

## DOL extends COVID-19 vaccination emergency standard comment period

The U.S. Department of Labor’s Occupational Safety and Health Administration (OSHA) has extended the comment period for the COVID-19 vaccination and testing emergency temporary standard (ETS) to January 19, 2022. OSHA extended the comment period by 45 days to allow stakeholders additional time to review the ETS and collect information and data necessary for comment.

Comments identified by docket OSHA-2021-0007 may be submitted electronically at <https://www.regulations.gov>, the Federal e-Rulemaking Portal. The Federal e-Rulemaking Portal is the only way to submit comments on this rule. For details, read the November 5, 2021, Federal Register notice “COVID-19 Vaccination and Testing; Emergency Temporary Standard.”

On November 5, 2021, OSHA issued an emergency temporary standard to protect workers from the spread of coronavirus on the job. The emergency temporary standard covers employers with 100 or more employees. Covered employers must develop, implement, and enforce a mandatory COVID-19 vaccination policy unless they adopt a policy requiring employees to either get vaccinated or undergo regular COVID-19 testing and wear a face covering at work. More information about the ETS is available at <https://www.osha.gov/coronavirus/ets2>.

—Source: OSHA

## Purdue researchers test 3-D concrete printing system

Purdue University researchers are seeking to make the transition to clean wind energy more cost-efficient as they test a new technology created by an international startup to anchor offshore wind turbines.

RCAM Technologies, which has offices in the United States and United Kingdom, received a Phase I Small Business Technology Transfer grant from the National Science Foundation to develop three-dimensional (3-D)–printed concrete suction anchors to replace traditional anchors for offshore wind plants. Research will be conducted at the Robert L. and Terry L. Bowen Laboratory for Large-Scale Civil

Engineering Research in Purdue’s College of Engineering in West Lafayette, Ind.

Gabriel Falzone, director of operations at RCAM Technologies, says that traditional anchors for floating offshore wind plants are made from steel, which makes them expensive. They also require large vessels for installation.

“Our concrete, 3-D–printed suction anchors will reduce the cost of anchors by up to 90% compared with traditional drag anchors when used in a shared mooring configuration,” Falzone says. “Suction anchors can accept loading in multiple directions, which allows them to be connected to multiple turbines. This can reduce the number of anchors required per plant.”

Research on the anchors will be led by Jan Olek, the James H. and Carol H. Cure Professor in Civil Engineering, and Pablo D. Zavattieri, the Jerry M. and Lynda T. Engelhardt Professor in Civil Engineering, both from the Lyles School of Civil Engineering, and Jeffrey P. Youngblood, a professor in the School of Materials Engineering.

Fabian Rodriguez, a graduate student in the Lyles School of Civil Engineering working on the project, says the research focuses on developing the 3-D printing process at larger scales.

“Being able to understand the behavior of cementitious materials in different 3-D printing systems allows us to have a clear idea of the physical characteristics and quality of the

**Purdue University PhD student Fabian B. Rodriguez (second from right) explains the 3-D printing process to faculty advisors Jan Olek (left) and Jeffrey P. Youngblood (second from left) in Purdue University’s Robert L. and Terry L. Bowen Laboratory in West Lafayette, Ind. They are conducting research into three-dimensional printed suction anchors to replace traditional anchors for offshore wind plants. Courtesy of Purdue University/Vincent Walter.**



materials that we want to use for large-scale construction in marine environments,” Rodriguez says. “The current robotic system will allow us to produce larger elements on which we can evaluate properties such as their strength and durability.”

Olek says a challenging aspect of this application of 3-D–printed concrete is that it will be exposed to a marine environment.

“That means exposure to elevated levels of chlorides that can chemically react with the hydrated cementitious matrix and potentially negatively impact the durability of the anchor,” Olek says. “We are looking into the microstructure of concrete

created during the layer-by-layer deposition process. We want to know how it influences the permeability and rate of ingress of chlorides into the printed element and to assess impact on durability.”

Youngblood says, “3-D printing shines where labor costs are high and structures are unique and/or complex. Here, it has the chance to really make an impact, as construction is labor-intensive, and this particular design would be difficult with other manufacturing methods.”

—Sources: Steve Martin, Gabriel Falzone, Jan Olek, Jeffrey P. Youngblood, and Pablo Zavattieri

## INDUSTRY CALENDAR

Event details are subject to change.

<b>TRB 101st Annual Meeting</b> Washington, D.C.	January 9–13, 2022
<b>World of Concrete 2022</b> Las Vegas Convention Center, Las Vegas, Nev.	January 18–21, 2022
<b>PCA Design and Control of Concrete Mixtures Course</b> Elmhurst, Ill.	February 14–17, 2022
<b>2022 AASHTO Washington Briefing</b> Washington, D.C.	March 1–4, 2022
<b>ASCE GEO-Congress 2022</b> Charlotte, N.C.	March 20–23, 2022
<b>TRB International Data Science for Pavements Symposium</b> McLean, Va.	March 22–24, 2022
<b>ACI Concrete Convention</b> Caribe Royale Orlando, Orlando, Fla.	March 27–31, 2022
<b>International Conference on Accelerated Pavement Testing</b> The Université Gustave Eiffel, Nantes, France	April 3–6, 2022
<b>ASCE Structures Congress 2022</b> Hyatt Regency Atlanta, Atlanta, Ga.	April 20–23, 2022
<b>PTI 2022 Convention</b> Hilton La Jolla Torrey Pines, La Jolla, Calif.	April 23–27, 2022
<b>2022 AASHTO Spring Meeting</b> New Orleans, La.	May 8–15, 2022
<b>TRB 2nd International Conference on Nanotechnology of Cement and Concrete</b> Irvine, Calif.	May 23–24, 2022
<b>2022 fib International Congress</b> Oslo, Norway	June 12–16, 2022
<b>fib and RILEM Bond in Concrete 2022 5th International Conference</b> Stuttgart, Germany	July 25–27, 2022
<b>PTI 2022 Committee Days</b> Cancun, Mexico	October 4–7, 2022
<b>ACI Concrete Convention</b> Hyatt Regency Dallas, Dallas, Tex.	October 23–27, 2022
<b>Greenbuild</b> Moscone Center, San Francisco, Calif.	November 1–3, 2022

Compiled by K. Michelle Burgess ([mburgess@pci.org](mailto:mburgess@pci.org))