



## State President's Message

Andy DiLeo, PE, SE  
SEAOA State President



As the year starts to heat up, I have two things to touch on.

First is our 2021 virtual convention. You all should have received a save the date email announcing that the convention will be held June 10<sup>th</sup> and 11<sup>th</sup>. The format will be similar but not exactly what we've done in past years. On Thursday the 10<sup>th</sup> we will have opening remarks and multiple technical presentations. A live question and answer sessions will be held at the end of each presentation to give everyone a chance to participate in the discussion. In addition to technical presentations on Friday the 11<sup>th</sup>, an awards presentation will be held for the 2021 Excellence in Structural

Engineering Awards. While we will not have a trade show this year, we are still expecting to have participation from a number of exhibitors. Stay on the lookout for emails containing more information. In the coming weeks the Convention Planning Committee intends to announce the full itinerary including presenters and presentation topics. As always, this year's convention will be a great value for our members.

On another topic, the Arizona Legislature has introduced a number of bills that essentially remove licensing requirements for engineers and even change the definition of practicing engineering. SEAOA would like to encourage members who may be interested to join our legislative committee. The committee can help identify these bills as they are introduced to the legislature, interpret them, help inform our membership and help SEAOA take action when we determine it to be necessary.

Finally, I hope you are all staying healthy and well. I look forward to being able to resume our in-person meetings when its comfortable and safe for everyone.

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## SEAOA 2021 EXCELLENCE IN STRUCTURAL ENGINEERING AWARDS: CALL FOR ENTRIES

The SEAOA is once again looking for the best and the brightest projects from our members so that we may showcase them at our Annual Convention. No project is too small if it required a unique, "excellence in structural engineering" approach. This year's announcement can be found on the website:

[2021 SEAOA Excellence in Structural Engineering Awards: Call for Entries](#)

Please remember that all submittals must be made by an active SEAOA member (a registered SE) who had a responsible role in the project. Entries must be received no later than 4:00pm on April 26, 2021.



JOINT CENTRAL AND  
TUCSON CHAPTER  
VIRTUAL LUNCH  
MEETING

April 20, 2021  
12pm-1:30pm  
[Register Here](#)

## Central Chapter Chairperson's Message

David Grapsas, P.E., S.E.  
Central Chapter Chair



I hope everyone has had a great first quarter in 2021.

New Millennium, Simpson, and Felten Group all gave excellent presentations for our Central Chapter virtual meetings this year. Thank you to

everyone that attended virtually.

Our next virtual event is on April 20, 2021 where Erin Conaway will be presenting on the Steel Market Conditions. This presentation will look at all of the factors at play in the steel supply chain that my impact supply and pricing at any given time.

The Central Chapter is continuing to monitor the ongoing situations and the ever-changing events and executive orders. We are hopeful the days of in person events will be back soon.

Please check the SEAOA website for updates and calendar of events.

## Tucson Chapter President's Message

Jennifer McMahon Patronski, PE, SE  
Tucson Chapter President



Happy Spring SEAOA members! It is hard to believe April is already here. The first quarter of 2021 has sped past. I do wish it has brought health and prosperity to our member firms, members, and their families.

Because we are still in a virtual meeting world, I have few updates to share regarding the Tucson Chapter. It has been a pleasure coordinating with the Central Chapter – Thank You David Grapsas, et.al. for tag-teaming the schedule this year! We look forward to upcoming virtual meetings on the AISC Marketplace later this month and our annual joint meeting with ACI in May on “Changes to the Concrete Design Standard”.

One subject to watch closely this year is the continued concern over the change in regulation of engineering by the State. Last year, although opposed by many from the engineering community, Arizona legislation SB1274 changed the composition of the AZBTR Board. This year, our eyes are on SB1062 (re: engineering definitions) and SB1304. SB1304 has been withdrawn and amended recently yet continues to raise concern in the engineering communities as it would delegate regulation of engineering to a corporate organization, and it would remove the requirement to have registered engineers design public works projects.

