



STRUCTURAL ENGINEERS ASSOCIATION OF ARIZONA NEWSLETTER

www.seaoa.org

JANUARY – MARCH 2024

State President's Message

David Grapsas, PE, SE
SEAOA State President



Happy New Year! I hope everyone was able to spend quality time with friends and family over the holidays. We often get caught up in the day-to-day of work, and I encourage everyone to create and maintain a great work/life balance. Time goes by fast, and unfortunately, it is one thing we can't get more of. Take time to be with friends and family!

Please be on the lookout for event invitations, including the monthly Tucson and Phoenix Chapter meetings. The SEAOA website also has a calendar of events to keep you updated.

The SEAOA is a volunteer organization and relies on membership to make itself better. There are several committees, and you can find more information at www.seaoa.org. The chapters encourage members volunteer so reach out to any of the committees to see how you can sign up to help.

The Structural Engineers Association of Arizona provides its members with benefits including the ability to post job announcements for free. Members may also post their contact information under the "Need a Structural Engineer?" tab of the SEAOA home page. Plan review staff working for jurisdictions can't make personal recommendations for structural engineers to homeowners or small businesses who need to provide calculations and sketches for their small project. This is also free to SEAOA members.

The 2024 SEAOA Convention and Conference is tentatively planned for June 20-22 in Phoenix. A Save the Date announcement will be forthcoming. Please reach out to info@SEAOA.org if you would like to help in the convention planning, have speaker suggestions, have any suggestions or would like to join one of our great Chapters or Committees.

I wish you all a prosperous 2024.

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TUCSON CHAPTER MEETING

January 17, 2023
More info to be posted to the SEAOA website



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CENTRAL CHAPTER MEETING

More info to be posted to the SEAOA website

Tucson Chapter President's Message

Janelle Perry, PE, S.E.
Tucson Chapter President



I want to thank Daniel Stratulat with Speedie for volunteering to be our Board Treasurer. He hasn't been involved with our organization for very long but is already stepping up to help. What a great example for us all.

I enjoyed our student night very much and was so pleased with the turnout of students and professionals even if we had to find extra chairs! What bright young minds were on display during their project presentations. A very special thank

you to the companies that sponsored student meals: Grenier Engineering, JPS, M3, Schneider and Associates, and Structural Concepts.

We are looking at dates for our bowling tournament on a weekday afternoon in February. Please save the date (when it comes out), and plan to take a couple hours off to join us for a fun time NOT talking about structural engineering (unless you want too of course). All profits for this event will go to scholarships. We will be encouraging companies to sponsor teams and plan to have some exciting prizes for the best teams. Plus, can everyone say "bragging rights"?

YMG President's Message

Cesar Castro, P.E.
Younger Member Group President



Happy New Year! In the spirit of the new year, the YMG Executive Board has exciting news to share, starting with a set of goals. We firmly believe that establishing clear and achievable goals is pivotal to our success. We are eager to collaborate with all current and new

members to achieve the following goals for this year:

1. Increase membership to 20 members.
2. Support members in obtaining professional licensure.
3. Develop technical knowledge through design seminars and guest speakers.
4. Increase exposure of structural engineering to local universities and K-12 education.

The Executive Board will lead our group in achieving these goals. Please welcome the 2024 Executive Board.

President: Cesar Castro
Treasurer: Chase Young
Industry Liaison: Nathan Holt

We have a few upcoming meetings aligned with the goals for our group – keep an eye out for upcoming emails for locations and times:

Upcoming Meetings:
Professional Licensure Presentation (01/30/24)
YMG – ASU Mixer (02/22/24)
Guest Speaker (03/21/24)

To stay updated on our meetings and events, please sign up for our emailing list by contacting us at seaoazymg@gmail.com. We will be sending out flyers and updates regularly.

Here's to a successful and collaborative year ahead!

SEAOA Scholarship Recipient

Justin Reed
University of Arizona Civil Engineering Junior



Dear SEAOA,

I want to begin by expressing my gratitude for being awarded a 2023 Structural Engineers Association of Arizona scholarship. This scholarship will help me to prioritize my education so that I can finish my undergraduate

degree at the University of Arizona, as well as pursue a master's degree in structural engineering.

Growing up, I always had an interest in the built environment, especially in buildings and bridges. I would often go to downtown Denver with my parents for the sole purpose of looking at the structures that were there. I was especially interested in the impressive historic buildings such as Union Station and the Cathedral Basilica of the Immaculate Conception. Despite this, I started my education at the University of Arizona as a biosystems engineering student (which has pretty much nothing to do with structures). After taking statics and enjoying it so much, I quickly realized that biosystems engineering was not a great fit for me, so I decided to go back to my roots and pursue civil/structural engineering. Now, being in classes related to structural engineering, I know that structural engineering is the right place for me to be.

