



<b>Title</b>	<b>PBS: Precast Bridge Studio for California Annual Report, Year 3</b>
<b>Annual Report Submitted to:</b>	Precast/Prestressed Concrete Institute (PCI) Foundation Attn: Ms. Marty McIntyre, Executive Director 200 West Adams Street, Suite 2100 Chicago, IL 60606 (708) 386-3715 martymci@pci-foundation.org
<b>Annual Report Submitted by:</b>	Principal Investigator Eric E. Matsumoto, PhD, PE, Professor Department of Civil Engineering California State University, Sacramento (916) 278-5177, ericm@csus.edu
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<b>Report Date:</b>	June 30, 2021
<b>Project Period:</b>	July 1, 2020 – June 30, 2021

## Overview of the Sac State Precast Bridge Studio, Year 3—Don't Be Stressed... Be Precast/Prestressed!

Based on a 4-year Curriculum Development grant by the Precast/Prestressed Concrete Institute (PCI) Foundation, the Precast Bridge Studio (PBS) at Sac State has continued during Year 3 (July 1, 2020 to June 30, 2021) to develop and provide unique “immersion” experiences for Civil Engineering (CE) and Construction Management (CM) students in precast/prestressed (PC/PS) concrete, focused on bridge design and construction.

Spurred by state-wide Covid limitations in Year 3, PBS pivoted to many online experiences but, just as importantly, maintained—and, in some cases, expanded—in-person, hands-on field trips, competitions, and projects that characterize PBS and benefit its participants. Figures 1 to 12 show several Year 3 highlights of the PBS Class and PCI Club. See *PBS Links* under the final section of this report for more details. All these events and activities were carried out in close coordination with industry and under state-mandated safety precautions.

Tables 1A/1B provide the extensive list of Year 3 industry participants, and Tables 2A/2B summarize Year 3 student participation. With truly remarkable industry support, PBS impacted over 340 students (including repeats) through the integrated CE/CM bridge design/construction project which is part of 3-unit classes for CE and CM and through PCI Student Club events led by a team of 6 PCI Student Officers, precast competitions, CE/CM student and faculty participation at the PCI National Convention, and a unique Precast Canopy Project that includes design, fabrication, and installation for a new structure in the Sac State Engineering Quad.

Year 3 highlights include:

- **342 students** (including repeats) positively impacted by PBS class, events, projects/competitions, and the 2021 national convention
- Second offering of the **PBS bridge design/construction class**, with the first CE-CM integrated course project in campus history, with 21 students in Fall 2020.
- Second consecutive year of **expanded bridge design/construction mentorship** of students in the PBS bridge class, up 40% (4 bridge design consulting firms and 1 construction firm/contractor with 14 senior and assistant mentors in Year 3, up from 10 mentors in Year 2).
- Continuation of **PBS class industry immersion** via: online presentations (5), 3-hour industry workshops (4), in-person field trips (3), online PBS Finale Event with student presentations and industry evaluations/recognition, and PCI eLearning modules.
- **Expansion and development of events with industry interaction/mentorship**: highlight girder erection site visit with precaster and contractor as tour guides, new presentations

for Project Kickoff, Sumiden tour, Caltrans construction materials, and additional interaction based on software workshop with software troubleshooting.

- Start of “**Completing the Loop**”: Students advancing from PBS student participant to serving as PBS industry mentor.
- Despite Covid, continued progress of the only west-coast **PCI Student chapter**, with 5 new PCI club officers and 293 students (including repeats) impacted by the PCI Student Club/PBS activities online and in-person as well as student participation at the PCI National Convention (8 students, including 2 CM students), plus 2 faculty (CE and CM), as well as 28 students participating in precast projects and competitions.
- Development of PC projects, including major **PC canopy project** (involving graduate and undergraduate students) with extensive industry interaction and support of in-kind donations from Clark Pacific, JVI, and Ed Nicholson, SE Inc. (with others expected for Fall 2021).
- Extensive participation of local industry and students in the **2021 PCI Foundation Professors Seminar in Sacramento, CA** (6/2/21), including 2 hours of presentations with 12 industry members, former PBS students, and faculty presenting on “Mentorship: The Key Factor toward a Vibrant Precast Studio”, and 7 current and former PCI Club Officers presenting with the faculty advisor on “A PCI Student Club: Synergy for a PC Studio”.
- Student survey providing evidence of **PBS impact on student job opportunities**: 78% stating that PBS has a high to very high impact on their job hiring/opportunities.

Through the practical experiences and industry mentorship during Year 3, PBS has continued its steady progression in achieving its program objectives: 1) Educate CE and CM students with a practical understanding of PC/PS concrete bridges; 2) Provide students a foundational, hands-on understanding of PC/PS materials and technology through interaction with industry; 3) Equip students with the ability to perform PC/PS design and preconstruction services for multi-span bridges; 4) Incorporate mentorship with PC/PS bridge experts that enable students to immediately enter and function productively with industry; and 5) Establish an approved curriculum including bridge design and construction classes and seminars with CE-CM student interaction.

## **Year 3—Major Curriculum Developments**

The following sections provide additional details of major PBS developments during Year 3.

### **Development of Integrated CE/CM Design-Build Teams**

Year 3 focused on further development of the core PBS curriculum—the establishment of an integrated CE/CM bridge class with bridge design-build teams. Fall 2020 included the second offering of the PBS bridge design/construction classes in CE and CM with its joint CE/CM project, the first CE/CM integrated experience in college history. 15 CE students from CE168, Prestressed Concrete Design (3-unit upper level civil engineering design elective) were combined with 6 CM students from the CM199, Special Studies class (3-unit upper level construction management class) into a joint project experience with 4 precast bridge design/construction project teams each addressing its own unique bridge.

