

ENTRY FORM



DVASE 2019 Excellence in Structural Engineering Awards Program

PROJECT CATEGORY (check one):

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

Approximate construction cost of facility submitted:	\$800,000.00
Name of Project:	Restoration of Nassau Hall Cupola, Nassau Hall, Princeton University
Location of Project:	Princeton, New Jersey
Date construction was completed (M/Y):	December 20, 2018
Structural Design Firm:	Joesph B. Callaghan, Inc.
Affiliation:	All entries must be submitted by DVASE member firms or members.
Architect:	Mills + Schnoering Architects, LLC
General Contractor:	Massimino Building Corp.

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.

Nassau Hall was originally built in 1756; the oldest building on the Princeton University campus and the largest stone structure in America at the time. The building was rebuilt in 1802 and 1855 after significant fires left only parts of the building remaining. There have been several other alterations and renovations throughout its lifetime. According to available drawings by Day & Klauder Architects dated June 1921, significant alterations to the bell tower were completed at this time.

The bell tower is the most recognizable building element. It rises approximately 64 feet above the main roof and consists of several sections: the upper dome and finial, lantern, lower dome, entablature, belfry and the base. (See image, next section.)

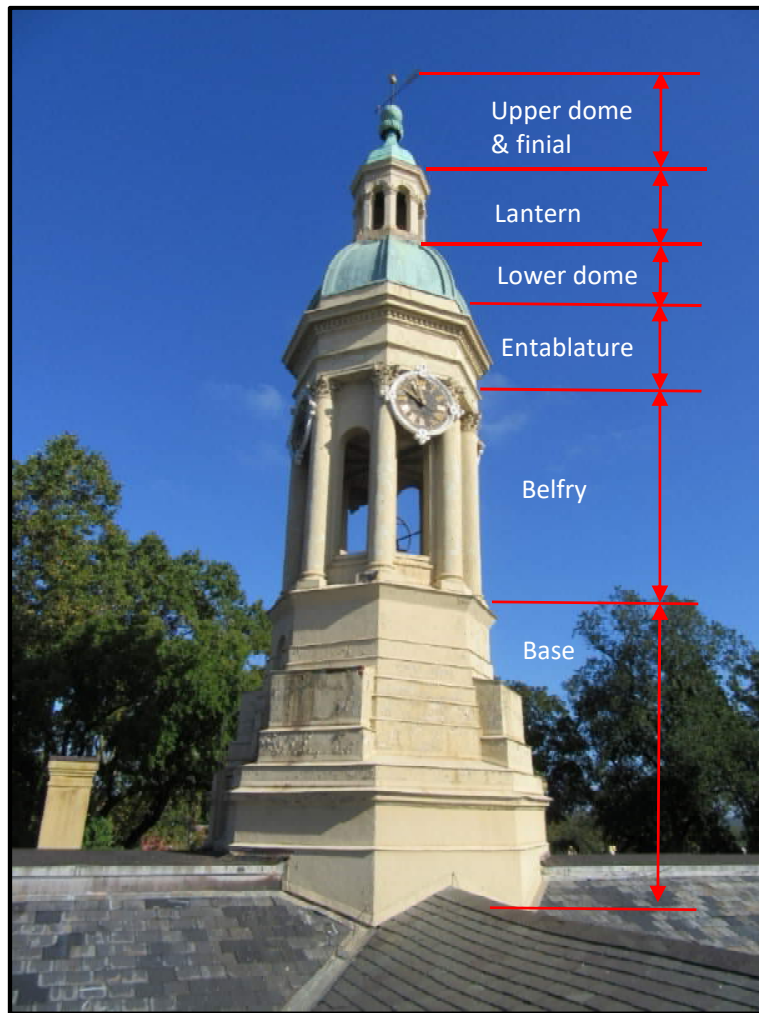
Princeton University was interested in developing a bell tower restoration program. In conjunction with Mills + Schnoering Architects, LLC, our firm was retained to provide structural engineering services. The tower construction consists of copper-clad iron framing elements bearing on stucco-covered masonry walls and columns. Our assessment found varying degrees of corrosion to the iron frame, isolated rotted wood, and deteriorated concrete and masonry throughout. The rehabilitation project included removing all copper cladding to expose the iron frame. Severely deteriorated sections were replaced with new steel sections to match the original design. All remaining iron elements were wirebrushed clean, all connections inspected and tightened, and a protective modified-epoxy coating was applied to all framing elements. Rotted wood was replaced and all deteriorated concrete was removed and repaired. New copper cladding was installed to match the original design and articulations.