Anyone interested in participating in SEAOA's Legislature Committee or in receiving additional information regarding Arizona State legislation affecting our engineering communities, please reach out to me at [jmpatronski@scice.com](mailto:jmpatronski@scice.com). Also, additional information may be found at: <https://btr.az.gov>.

## YMG President's Message

John Heck, PE, SE  
YMG President



April is the most beautiful time of year to be stuck inside on the weekends cramming for the PE and SE exams. If you are like me, I constantly lived with the fear of missing out on the adventures my friends and family

were organizing. One of the few positives about the state still being partially closed is that there is less to miss out on while you are studying! Study hard

these next two weekends by working on practice problems, tabbing code references or examples, and finally take a day off to relax and organize your materials. Good Luck!

With the vaccines rolling out I would like to meet over the summer or early fall to discuss open positions within the YMG. I will be stepping down after one year (not counting 2021) and want to pass of the responsibilities to new and different members that are looking for leadership experience. Please keep an eye out for a happy hour invite over the summer.

### SAVE THE DATE!!



We are pleased to announce the SEAOA 2021 Virtual Conference!

The two-day format will include 1-hour presentations with 15-minute Q and A sessions following each presentation. Scheduled topics include Mass Timber with Michelle Kam-Biron, Dr. S.K. Ghosh presenting on the IBC 2018/ASCE 7-16, SpeedCore from AISC, case studies and more to be announced.

Please save the date in your calendars as more information and registration will be sent soon.

Exhibitor registration is now open at [www.seaoa.org](http://www.seaoa.org)!

## **2020 SEAOA Excellence in Structural Engineering Award Winner Martin, White & Griffis Structural Engineers, Inc.**

### ***New Buildings > \$10 Million: University of Arizona Health Sciences Innovation Building***

The University of Arizona Health Sciences Innovation Building (HSIB) is a 217,000 square foot cutting edge laboratory and research facility that uses structural ingenuity to achieve remarkable learning and collaboration. While the 9-story plus basement building fosters a wide variety of learning, research and gathering spaces for teams of 2 to 1000, delivering the project in a 37-month fast-track process required extensive collaboration. Early decisions on an initial structural system, preplanning for construction logistics, and best value evaluations for the University were coupled with a host of structural systems and approaches that could flex even as construction progressed.



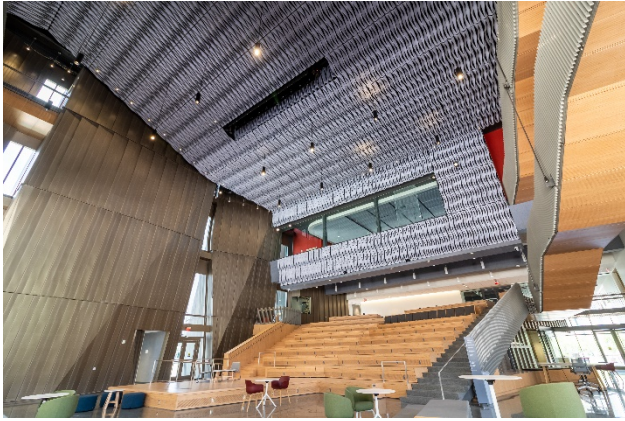
*HSIB Elevation – forum area and ‘V’ columns at ground level*

Located just south of the U of A Medical Building on the corner of Mable and Warren Ave. The HSIB is a multi-disciplinary and simulated practicing building for teams of the health profession, students, and facility members. The building was designed to have flexible large spaces, with smaller areas for group and teams to gather in learning areas. In addition, the facility includes a state-of-the-art clinical labs and simulations centers.



*Two story ‘V’ columns looking north- special concrete forms used to frame the concrete*

The 37-month fast track design started with the basement and foundation elements. The HSIB basement was framed with shotcrete walls and accommodated two underground tunnels. One connects the HSIB to a Medical Research Building, while the second connects to another University Pharmacy College building; both at basement levels. The building’s primary lateral resisting system - four concrete core walls of reinforced concrete – were constructed over drilled piers and spread footings at interior two-story column locations over the course of several months. Concurrent with this erection were two-story, slip-formed V-columns used under the eastern portion of the building. These first to third-level columns were key to maintaining open, ground-level access to the Forum. Integrating three large, glass-windowed steel-framed hydraulic doors that open the Southern end of the space, the Forum can accommodate an indoor-outdoor gathering of more than 1000 people.



