

ENTRY FORM



DVASE 2022 Excellence in Structural Engineering Awards Program

PROJECT CATEGORY (check one):

Buildings under \$5M		Buildings Over \$100M	
Buildings \$5M - \$15M		Other Structures Under \$1M	
Buildings \$15M - \$40M	<input checked="" type="checkbox"/>	Other Structures Over \$1M	
Buildings \$40M - \$100M		Single Family Home	

Approximate construction cost of facility submitted:	\$37.3M
Name of Project:	Franklin Field - Grandstand Restoration Phases 2 to 6
Location of Project:	233 S. 33rd St. Philadelphia, PA
Date construction was completed (M/Y):	01/2022
Structural Design Firm:	CVM Engineers Inc. 1002 W. 9th Ave. King of Prussia, PA 19406
Affiliation:	All entries must be submitted by DVASE member firms or members.
Construction Manager:	JJ White, Inc. 5500 Bingham St. Philadelphia, PA 19120
Concrete Contractor:	Pullman, SST 227 High Hill Rd. Swedesboro, NJ 08085

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 annual virtual presentation 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.

Franklin Field – Restoring America’s First Modern Football Stadium

Franklin Field was originally constructed in 1895 as a venue for athletic events. The lower section of reinforced concrete bleachers was added in 1922, and the steel-framed upper grandstands added in 1925. The addition of the upper grandstands created the first modern, two-tiered football stadium in the United States. Since 1925, Franklin Field has hosted political conventions, Ivy League sporting events, NCAA Championships, Philadelphia Eagles games, University commencement, and the Penn Relays. After nearly a century of service, the reinforced concrete grandstands had deteriorated and needed a comprehensive restoration to extend the service life of the structure. This award submission addresses Phases 2 to 6 of the restoration program, which were completed between June 2019 and January 2022.

Development of the restoration plan required evaluation of the performance of prior repairs, review of repair options, and owner consultation to gauge tolerance for future maintenance and the desired service-life of the repaired structure. These discussions led to a repair plan designed to provide a minimum expected service-life of 25 years, with routine condition surveys, maintenance, and the replacement of sealants and coatings over time. The final repair design for Franklin Field was developed in accordance with the requirements of ACI 562–16.

Extensive repairs were required to address concrete spalling due to reinforcing steel corrosion, with most of repairs located at or adjacent to previous repairs. The repairs were largely designed to be full depth, with the repair material selected to match the original concrete properties. Access limitations at the stadium resulted in all repairs being completed using pre-packaged concrete materials, placed by hand using 5-gallons buckets.

Several approaches were considered to protect the existing reinforcing steel and mitigate the potential for future corrosion damage. The primary mechanism was the application of a urethane-based waterproof membrane on the grandstand surfaces after removal of the failed coatings using hydro-demolition. Sacrificial galvanic anodes were selected as a secondary mechanism to protect the reinforcing steel as they satisfied the owner’s need for a minimal maintenance system. Installed in both the repaired and unrepaired grandstand areas, the anode size and spacing was selected to provide corrosion protection for the 25-year design service-life. To monitor the performance of the repairs, a corrosion monitoring system was installed in the grandstand sections. The system allows for monitoring of both internal and external temperature and relative humidity of the concrete grandstands and the current generated by the sacrificial anodes. Monitoring results will be used by the Owner to plan future maintenance.

The Owner required construction to be phased to allow full use of the stadium for Penn Relays and commencement, with limited use for football and lacrosse games. This construction plan resulted in 6 construction phases with the first phase was completed in 2017. Phases 2 to 6 (current award submission) were completed from 2019 to 2022. Phases 2 to 6 had a GMP of \$38.3M and were completed on time in January 2022 at a total cost of \$37.2M. Given the uncertainty in initial repair quantities, completion of the repairs under budget was a major success. Some of the unique project attributes included:

- Restored an iconic structure for future generations
- Placed approximately 8,000 bags (185 cy) of pre-packaged concrete repair materials by hand
- Installed approximately 77,500 galvanic anodes for corrosion mitigation
- Monitoring system installed for quantitative assessment of repair performance over time
- Completed a multi-million dollar repair program on time and under budget

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



Figure 1. Panorama of Franklin Field from top of east grandstands.



Figure 2. Franklin Field - exterior view.



Figure 3. Concrete spall captured on netting.



Figure 4. Concrete spall at prior repair. Note presence of multiple repair materials and lack of reinforcing steel undercutting.



Figure 5. Full depth repair being completed.



Figure 6. Existing coating removal via hydrodemolition.



Figure 7. Anode installation.




Figure 8. Repairs in process upper south grandstands.

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:

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