Similar to Year 2, design-build teams learned fundamentals of bridge design and construction in their respective CE and CM classes, and worked closely together in one of four teams to design (mainly a CE student function) and perform preconstruction services (mainly a CM student function) based on four actual multi-span precast, pretensioned girder bridge projects in California and Washington, under the mentorship of bridge industry experts—including four local bridge design firms plus Caltrans, precast bridge fabricators, bridge software experts, construction managers, contractors, suppliers, and others. Teams used the CA Wide Flange girder, bulb-tee girder, or voided slab to produce realistic design and construction deliverables including superstructure design and check calculations, representative plans (general plan, typical section, precast girder details, seismic details), sizing of substructure members, preplanning site logistics, construction sequence, pour plan, girder erection, cost estimate, and schedule.

The four design-build teams in Year 3 typically had 4 CE students with 2 CM students (except for one team without CM students) that coordinated throughout the semester and delivered status (intermediate) and final presentations and reports. CE students participated in the project through enrollment in the CE168 class, Prestressed Concrete Design, centered on AASHTO LRFD bridge design, taught by the PBS CE professor using the PCI Bridge Design Manual among other resources, including the PCI online eLearning Modules. (**NOTE:** See *PBS links* for encouraging student video testimonies of the positive impact of the eLearning Modules and their overall PBS experience.) CM students participated through a course project in the CM199 class, Special Studies, taught by the PBS CM professor. For the first time, some variation in focus and level of difficulty was incorporated to accommodate the specific make-up of the team (e.g., a team with a graduate student included seismic design of the substructure, a topic beyond the undergraduate curriculum).

The benefit of this CE-CM integration and realistic, synergetic—and, at times, challenging—interaction was evident during the end-of-the-semester PBS Finale, the final team presentations via Zoom before an online audience of approximately 50, including dozens of bridge industry members, the Dean of the College, and the PCI Foundation Executive Director, and the PCI West Executive Director. Some of the attendees are shown in Figure 8. Caltrans Accelerated Bridge Construction expert, Dorie Mellon, PE gave a fitting keynote speech, “Accelerated Bridge Construction Practice in California, from Concept to Practice.” The PBS Finale brochure cover is shown in Figure 1.

### **Expanded Mentorship on Bridge Project**

For the second consecutive year, the number of industry mentors expanded in the PBS class, a significant 40% increase, from 10 to 14 CE/CM mentors. As shown in Table 1A and Figures 3-7, the 4 bridge consulting firms (T.Y. Lin International, Mark Thomas, MGE Engineering/Caltrans, and Dokken Engineering) provided 10 mentors: 5 senior mentors and 5 assistant mentors. Each team incorporated 1-2 assistant mentors, who provided additional flexibility and accessibility to students during the semester. In addition, the 3 CM mentors included one practicing construction manager (Viking Construction) and two Sac State CM professors. In addition, Caltrans worked with the CE PBS Professor to provide oversight mentoring for all teams.

Through this expanded mentorship, students enjoyed greater support and access, allowing the scope, challenge, and quality of the curriculum to steadily increase for both bridge design and bridge preconstruction services.

### **Expanded Events with Industry Interaction and Mentorship**

In addition to the project mentorship as mentioned above, PBS during Year 3 expanded industry events with interaction, while maintaining the foundational industry experiences developed previously during Years 1 and 2. Table 3 summarizes for each student category the foundational experiences (Column 2) and lists the new developments/additions during Year 3 (last column), mostly in chronological order of a semester. Figures 1 and 2 show students during in-person events during the Covid-impacted PBS Class.

Table 3 (last column) illustrates the significant number of developments and new additions to improve curriculum content and student access to/interaction with industry during Year 3. All items are considered useful additions to PBS. As shown in Figure 1, one particularly impactful event for students was the midnight site visit to observe precast girder erection (at Hwy 99 at Cosumnes River in Elk Grove), coordinated and led by Con-Fab (Brent Koch, PE, Plant Manager, Alan Leatham, PE, Erection Manager, plus PBS alumni Ariel Roque and Sac State Alumni, Khanh Nguyen), in addition to assistance by the Contractor (George Delano, PE, Granite Construction) and two of his workers on site during the tour. In the midst of Covid-related shut down,

students strongly responded to this in-person experience and the two plant tours (Con-Fab and Sumiden Wire) and expressed deep appreciation for industry commitment to positively impacting their learning.

It should also be noted that events listed in Table 3 are integrated into the overall semester schedule and do not reflect the full class content including lectures by the CE and CM PBS Professors to equip students to understand/perform design and pre-construction services. To fit everything, one Year 2 workshop (Precast Seismic Connections) had to be eliminated.