I am currently in my junior year at the University of Arizona, on track to graduate with my Bachelor of Science in Civil Engineering in May 2025. After completing my undergraduate degree, I fully plan on pursuing my master's degree in structural engineering. I am involved in multiple student

organizations such as American Society of Civil Engineers and Theta Tau Professional Engineering Fraternity where I get to use my skills to work on multiple projects related to structural engineering.

In my free time, I mostly like to build things with my hands. I have always loved woodworking and making jewelry. Most recently, I made dozens of necklaces and bracelets to sell in a fundraiser to support engineering in local Tucson schools. I have also been trying to branch out with my hobbies by doing things that I don't have much experience in, such as making electronics and learning different coding languages. Playing tennis and volleyball have been a large part of my life and I still like to play both sports in my free time. Studying engineering is very demanding, so having something to be active in has been a great way to relieve stress and have fun during the school year.

My short-term plans are to learn as much as possible about the structural engineering field and apply what I have learned so far during school in my internships. For the upcoming summer, I will be a structural engineering intern with Stantec on their transmission line team. I will be taking the Fundamentals of Engineering exam before I graduate with my undergraduate degree. After graduating with my master's degree, I plan to work in the structural engineering field where I can go on to get my Professional Engineer license as well as my Structural Engineer License. In my career, I hope to be able to work on projects that I will be proud of and that will make a real impact on the world.

Thank you once again for selecting me as the recipient of this scholarship, and for investing in my future.

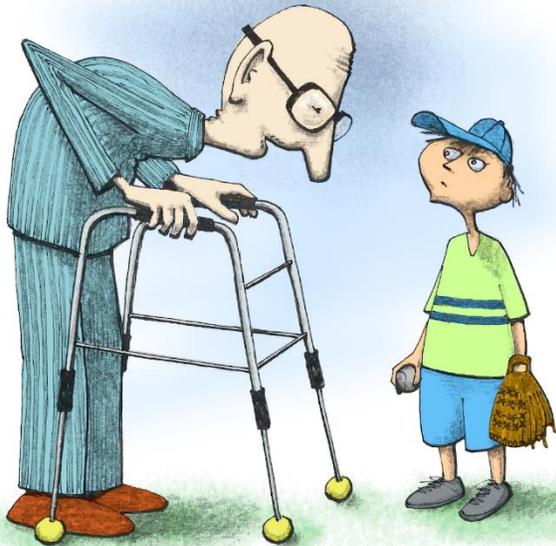
Sincerely, Justin Reed

Need a Structural Engineer?

The SEAOA created a web page for members to add their name to a list of structural engineers who are available to consult on small residential and commercial projects. This list is very helpful for building safety staff in all jurisdictions. When an applicant receives a plan review comment requiring engineering for something like a new lintel in an existing wall, the first question the applicant asks is, "Can you tell me who to use?". Plan review staff are not allowed to make these referrals for several reasons. They can however refer to the website.

Please contact Sarah Betts (info@seaoa.org) if you are interested in adding your name to this list.

THE RIGHT BRAIN
© Brent Wright rightbrainwrightengineers.com



"...WORK, WORK, WORK AND SACRIFICE NOW SO WHEN YOU'RE OLD LIKE ME YOU CAN FINALLY DO EVERYTHING YOU ALWAYS WANTED TO DO."

Ah, retirement! That magical time of life when you can finally kick back and do everything you've always wanted to do. Your lifetime of hard work and sacrifice have paid off, except...

...now you or your spouse are too frail, too unhealthy, opportunities have passed, the ship has sailed.

Many might live to regret that they haven't prepared enough for their golden years, but far worse is to have squandered life preoccupied with making a living while missing out on actually living. No one on their deathbed ever wishes they had focused more on work. What they regret is that they worked too much, let fear keep them from going after what they really wanted, or worried too much about what others think.

It's a difficult balancing act, but when in doubt I recommend the advice of the late actor Michael Landon who died from pancreatic cancer at age 54: "Whatever you want to do, do it now. There are only so many tomorrows."

This Right Brain cartoon is a contribution from Brent Wright of Wright Engineers, an SEAOA supporting firm. If you would like to contribute an original cartoon, please email it to info@seaoa.org

Future Cities Competition – Your Help is Needed!

Richard Dahlmann, PE, SE

The SEAOA is once again sponsoring an award at the Future Cities competition. This is an annual event for 6th-8th grade students. The purpose is to expose these students to engineering and encourage this as a possible future career path.

The students have been preparing since September. Around 100 teams normally make it to the regional finals. Teams of 3-4 students create a computer model of a city, write essays and narratives, build a scale model of part of their city, and finally, make a 7-minute presentation. Many societies, such as the SEAOA, give out awards pertinent to their fields.

We are looking for some volunteers to help out.

The time commitment is not significant. We will get 1-3 page essays from the teams to review for items relating to structural engineering. We will split them up among the judges and then share the ones that relate to our field. Then, between January 14-18, the

team models will be on display at the Burton Barr library- so we can go see them (as our schedules allow) and narrow down the list of teams we want to talk to during the main competition.