*Forum Area – Over 1000 persons can occupy this space with the South panel doors open*

After the core walls were completed, pre-fabricated 90-foot steel plate girders were placed floor by floor and composite concrete over metal long-span deep Dek was erected. Each of the long-span composite plate girders exceeded a 60-foot transport limit, and required special permits. Although the plate girders were designed not to require shoring, logistical concerns about connections and the erection process had to be considered. Extensive MEP coordination allowed penetrations to be fabricated in the web of the girders to avoid possible problems while installing the MEP systems.



*Typical floor framing with 90' steel plate girders. Holes in steel girders for MEP ducts and piping*

These floors included the InfoCommons spaces, which featured 12" slabs and upturned beams for an exposed concrete ceiling. While notches within the beams allowed for MEP systems to connect, only fire sprinkler penetrations occurred in the slabs.

90-foot span steel trusses that form clear-story windows on the roof level were erected last. Filtering northern light into administrative and research spaces, the steel roof framing spans between the high and low truss chords of adjacent trusses. Throughout the last phases of construction, steel framed mechanical shafts on the west side of the building were erected. Large mechanical equipment was delivered via these shafts and placed on the steel plate girders and composite concrete floor system. When the project was completed, it was the second tallest structure in Tucson.

## **2020 SEAOA Excellence in Structural Engineering Merit Award Winner: Meyer Borgman Johnson - New Buildings, Over \$10M: American Express – New Canyon Building**

The Canyon Building is home to 3,000 employees and is the fourth office building on American Express Desert Ridge campus. It is 4-stories and the largest at 300,000 square feet. Structurally, it is comprised of cast-in place post-tensioned concrete floor plates and concrete moment frames wrapped with a precast concrete and aluminum panel exterior wall system. The unique floor plan includes four separate post-tensioned concrete plates interconnected with pedestrian walkways, a steel bridge, three large exterior canopies, and a high bay cafeteria. A visually stunning 4-story tall indoor atrium links the each of the wings.

In collaboration with two of the Valley's precast suppliers the project also includes two precast concrete parking structures. Both are five stories tall, one totaling 610,000 square feet with space for 1,880 vehicles and the other totaling 520,000 square feet with space for 1,520 vehicles. The structures allow for the reduction of 3,400 stalls of surface parking on the campus.

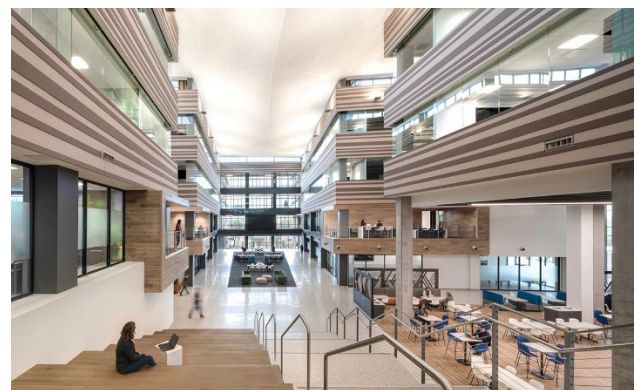
Instead of a traditional project delivery model such as design-bid-build, the Canyon Building was delivered using integrated project delivery (IPD) lite, which brought all project stakeholders together early and throughout the project. IPD brought efficiencies to both the design and construction process in terms of time and cost savings as the architects, engineers, contractors, and the owner were able to communicate more efficiently, address questions and make changes quicker in a real-time environment. Several structural systems including one-way concrete slabs on post-tensioned wide beams, a composite slab on structural steel, and post-tensioned concrete flat plates were contemplated. The combination of economy, speed, and structural characteristics led to the selected post-tensioned concrete flat plate system. MBJ provided an early concrete package that was in permit review prior to any other disciplines finishing their final design as part of this process.



