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

Approximate construction cost of facility submitted:	$78,000,000
Name of Project:	The Harper
Location of Project:	1910 Chestnut Street, Philadelphia, PA
Date construction was completed (M/Y):	June 2019
Structural Design Firm:	The Harman Group
Affiliation:	**All entries must be submitted by DVASE member firms or members.**
Architect:	DAS Architects Inc.
General Contractor:	Wellcraft Construction Company, Inc.

Company Logo (insert .jpg in box below)

THE HARMAN GROUP
structural engineering
parking planning and design

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 Harper, a 25-story, 260,000 square foot mixed use residential building in Philadelphia, will feature 183 apartments and two floors of retail. Located at the site of the former Boyd Theater, The Harper includes premier retail space, creative office space, an outdoor park with a pool and an underground garage. The building tops out at 314 feet above grade and is the tallest all-steel and hollow core concrete plank structure in the city (no concrete core).

The Harper features several creative solutions to structural problems posed by the owner and the architect. Of paramount importance to the retail plan was the elimination of every other column on the standard 24'x26' column grid that was used in the parking area and the apartment tower. As a result, outside of the tower footprint we have long-span steel girders which enable large column free spaces in the retail. Below the apartment tower, we transferred out nine columns using five stick-framed trusses and two plate girders.

The owner was sensitive to the costs incurred by transferring out columns to free up more space in the retail areas and asked how we could reduce structural costs. The Harman Group decided to use grade 65 A572 steel for all columns and truss members 90 pounds per foot and heavier. As a result we saved approximately 200 tons of material, and the owner saved approximately $180,000, an amount significantly higher than our design fee! According to Arcelor Mittal steel, the Harper is the first residential tower, and only the second building in Philadelphia to use grade 65 steel.

In addition to the column transfer and use of grade 65 steel, part of the challenge of building on this site was the limited amount of laydown area for the steel and limited crane capacity. This lack of space and crane capacity, typical for an urban environment, meant that the transfer trusses could not be built on the ground and lifted in one piece to the transfer level. Zero camber can be difficult to achieve when stick-building trusses. The top or bottom chord of the truss is erected first and will deflect significantly under its own weight. If not corrected, the transfer columns will start off too low, causing the entire building to be too low at those column locations.

The trusses were stick built and the deflection in the top chords, just from self-weight, was between 5/8 of an inch and 1 ¼ inches. To correct for this deflection, first the trusses were erected, all of the bolt holes were stuffed, but not tightened. Then the steel erector jacked up the trusses to set zero camber. Shoring and spreader beams were added to distribute the load from the jacking operations. Then, the tower crane was used to pull up on the truss until the crane hit its load limit, and then jack pressure was applied. As the jacks took load off the crane, the crane applied more force, and so on until the trusses were level.

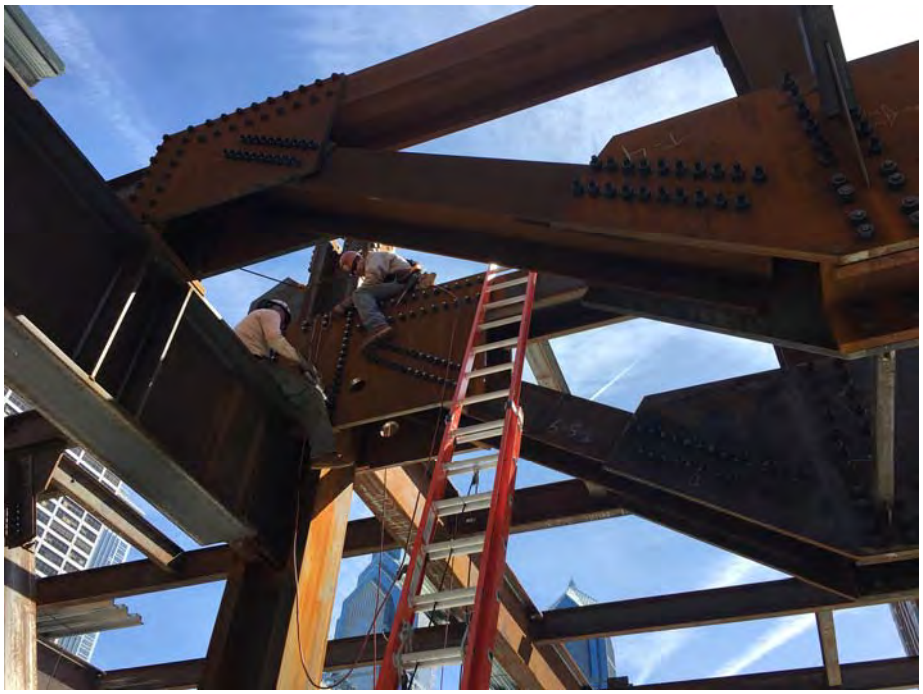
After the surveyor called the truss at the proper elevation, all of the bolts were torqued to spec (1 1/8" A490-SC TC bolts). When the bolts were tightened, the jacks and the crane were released and the surveyor did a final check of elevation. After torqueing all the bolts, deflection due to self-weight of the truss was minimal, 1/16 of an inch or less (almost exactly zero camber).