### **Completing the Loop: From PBS Student to PBS Mentor**

Year 3 was the first time PBS students “completed the loop,” advancing from being a former PBS student to serving as a PBS mentor in 2020. One PBS 2019 student, Vitaliy Danchuk (Figure 11, bottom right), became an assistant PBS bridge design mentor, providing valuable service not only as a mentor to the TY Lin student team, but also as a resource to all teams in the use of the bridge design software, PGSuper, which he learned during the 2019 PBS class through BridgeSight Software workshops and then mastered in 2019-2020 upon being hired as a new bridge engineer by TY Lin, on a major bridge project (which also became the bridge project used for the 2020 TY Lin student team). In addition, another PBS student, Ariel Roque (PBS 2018) who was hired by Con-Fab, assisted students during the Con-Fab plant tour, as well as the midnight girder erection field trip (Hwy 99 at Cosumnes River). This “closing the loop” development is a significant testimony to the benefit and the win-win nature of PBS and is greatly valued by both students and industry. These two former PBS students were among the industry members who presented at the 2021 PCI Foundation Professors Seminar, “Mentorship: The Key Factor toward a Vibrant Precast Studio.”

### **PCI Student Chapter Progress during Covid-impacted Year 3**

Despite Covid, when many campus clubs shut down for the year, the Sac State PCI Club, led by a team of 5-6 student officers in close coordination with the PBS CE Professor (faculty advisor), continued to provide quality events, online and in person, to the PCI Student Club—the only west-coast student chapter of PCI. Some club events were linked to the PBS class (e.g., plant tours, girder erection field trip, workshops, presentations) while others were independently developed by club officers (e.g., lunchtime seminars, general meetings). Figures 9-10 and Table 2A show the diversity of Year 3 club events, and Figures 11-12 show student participation at the 2021 PCI Foundation Professors Seminar, where 7 current and former PCI Club officers shared a well-prepared presentation, “A PCI Student Club: Synergy for a PC Studio.” This presentation encapsulated the unique value of a PCI Student Club for the attending professors and encouraged them to establish a PCI student club.

As shown in Tables 2A/2B, 342 students (including repeats) were impacted, which is approximately 75% of the pre-Covid total (Year 2).

In addition to the many PCI Club events, students also participated in two competitions: PCI Big Beam Competition and the PCIF Video competition (placing 2<sup>nd</sup>). In addition, a sizable contingent from Sac State participated at the 2021 National Convention in New Orleans (May 2021), with 8 students (first time for 2 CM) and both PBS Professors (first time for CM). This experience energized many students to also participate in the June 2021 PCIF Professors Workshop.

### **Precast Canopy Project**

During Year 3, three CE graduate students participated in a challenging, industry-supported, precast design/fabrication/installation project, called the Precast Concrete Canopy (PCC), under the mentorship of Clark Pacific (Glen Underwood, SE; Doug Bevier, PE), JVI (Chuck Magnesio, PE; Heidi Ziemann, PE), and Ed Nicholson, SE, as well as the PBS CE Professor. PCC is a canopy to be designed, fabricated, and installed as a highlight feature of the Sac State engineering quad, based on PCI award-winning CSUS Parking Structure 5 (PS5). PCC will be not only functional and safe, but also an educational and aesthetic beacon of precast concrete at Sac State for students and campus visitors. This project will continue into Year 4, with additional industry and campus involvement expected.

### **Impact of Year 3 Curriculum Developments**

To provide a preliminary assessment of PBS impact on students, a survey has been conducted for the students from Years 1-3, with select results shown in Figures 13-18 for respondents (approximately 50% of the overall number of PBS participants). Key results are summarized below:

- 95% of the students rate the PBS Program a Very Important part of their curriculum.
- 80% of the CE students rate the bridge design mentorship a 4 (15%) or a 5 (65%), with 5 being “Very Impactful and a Highlight of PBS” and 1 being “Not Impactful at All”
- 78% of the students rate the impact of the PBS Class/Project on their job hiring as a 4 or a 5, with 5=Very Impactful and 1=Not Impactful at All
- Approximately 2/3 of the PBS graduates state that their job is in the transportation sector, involves precast concrete, and benefits from knowledge of precast concrete
- Many students desire to convey to the PCI Foundation/JVI/PCI West their strong, heartfelt appreciation for PBS (See Figure 17-18).

### **Year 3—Link to Year 3 PBS Student Experiences/Deliverables**

To convey Year 3 PBS student experiences, deliverables, and excitement, the following link provides folders with videos, photos, presentations, and articles:

[https://mysacstate-my.sharepoint.com/:f:/g/personal/ericm\\_csus\\_edu/Esf69nRuJKtEqgmyoag81RABGO8BuyZCGgMI1oJUAD1\\_IA?e=WrhOhR](https://mysacstate-my.sharepoint.com/:f:/g/personal/ericm_csus_edu/Esf69nRuJKtEqgmyoag81RABGO8BuyZCGgMI1oJUAD1_IA?e=WrhOhR)



