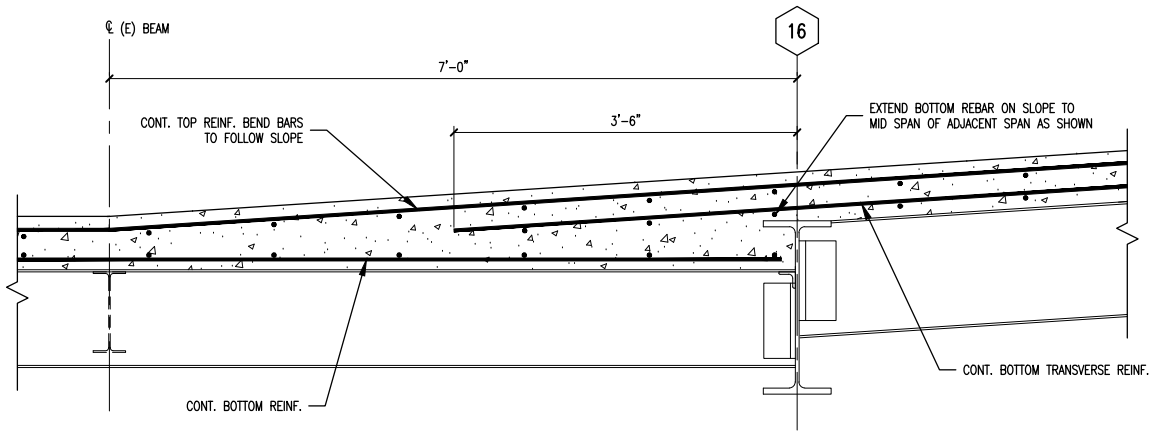


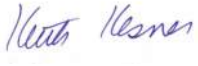
Figure 9. Repair detail at sloped ramp.

By signing, signatory agrees to the following and represents that he or she is authorized to sign for the structural design firm of record.

All entries become the property of DVASE and will not be returned. By entering, the entrant grants a royalty-free license to DVASE to use any copyrighted material submitted.

If selected as an award winner, you may be offered the opportunity to present your project at a DVASE breakfast seminar. Would you be willing to present to your colleagues? ☒ ***YES*** ☐ ***NO***

Submitted by:

Print name:	**Signature:**	**Date:**
Keith Kesner		4/9/18

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