Through creative engineering, the Harman Group was able to bring the vision of the architect and the owner to life while staying on budget.

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

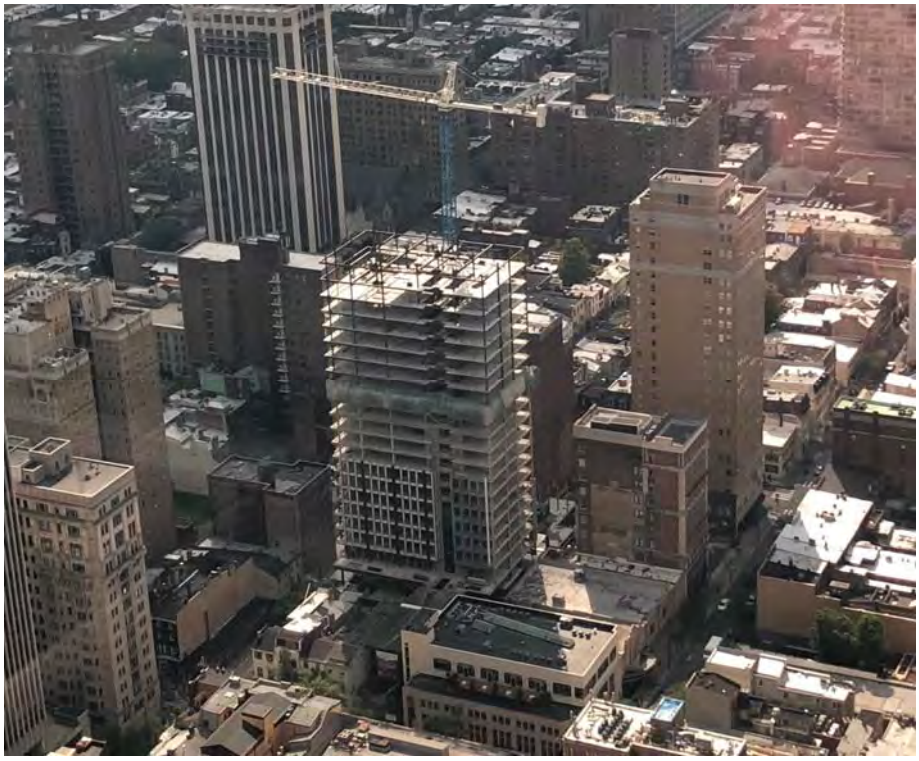
Rendering (DAS Architects)

One of (5) transfer trusses over the retail level, grade 65 steel members.



Two of (5) transfer trusses over the retail level, end connections. One truss connects to a column the other truss is supported on a heavy W40.

Transfer truss showing nodal bracing of the compression web members.



View of the Harper under construction from One Liberty tower.

The Harper topped off as only the second building in Philadelphia to use grade 65 steel.

The Harper with tower façade almost complete. Scheduled to open to residents on 6/1/2019.

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 is granted 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: Jan Vacca	**Signature:** 	**Date:** **3/13/19**

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