**Table 1A. PBS Participation, Year 3—Industry Members**

<b>Regional Champions</b>	<b>Function/Contribution</b>
<p><b>PCI</b> Ruth Lehmann, PE, PMP, Executive Director, PCI West</p> <p><b>Fabrication</b> Brent Koch, PE, Chief Engineer, Con-Fab California Mike Hein, PE, President, Con-Fab California Nick Adams, Plant Manager, Con-Fab California Alan Leatham, PE, Erection Manager, Con-Fab California Ariel Roque and Khanh Nguyen, Project Engr, Con-Fab</p> <p>Glen Switzer, Manager, Dura-Stress, Inc.</p> <p><b>Design</b> <u>Caltrans</u> Say-Gunn Low, PhD, PE, Precast Committee Austin Young, PE, Transportation Engineer</p> <p><u>Consulting Firms</u> <u>Dokken Engineering</u> Rob Burns, SE, Senior Engineer Jeremy Nottnagel, Assistant Engineer <u>Mark Thomas</u> Jason Hickey, SE, Tech. Lead Engr Victor Sherby, PE, Senior Bridge Engineer Aaron Clubb, Design Engineer <u>MGE Engineering, Inc.</u> Wes Sennett, SE, Senior Engineer Robert Sennett, SE, Principal <u>TY Lin International</u> Bob Fish, SE, Vice President (Lead Mentor) Mark Philipps, PE, Senior Bridge Engineer Vitaliy Danchuk, PE, Bridge Engineer</p> <p><u>Bridge Software</u> Richard Pickings, PE, President, BridgeSight Software</p> <p><b>Specialty Products</b> Kevin Evans, Plant Manager, Sumiden Wire Products Corp. Soua Herr, (New) Plant Manager, Sumiden Wire Joel Parra, Quality Engineer, Sumiden Wire Products Corp.</p> <p><b>Construction</b> Andy Mantell, PE, Assistant Professor, CSUS Troy Clemmons, PE, Vice President, Viking Construction George Delano, PE, Granite Construction Dorie Mellon, PE, ABC Specialist, Caltrans Craig Knapp, PE, Senior Bridge Specialist</p> <p><b>Precast Projects</b> Glen Underwood, SE, Chief Structural Engr, Clark Pacific Doug Bevier, PE, Project Manager, Clark Pacific Chuck Magnesio, PE, Senior VP, Engineering, JVI, Inc Heidi Ziemann, PE, Chief Engineer, JVI, Inc Ed Nicholson, SE, EJNSE Consulting</p>	<p><b>PCI</b> PCI West (Overall Coordination)</p> <p><b>Fabrication</b> Bridge Precaster, Lead (Plant Tour, Presentation, Site Visit)</p> <p>Bridge Precaster (Presentations)</p> <p><b>Design</b> Bridge Design Coordinator, Lead (Bridge Design) Bridge Design (Bridge Mentor, Presentation)</p> <p>Bridge Design (Bridge Mentor, Presentations)</p> <p>Estimating and Specifications (Presentation)</p> <p>Bridge Design (Bridge Software Training Workshops)</p> <p><b>Specialty Products</b> Prestressing Strand (Plant Tour, Presentation)</p> <p><b>Construction</b> Construction Mentor Precast vs CIP Construction (Presentation, Mentor) PC Girder Erection Tour Accelerated Bridge Construction (Keynote Speech) Concrete Construction Materials</p> <p><b>Precast Projects</b> Building and Architectural Precaster (Plant Tour, Pres., PCI Big Beam, PC Student Project Mentor) Precast Project Mentor Precast Project Mentor Precast Project Mentor</p>

**Table 1B. PBS Participation, Year 3—Principal Investigators**

<b>Professors/Sac State Champions</b>	<b>Function/Contribution</b>
Civil Engineering: Prof. Eric Matsumoto, PhD, PE Construction Management: Prof. Mikael Anderson, PE	Principal Investigator (PI), PBS Lead Co-PI, Construction Management Coordinator/Mentor

**Table 2A. Student Participation Statistics, Year 3**

PBS Class	Participants	
Precast Bridge Studio Class (Fall 2020, 16-week semester)	Civil Engineering Students (CE168): 15 Construction Management Students (CM199): 6	
	SUBTOTAL: 21	
PBS Student Travel Nationally	Participants	
PCI National Convention (New Orleans), May 2021	Students (6 CE, 2 CM)	8
	SUBTOTAL: 8	
PBS Precast Projects/Competitions	Participants	
PCI Big Beam	Team 1: Fall 2020 (Design)	6
	Team 2: Spring 2021 (Design/Fabrication)	6
	Team 3: Summer 2021 (Testing/Report)	6
Precast Canopy Project	Fall 2020	2
	Spring 2021	3
PCI Foundation Student Video Competition	Spring 2021	5
	SUBTOTAL: 28	
PBS Events and Participants		
<u>Fall 2020</u>	<u>Spring 2021</u>	
General Meeting (Kickoff), Durastress/PC Girders 22	General Meeting (Kickoff), Clark Pacific/UCSB	18
Software Workshop I (PGSuper) 21	General Meeting (2nd), Willis Constr./Broad	12
PBS Seminar (PC/PS Fabrication, Confab) 15	General Meeting (3rd), PCIW, TY Lin/Lid Struct.	20
PBS Field Trip I (Sumiden Wire Plant Tour) 26	PCIF Video Competition	5
PBS Field Trip 2 (Confab Plant Tour) 26	<u>Summer 2021 (6/2/21)</u>	
PBS Seminar (CIP vs PC/PS Construction) 17	PCIF Professors Seminar Presentation/Dinner	9
Software Workshop II (PGSuper) 15	SUBTOTAL: 59	
General Meeting (2 <sup>nd</sup> , Lunchtime), TEKLA 12		
PBS Field Trip 3 (Girder Erection, Hwy 99, Confab) 30		
General Meeting (3 <sup>rd</sup> ), PCIW, PS5/PB 18		
PBS Finale 24		
SUBTOTAL: 226		

**Table 2B. Student Participation Statistics, Year 3 (continued)**

PBS Student Participation—Class:	21 Students
PBS Student Participation—Projects/Competitions:	28 Students
PBS Student Participation—Activities:	285 Students
PBS Student Participation—Travel/National:	8 Students
<b>TOTAL: 342 Students</b>	

