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## April Meeting

*Date:* Thursday, April 14, 2022 at 11:30

*Host:* Nebraska ASCE Environmental Committee

### Spouses and Guests Welcome

*Location:*

*Beacon Hills*

*6750 Mercy Rd*

*Omaha, NE 68106*

*Presenter:* Todd Pfitzer, City of Omaha Public Works

*Menu/Price:* Buffet provided by Beacon Hills

ASCE Members \$15.00 with meal or \$10.00 without, Guests \$20.00  
Payable to NEASCE at the door (cash, check, or credit card) or pre-pay with PayPal.

**Life Members** and **Students** are FREE....but you must register.

Register at the link below.

<http://events.r20.constantcontact.com/register/event?oeidk=a07ej4v10ki1472aa4e&llr=tdh4jixab>

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Brandon Vacek, PE,  
M.ASCE

## From the President

Greetings Nebraska ASCE!

I look back to yesterday and I swear it was just the end of the Christmas Holiday season, the year is just flying by. I wanted to take the opportunity this month to give a shout out to some amazing folks we have in our section. Over the past few months ASCE has been announcing award recipients across our organization and we are lucky enough to have two of these in our Nebraska Section.

Last month, Dr. Christopher Neale was highlighted in our newsletter for the 2022 Royce J. Tipton Award presented by ASCE's Environmental and Water Resources Institute for "significant contributions on the use of remote sensing for estimating evapotranspiration of agricultural crops, irrigation water management and hydrology, and the education of irrigation engineers."

This month, Dr. Chungwook Sim, and their co-authors, Dr. Maher Tadros, Mr. David Gee, and Mr. Michael Asaad, will be highlighted for the 2022 T.Y. Lin Award presented by ASCE's Structural Engineering Institute for their paper "Flexural Design of Precast, Prestressed Ultra-high-performance Concrete Members". This paper was published in the *PCI Journal*, November-December 2020.

I want to congratulate all of them once again for their prestigious work in their fields of Civil Engineering and receiving their recognition in ASCE.

Coming up this month, our Environmental Technical Committee will be hosting Todd Pfitzer on April 14th. We have several big events coming up over the next few months, so please keep an eye out for invitations to all our events.

If you have not received any invitations to our events this year by email and wish to do so, please contact myself or one of our board members. We can make sure your information is up to date so you can stay informed on all things going on with the Nebraska Section of ASCE.

Sincerely,

*Brandon Vacek*

Brandon Vacek, President, ASCE Nebraska Section

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## T.Y. LIN AWARD

The ASCE T.Y. Lin Award was endowed in 1968 by T.Y. Lin, F.ASCE, to encourage the preparation of meaningful papers in the designated field of endeavor. Chungwook Sim, Ph.D. (Assistant Professor of Civil and Environmental Engineering at University of Nebraska-Lincoln), Maher Tadros, Ph.D. P.E. (Distinguished Emeritus Professor of Civil and Environmental Engineering at University of Nebraska-Lincoln and the Founding Principal of e.Construct USA LLC), David Gee (Structural Engineer with e.Construct specializing in UHPC and Bridge Design), and Micheal Assad (Structural Engineer at Kiewit Corporation specializing in Bridge Engineering) will receive the 2022 T.Y. Lin Award from the American Society of Civil Engineers (ASCE) at the Structures Congress in Atlanta, Georgia in April 23 for their paper “Flexural Design of Precast, Prestressed Ultra-High Performance Concrete Members,” published in the PCI Journal, November-December 2020.

Ultra-High-Performance Concrete (UHPC) is a relatively new class of concrete with superior compressive and tensile properties and excellent durability. It was introduced in the early 1990s by French engineers. The superior compressive strength is created by utilization of quality controlled ingredients and particle packing analysis aimed at reducing the air voids between the particles of the various ingredients. The compressive strength can be as high as 800 MPa (116,000 psi). This optimized particle packing also creates a material that resembles ceramic. See the photo for basic ingredients. Fine sand and potable water are added to the components shown to complete the paste. It is highly impervious and thus not subject to deterioration due to freeze-thaw cycles.