*Exterior View of American Express Canyon Office Building*



*Exterior Canopy*



*Interior View of Atrium*

## **2020 SEAOA Excellence in Structural Engineering Award Winner:** **PK Associates - New Buildings, Over \$10M: Block 23 @ Cityscape**

This mixed-use, high-rise development consists of a nine-story, 200,000 square foot Class A office, 13,000 square feet of retail and restaurant space, and a 67,000 square foot Fry's Grocery Store. The 17-story, 390,000 square foot residential tower features 332 units built on top of a 3 level, 500-space subterranean parking structure. An 18,000 square foot outdoor amenity deck spans the two buildings on the 5th level and sits atop a portion of the parking structure.

PK Associates Consulting Structural Engineers worked closely with Red Development, Streetlights Residential, Omni Plan, Whiting Turner Construction, and Suntec Concrete to deliver this structurally complex project, on time and within budget.

**Challenge:** This block of Phoenix's historic downtown area had many original uses throughout the years. Most recently, the site had been occupied by a subterranean parking garage and parking lot. There was significant interest in preserving the existing garage, but its structural capacity was not adequate to support this redevelopment project.

**Ingenuity:** PK Associates worked closely with the shoring designer to analyze the capacity of the existing walls and determined that both the north and the east walls of the existing underground parking garage could be saved and used as shoring. This reduced the amount of material removed from the site and lowered the amount of required new shoring.

After removal of the pre-existing three-story basement, the new structural design took advantage of the already excavated space to create a split basement with one portion being 3 stories deep and the other portion only one story deep. This innovative design element required both caissons and spread footings. PK Associates worked in close collaboration with the geotechnical engineer to prevent large differential settlement between the two systems.

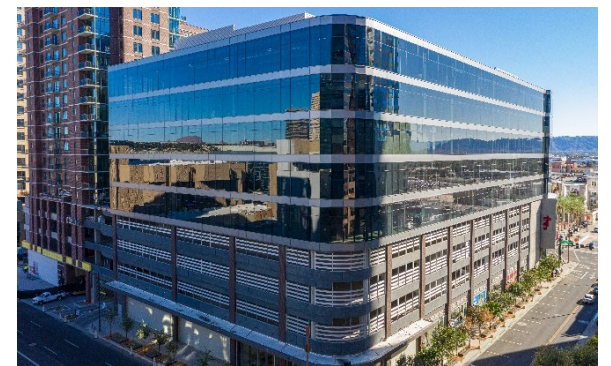
**Results:** The highly anticipated mixed-use redevelopment project in Downtown Phoenix has exceeded all expectations while re-purposing elements of the previous structure to reduce waste and preserving elements of the site's long history.



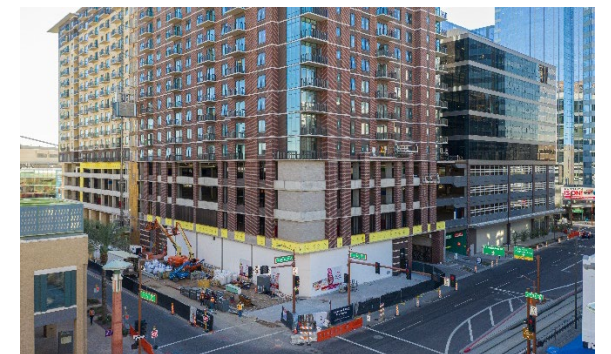
*Block 23, South view Fry's Grocery Store and Class A office space above The Ryan Residential*



*Block 23, 5<sup>th</sup> level Amenity Deck*



*Block 23, Northwest view Class A office space*



*Block 23, Northeast view The Ryan Residential*

## **2020 SEAOA Excellence in Structural Engineering Award Winner:** **Meyer Borgman Johnson - New Buildings, Over \$10M: Northern** **Arizona University Kitt Recital Hall**

Situated between the Clifford White Theater and the Ardrey Auditorium with adjacencies on 3 sides, the new \$15 million, 255-seat recital hall helps create a more robust performing and fine arts complex on the NAU campus. The project includes a new 21,000 square foot addition plus renovation of 6,800 square feet of existing space. Also included in the new spaces are choral and instrumental rehearsal rooms, choral and instrumental libraries, and lobby space. The new hall is designed to LEED certified criteria.