**Table 3. PBS Foundational Events and New Developments/Additions, Year 3**

<b>PBS Student Category</b>	<b>Foundational Events</b>	<b>New Developments/ Additions during Year 3</b>
CE	Precast Girders—Overview	Bridge Proportioning
CE	PCI eLearning Modules	Some required, some Extra Credit
CE and CM	Kickoff Meeting with Bridge Layout and Girder Selection Presentation/Exercise	Bridge Proportioning
CE and CM	PC Bridge Software Workshop 1	Additional Interaction; Submitted Questions
CE	Precast Plant Lecture (Con-Fab)	
CE and CM plus PCI Students	Precast Plant Tour (Con-Fab)	
CE and CM	Project Proposal	
CE		PC Bridge Materials (Caltrans)
CE		Prestressing Strand Plant Lecture via Zoom (Sumiden)
CE and CM plus PCI Students	Prestressing Strand Plant Tour (Sumiden)	Lecture via Zoom
CE and CM plus PCI Students	Girder Erection Tour (Con-Fab)	Tour Guides including Con-Fab Plant Manager, Erection Mgr, and Contractor
CE and CM	PC Bridge Construction Workshop: PC vs CIP; Site Logistics, Risks/Opportunities	
CE	PC Bridge Software Workshop 2	Additional Interaction; Submitted Questions
CE	Cost Estimating/Specs	Consultant Perspective
CE and CM	3 Mentor Meetings	2 Additional Meetings
CE and CM		Project Status Presentation and Report: 30% Submittal
CE and CM	Project Status Presentation and Report: 65% Submittal	Improved Guidelines
CE and CM	Dry Run Presentations	Added Times
CE and CM	PBS Finale	Online

## Sacramento State Precast Bridge Studio Finale Fall 2020

Student Presentations, Awards, and Keynote Speech:  
“Accelerated Bridge Construction in California—  
From Concept to Practice”



*Brent Koch, PE, Chief Engineer, and Alan Leatham, PE  
from Con-Fab California—with Granite Construction—lead  
Sac State CE and CM Students on Precast Girder Erection  
Tour at Hwy 99 and Cosumnes River, 10/11/20*

**December 17, 2020, 3:00P-6:40P**

**Zoom <https://csus.zoom.us/j/86118958665>**

Figure 1. PBS Finale Brochure Cover with PBS Students during Girder Erection Tour





*Joel Parra Explains Strand Die to Students during Sumiden Wire Plant Tour*

*Brent Koch, PE, Conveys Importance of Wide Flange Girder Details at Con-Fab Plant*

**Figure 2. Year 3 PBS Highlights: Sumiden Wire Plant Tour (L) and Con-Fab Plant Tour (R)**

<p><b>The Montlake Lid Bridge Project</b> By: Sound Engineering</p> <p>Under Construction: Picture taken 12/14/201</p> <p>California State University Sacramento, Department of Civil Engineering and Construction Management Team: Jacob Iken, PM, CE; Jessica Cheung, CE; Ricardo Membria, CM; Austin Moreno, CM; Taylor Moyles, CE Mentors: Bob Fish, SE; Mark Phillips, PE; Vitaliy Danchuk, TY LIN International Eric E. Matsumoto, PhD, PE; Mikael Anderson, PE, CM Dept. Chair CE 168/CM 199 Precast Bridge Studio</p> <p><b>Sound Engineering</b> a Construction Management Group</p> <p><b>PCI FOUNDATION</b> <b>TYLIN INTERNATIONAL</b></p>	<p><b>Roseville Parkway OH</b></p> <p><b>Erratic Engineering Design &amp; Construction</b> CE 168 Precast Bridge Design Studio Professor: Eric Matsumoto, PhD PE Professor: Mikael Anderson, PE Mark Thomas Mentors: Jason Hickey, SE Victor Sherby, PE Aaron Chubb</p> <p>Date: December 17, 2020 Christopher Grottkau, (CE) PM LaRautca Ross, (CE) Lateef Saeed, (CE) Rogelio Velazquez, (CE) Armando Ramos, (CM) Diego Gutierrez, (CM)</p> <p><b>SACRAMENTO STATE</b> <b>PCI FOUNDATION</b> <b>MARK THOMAS</b> <b>CITY OF ROSEVILLE CALIFORNIA</b></p>
<p><b>EASY AS Construction &amp; Engineering</b> <b>A B C</b></p> <p><b>Route 46/99 Separation (ABC)</b> CA Wide Flange Girders, Precast Columns, &amp; Precast Inverted T-Bent Cap</p> <p>Department of Civil Engineering Mentor: Wesley Sennett, PE Mentor: Austin Young, PE Professor: Eric Matsumoto, PhD PE Professor: Mikael Anderson, PE</p> <p><b>CE 168 Prestressed Concrete Design</b> Precast Bridge Studio December 17, 2020</p> <p><b>MGE</b> <b>Caltrans</b></p> <p>Nathan Carragher, CE PM Hitham Albedalvi, CE Angelita Alonzo, CE Brian Hu, CE</p> <p><b>SACRAMENTO STATE</b></p>	<p><b>White River Bridge Replacement</b> CE 168 Prestressed Concrete Design   Precast Bridge Studio   December 17th, 2020</p> <p>Amanda Jones, CE PM Daniel Gerkus, CM PM Jamshid Shir Mohammad, CE Theodoro Moreno, CM Ryan Moyles, CE Jose Rivas, CE</p> <p>Department of Civil Engineering Mentor: Rob Burns, SE Assistant Mentor: Jeremy Nottmangel CE Professor Eric Matsumoto, PhD PE CM Professor Mikael Anderson, PE Dep. Chair</p> <p><b>SACRAMENTO STATE</b> <b>DE</b> <b>PCI FOUNDATION</b></p>