Portland Cement

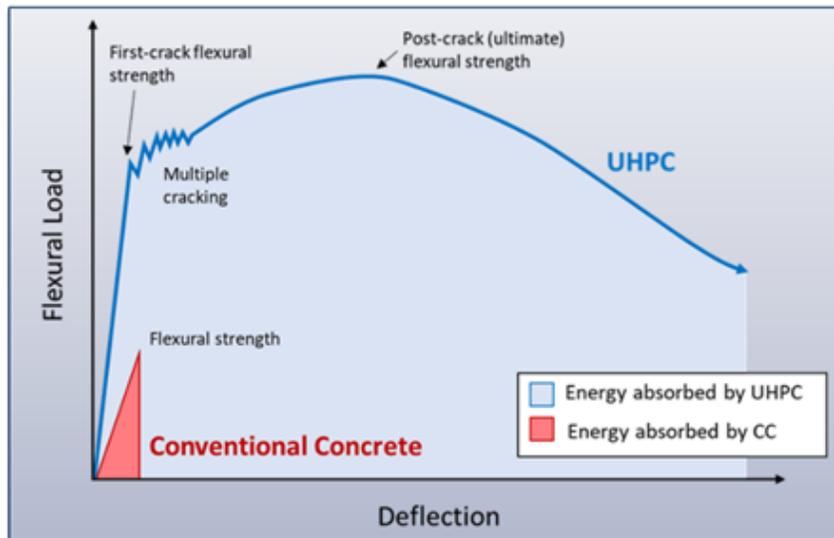
Supplementary  
Materials

Superplasticizers



Fiber Reinforcement

The more important property in structural applications is the tensile strength of UHPC. It is largely created by use of high strength high volume fraction steel micro-fibers. The second figure shows the huge difference in load-deflection relationship between conventional concrete and UHPC. The higher strength, ductility and strength gain beyond cracking create opportunity for design of beams and slabs without shear reinforcement and with very small beam web and flange thicknesses.



As a result, one can design low-volume members with superior structural capacity, relatively low weight and high durability. The authors of the award winning paper offer a simplified approach to account for the superior quality of UHPC to produce practical products and systems for long span floors in buildings and bridges to compete with conventional concrete and other structural steel systems.

Their journal paper proposes flexural design recommendations for precast, pretensioned Ultra-High-Performance Concrete (UHPC) members, including experimental verification and numerical examples. The paper deals with three examples: 1) a precast, prestressed concrete decked I-beam, 2) a precast, prestressed concrete floor slab, and 3) a precast, prestressed concrete bridge box beam. The use of UHPC for main structural members can be attractive for both building and bridge applications by achieving optimized, and cost-effective cross sections. And the research team hopes this paper can help designers and contractors make use of UHPC for main structural members more in practice.

Full paper can be found here: [https://www.pci.org/PCI\\_Docs/Publications/PCI%20Journal/2020/November-December/20-0016\\_Tadros\\_ND20.pdf](https://www.pci.org/PCI_Docs/Publications/PCI%20Journal/2020/November-December/20-0016_Tadros_ND20.pdf)

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## 2022 Truss Bustin'

During the school year, students at Daniel J Gross High School and Omaha North High Magnet have been working on designing trusses to compete in the Truss Bustin' competition. The goal is to produce the truss that can handle the strongest load within the machine. Once again, the competition was virtual, below are the results and the new component added this year.

This year a new challenge was added to the design process. Students had the option to use a new material, cardboard instead of the traditional balsa wood. This demonstrated the cost effectiveness between different materials since engineering economics is an important part of bridge design. Trusses could be built entirely of balsa, corrugated cardboard or hard cardboard or any combination that they choose. A unit price was assigned to each material and the cost was factored into the overall score.

On Saturday, 38 trusses were put to the test! The loads ranged from 5.14 lbs to 291.29 lbs. Trusses weighed in at 10.9 grams to 95.4 grams. Overall, the winner was the heaviest truss of the day and was made completely out of cardboard. The second heaviest truss also ended up on the podium, placing fourth. The lesson learned this year was that the most efficient material was critical to success.

Thank you to the students for participating and thank you to the teachers for bringing this opportunity to their students. As always, thank you to Mike Sklenar for putting so much effort into this event and doing a wonderful job of breaking the trusses. Now we look ahead to 2023 with the creation of the constraints for next years competition and the possibility of once again performing the Bustin in person!

### 2022 ASCE TRUSS BUSTIN' COMPETITION



Current Standings

Truss No.	Name	School	Weight (grams)	Total Materials	Submittal Factor	Geometry Factor	Aesthetics Factor	Balsa	Corrugated	Non-Corrugated	MEF	Load at Failure (lb)	Strength Factor	Overall Score	
1st Place	G7	Stephen, Alec, Luis	Gross	95.4	96.1	1	1	1	0	92.7	3.4	0.20353798	216.512	0.726184	3.5678
2nd Place	G1	Christian Anderson	Gross	44.5	45	1	1	1	45	0	0	291.29	2.534402	2.5344	
3rd Place	G6	Jaksen Wonderlich, Shawn Pekhat, Ben Pajngar	Gross	65.1	65.3	1	1	1	0	63.7	1.6	0.20245023	64.702	0.349898	1.72832
4th Place	G8	Tim C., Michael K, Mackenna E.	Gross	93.9	94.3	1	1	1	0	88.6	5.7	0.20604454	96.446	0.329953	1.60137
5th Place	N27	Armond Davis	Omaha North	26.2	25.9	1	1	1	25.9	0	0	1	89.444	1.508949	1.50895

**Upcoming Events and Seminars**

Program	Full Dates	City/State
ASCE/NITE Transportation Conference	May 27	Omaha, NE
2022 Annual Meeting	May	Omaha, NE



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