To address the project's acoustical challenges, the practice rooms adjacent to the recital hall were designed as a box within a box, which isolates the superstructure from the interior structures of the theater and auditorium on either side. The floating concrete floor slabs are supported on LDS rubber pads to isolate the floor along with uncoupled double walls and ceilings.

The design team was faced with the challenge of adding a second story over the existing single-story structure. MBJ's structural team studied the existing roof framing and found that the existing steel beams could support the second floor structure if they were transformed to composite steel beams. This required replacing the existing roof deck with composite steel floor deck, adding automatic welded shear studs to the existing beams, and placing a lightweight concrete topping slab. By keeping the existing steel framing, the design saved money on the structure and eliminated the risk of erecting a steel structure within the existing facility.

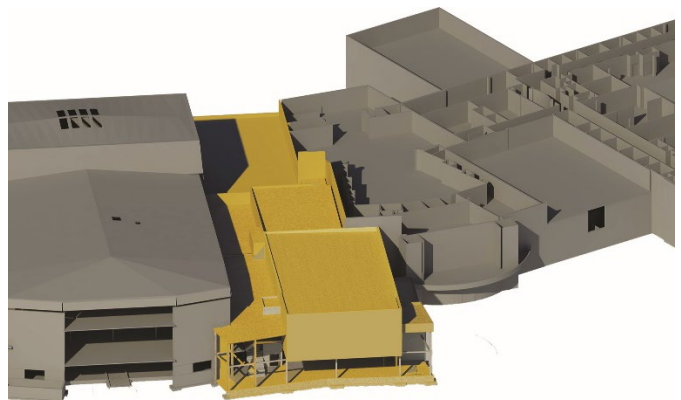
The roof framing over the band practice room is supported by long-span steel joists bearing on independent cold-formed steel stud walls providing a lightweight structure that is isolated from the surrounding existing structure. The combination of this lightweight roof framing system and the composite floor system described above allowed the existing foundations on the perimeter to remain without costly foundation strengthening methods. Most of the existing interior column foundations were strengthened to support additional loads.



*Exterior View of NAU Kitt Recital Hall*



*Existing Roof Beams to be Transformed into Second Floor Beams*



*Revit Model Showing Kitt Recital Hall Flanked on Both Sides by Clifford White Theater and Ardrey Auditorium*



## Future City Competition 2021

By Richard Dahlmann

The Future City Competition Arizona regional finals were held at the end of February. This is a competition for 6<sup>th</sup> through 8<sup>th</sup> grade students, and is a great introduction to engineering. Teams from all across Arizona competed in this year's regional finals. As with many other things over the last year, this was a unique competition this year.

The students have been working diligently on their cities since September. Their deliverables were virtual this year, and included:

- A Sim City computer model of their city
- An essay describing their city
- A physical scale model
- and a video presentation about their city

Many engineering societies give out awards to teams that put an emphasis on their discipline. The SEAOA has been participating in this for over 10 years.

A special Thank You to: Tim Alvarez (Kattera), Mark Sipes (City of Tempe), Jane Jansen (U of A), Karla Velasco (Risa), Pam Singleton (Pangolin), Kelly Robertson (Caruso Turley Scott), Ben Hagos (OMCO Solar), Marc Platt (Wright), Spencer Browne (U of A) and Matthew Schmitt (Caruso Turley Scott) for being SEAOA judges for this year's competition.

The SEAOA award recipient this year was: **Artemis II from Our Lady of Mount Carmel School.**

The competition theme this year was building on the Moon. The future city they developed was located in the Aitken Crater at the Moon's South Pole. Below is an excerpt from their essay:

*The compact layered building technique takes advantage of the low gravity on the moon to allowing for skyscrapers and tall buildings to reach extraordinary heights. Almost every building and structure is built in a compact layered manner in order to reduce the amount of space taken up by these constructions.*

They also took asteroid and meteor impacts into consideration, along with thermal and radiation challenges.

Congratulations Artemis II!