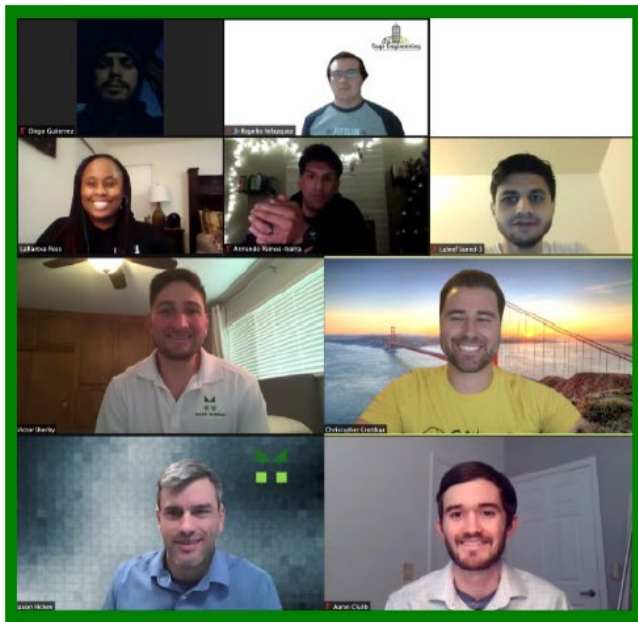
**Figure 3. Year 3 PBS Highlights: Four Bridge Projects with Integrated CE/CM Teams (CE168 and CM199)**

**PBS Zooms Fall 2020!**

*Rob Burns, SE, and Jeremy Nottmangel from Dokken Engineering Mentor CE/CM Student Team (ABC Design) via Zoom throughout the COVID-19 Impacted Fall 2020 Semester*



**Figure 4. Year 3 PBS Highlights: ABC Design Team (White River Bridge) with Dokken Engineering Mentors**

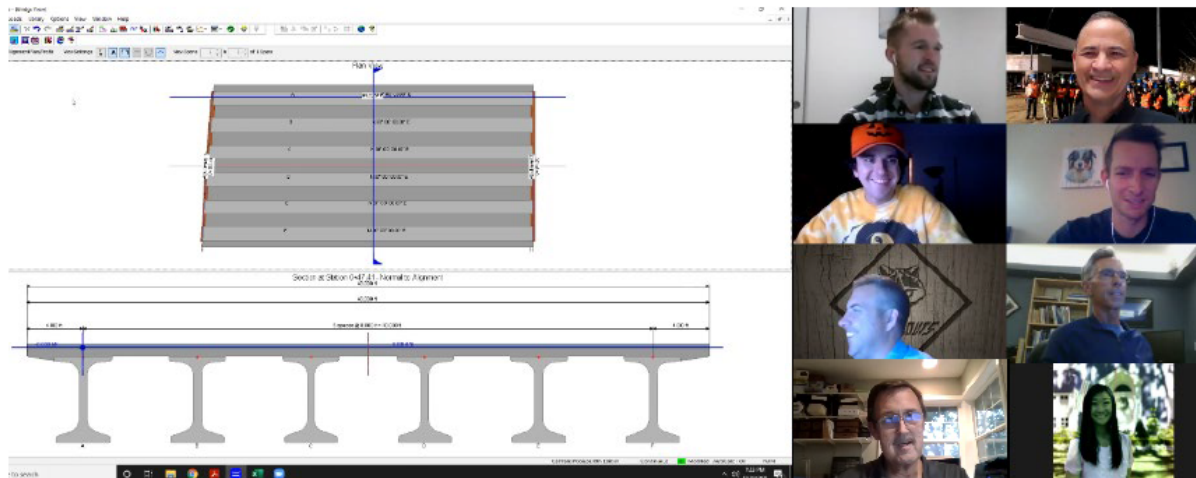


**CE/CM Team Celebrates as They Complete Project**

*CE/CM Student Team, EEDC, Celebrates as Challenging Team Project—Guided by Jason Hickey, SE, Victor Sherby, PE, and Aaron Clubb from Mark Thomas—Comes to Close, Fall 2020.*

**Figure 5. Year 3 PBS Highlights: EEDC Team (Roseville OH) with Mark Thomas Mentors**





**PGSuper, Professional Grade PC Girder Design Software, Training**  
*Sound Engr Team and TY Lin Mentors (Bob Fish, SE, Mark Phillips, PE, and Vitaliy Danchuk) Join Training/Consulting with Richard Pickings, PE.*

**Figure 6. Year 3 PBS Highlights: Sound Engr Team (Montlake Lid Bridge) with TY Lin Mentors, BridgeSight Software Mentor, and PBS CE Professor**



**Mentors Guide “Easy as ABC” Team in ABC’s of Accelerated Bridge Construction**

*Wes Sennett, PE, MGE Engineering, and Austin Young, PE, Caltrans, Mentor CE Team “Easy as ABC” on Hwy 46/99 Separation ABC Project*

**Figure 7. Year 3 PBS Highlights: Easy as ABC Team (Hwy 46/99 Separation ABC Project) with MGE Engineering and Caltrans Mentors**



Figure 8. Year 3 PBS Highlights: December 2020 PBS Finale Attendees (partial)



## PCI Club Events

### During Covid



PCI Club Sao State Student Chapter

### FEBRUARY KICKOFF MEETING

Tue, Feb 09 | 6:00-7:30PM

Zoom ID: 883 2559 1666

- General Meetings with Industry Guest Speakers
- PCI National Convention in New Orleans, LA
- PCI Big Beam





**GUEST SPEAKER:**  
 Grant Guerrieri  
 Clark Pacific Senior Project Engineer  
 Grant has over 16 years of experience in the precast industry and will share an exciting presentation on the application of precast/prestressed concrete for the UC Santa Barbara student dorms - AKA the Mungler project!