All masonry elements of the tower were repaired as well. All stucco surfaces were sounded, delaminated material removed and replaced. Cracked, spalled brick masonry was rebuilt. A protective coating was applied to all masonry surfaces.

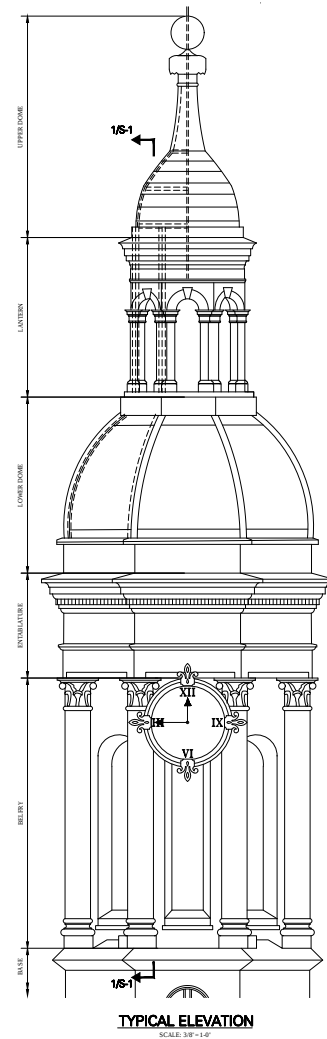
A challenge of the project was the access. The most effective way to access the bell tower and maintain building operations was to install pipe scaffolding above the roof. Due to the building configuration, the scaffolding was designed to be supported by the interior load bearing masonry walls below the roof structure. We analyzed the roof framing and identify load bearing walls that could resist the scaffolding loads. However, the integrity of these load bearing walls to resist these imposed construction loads was compromised due to previous mechanical system alterations. We provided repair details to rebuild and strengthen the walls to safely resist the imposed scaffolding loads.

This rehabilitation project is significant due to its scale and diversity of materials. From iron to copper to stucco to masonry to wood, the bell tower required significant restoration, attention to detail and quality workmanship to ensure Princeton could maintain and preserve one of its most treasured landmarks.

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



Bell tower structure



Existing conditions at time of survey - corroded iron framing elements at lantern columns; delaminated stucco and spalled brick masonry at base.



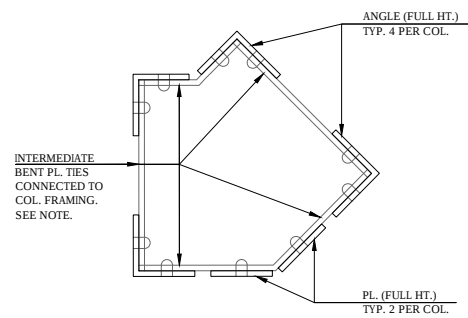
Before and after - bearing wall improvements in attic to support scaffolding loads.



Bell tower scaffolding bridging main roof.



Roof replacement in progress.



DETAIL C/S-2
TYPICAL LANTERN COLUMN
 SCALE: 3" = 1'-0"





Iron frame rehabilitation in progress.



Brick masonry and stucco repairs in progress.



Before.



Completed.



New copper cladding installed to match original.



Existing and refurbished clock.

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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