**REMINDERS:**

- Join our meetings for chances to win awesome raffle prizes!




Sign up for a free student membership:  
[www.pci.org/PCI/about/join/individualmembership.aspx](http://www.pci.org/PCI/about/join/individualmembership.aspx)  
 Check out our website:  
[www.sacpci.org/](http://www.sacpci.org/)

Figure 9. Representative PCI Club Events, Year 3



# PCI Club Events (Covid)

## Evening Agenda

*Raffle Prizes!*

- Ruth Lehmann, PE, PMP, PCI West Executive Director
  - Precast, Prestressed Concrete Award-Winning Projects 2021
  - Virtual Plant Tour
- Bob Fish, PE, SE; Vitaliy Danchuk T.Y. International
  - Closing The Lid on Cast in Place: Precast Girders on the SR520 Montlake Lid Project
- PCI Club Announcements
  - New Officers!
  - 2021 PCI Convention
  - Fall Precast Bridge Studio
  - 2021 PCI Prof. Workshop



- Honor graduating officers
- Random Raffles to attract new students






Figure 10. Representative PCI Club Events, Year 3 (Continued)



Figure 11. PCI Club Presentation at 2021 Professors Workshop



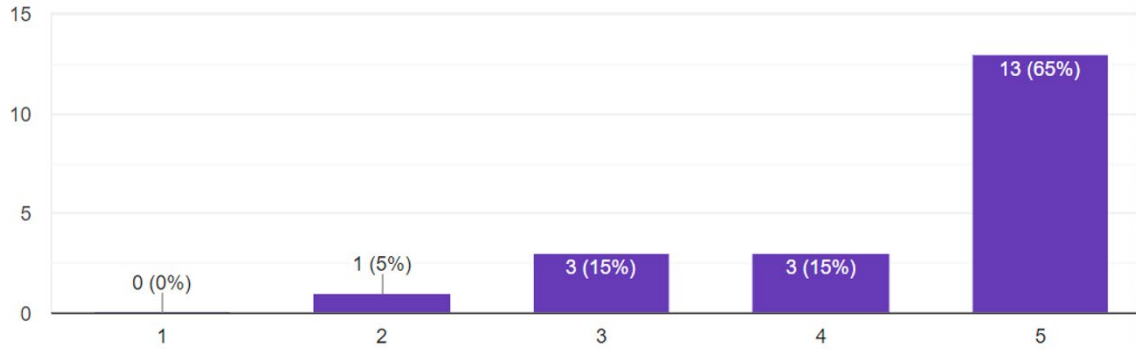
**Figure 12. PCI Club Presentation at 2021 Professors Workshop (Continued)**



## Anonymously from PBS Students (2018-2020)

(CE ONLY) The Bridge Design Mentorship was...

20 responses



Not Impactful at All



Very Impactful and a Highlight of PBS

Figure 13. Select Results from Student Survey for Years 1-3

## Anonymously from PBS Students (2018-2020)

State how much you agree with the following: "The PBS program is an important part of the curriculum."

20 responses

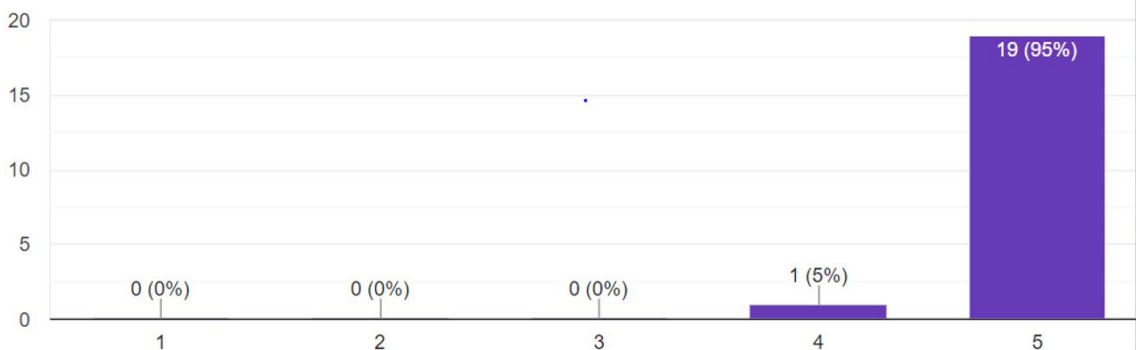


Figure 14. Select Results from Student Survey for Years 1-3 (Continued)

## Anonymously from PBS Students (2018-2020)

The impact of the PBS Class/Project on my job hiring/opportunities (including grad school if applicable) was...

18 responses

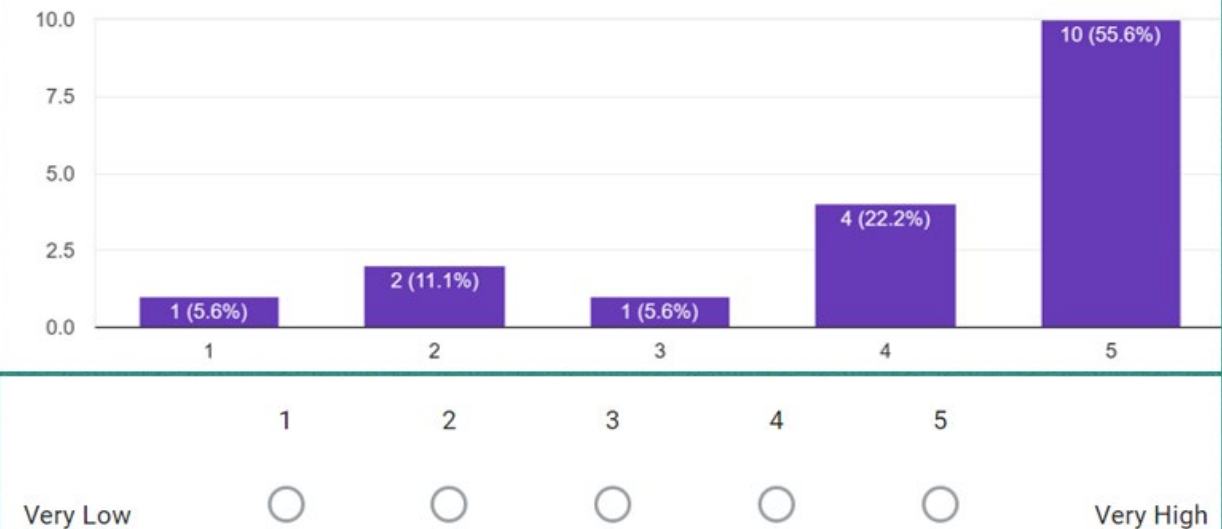


Figure 15. Select Results from Student Survey for Years 1-3 (Continued)

## Anonymously from PBS Students (2018-2020)

If working, my current job... (CHECK ALL THAT APPLY)

18 responses

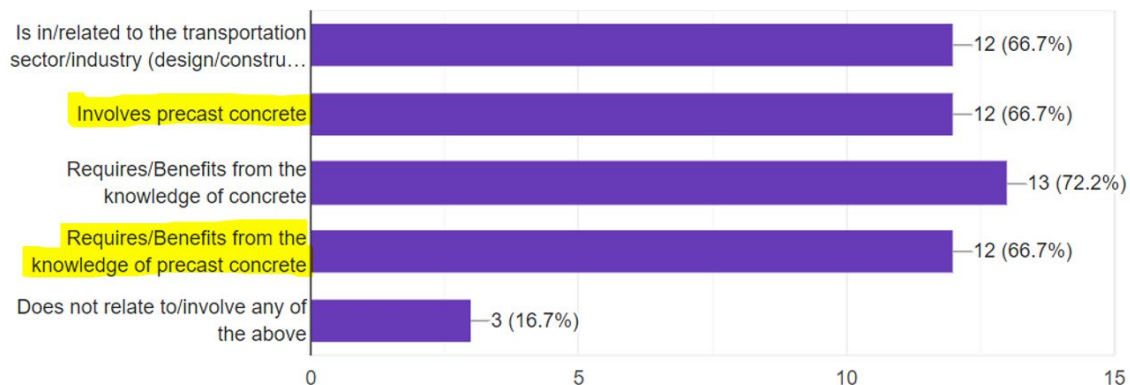


Figure 16. Select Results from Student Survey for Years 1-3 (Continued)

## Anonymously from PBS Students (2018-2020)

Here's something I would like to convey to industry sponsors/key supporters of the PBS program (PCI Foundation, JVI, PCI West):

10 responses

Thank you for making the class possible and giving us this amazing opportunity to grow and learn!

Thank you for supporting the PBS program at Sacramento State. The program has made a strong impact on many students and serves as a great bridge to connect undergraduate students to the many aspects of the industry (precast, construction, bridge, etc.). With your support, I am positive that the PBS program will continue to flourish and grow.

Something good is going on with this program. The students I know that I took the class with are getting picked up by companies really fast.

Thank you for making this opportunity possible! Your support will help to create the engineers of tomorrow.

I know without your passion for precast and the future this entire experience would not have been possible. Thank you so much for the extraordinary opportunity you provided for us with in the PBS Program and all the support you provide to the PCI Student Club. Your investment in the future is greatly appreciated.

Figure 17. Select Results from Student Survey for Years 1-3 (Continued)

## Anonymously from PBS Students (2018-2020)

Thank you for sponsoring our class. It helped me a lot on getting a job and until now at work, I am able to apply everything I've learned from our class. Please keep supporting this class because it really plays a big role to every CE student.

Thank you so much for sponsoring this. I believe this is a one of kind in this country and is producing great bridge engineers for California and other parts of the country.

Thank you for your help.

I want to thank you so much for supporting this program! As precast/prestressed is becoming increasingly common, it is essential that it be taught at the undergraduate level. Your support has played a huge role in making this all possible and educating the engineers of the future. From the bottom of my heart, THANK YOU!!

Your support and sponsorship not only invests into future engineers and successful careers, but into the future of our country. There is no doubt that the future of our infrastructure will be shaped starting from programs like the Precast Bridge Studio.

Figure 18. Select Results from Student Survey for Years 1-3 (Continued)