The competition itself is on the morning of January 20 (Saturday) at the Casteel High School in Queen Creek. We can talk with the teams and see their presentations.

If anyone is able to participate, your help would be appreciated.

Please let Richard Dahlmann (rdahlmann@ctsaz.com) know if you can help out or would like more details.

It is a lot of fun seeing what ideas the students come up with- and it is a great way to introduce them to Structural Engineering.

Request for Newsletter Articles

The SEAOA Newsletter Committee always appreciates input from the membership about articles and information that you'd like to see in upcoming newsletters. The newsletter is an excellent place for the SEAOA membership to share opinions, ideas and information with the rest of the association.

Here are some ways you can contribute to the SEAOA Newsletter:

- Submit a nomination of a fellow SEAOA member to be featured in our upcoming **Member Highlights** section
- Provide a short article on a **recent interesting design project** that you participated in
- Provide a short article on **engineering community outreach activities** that your company has participated in

Also, anyone who could volunteer a little time every quarter to help publish the newsletter is most welcome. One easy way to help would be to "proof" the newsletter before it's published. Please contact Sal Caccavale (seccbc@cox.net) or Mark Sipes (Mark.Sipes@maricopa.gov) if you have any articles that you'd like to submit, if

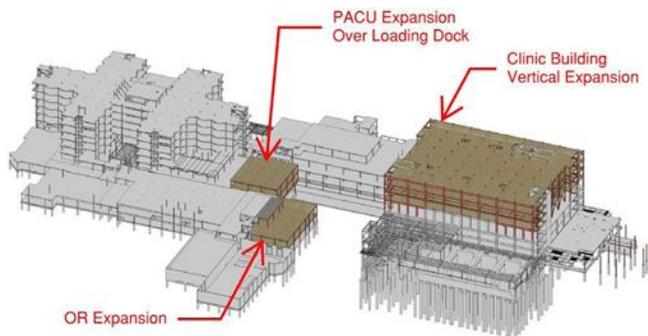
2023 SEAOA Merit Award in Structural Engineering Winner: Meyer Borgman Johnson New Buildings, Over \$10M: Mayo Clinic East Vertical Expansion, Phoenix, AZ

Kurt Kindermann, PE, SE

Ivy Rossiter, MBJ Marketing Coordinator

Mayo Clinic East Expansion aims to further boost patient capacity with the addition of over 240,000 square feet of space. The Mayo Clinic Building first opened in 2016 and includes consolidated cancer treatment, the Proton Therapy Facility and image-guided operating rooms that provide leading edge healthcare nationally. The addition of 4 floors to this functioning out-patient facility was carefully planned to avoid any detrimental impact on the daily operation of the facility.

Four distinct areas make up this large expansion project: 1) a four-story vertical expansion to the existing clinic, which is also provisioned for eight additional future stories, 2) new operating rooms, 3) a new cafeteria, and 4) horizontal expansions at the loading dock, where MBJ was required to manage several complex building interactions simultaneously. The existing loading dock was moved to the east, making room for a new basement and additional floors. The floors above were designed to span over the new loading dock to ease the movement of trucks to and from the dock area. The operating room expansion required close coordination with the owner to meet stringent vibration criteria. Like the clinic addition, the cafeteria is also designed for future

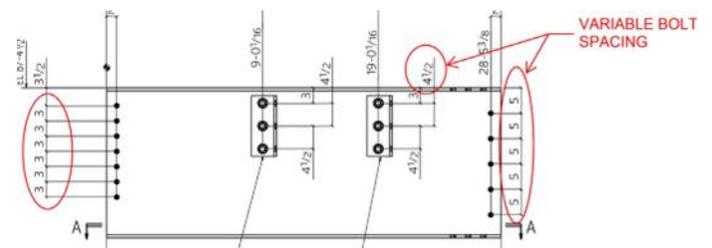


expansion.

STEEL OPTIMIZATION As an innovation strategy, MBJ was able to identify a 2 part integrated steel delivery process that considerably shortened the steel procurement schedule and reduced cost. First, MBJ provided the contractor with a steel fabrication

model direct from the design Revit model prior to fabricator selection. This allowed steel fabricators to competitively bid the project utilizing the fully connected fabrication model and eliminated assumptions required when pricing from printed drawings.

The second part was to optimize the steel design with the selected steel fabricator. This lean optimization process included 10 weeks of weekly meetings. This steel optimization team included the steel fabricator, MBJ delegated connection team, the general contractor and MBJ design team. The focus of the 10 weeks was to incorporate fabricator preferences and efficiencies into the structural details to eliminate wasted materials and labor. In addition, the MBJ delegated connection design team utilized an **automated connection design software** to determine the most efficient bolt size, strength and spacing to be used for all of the steel connections on the project. MBJ found that the most efficient run used one size bolt, and varied the bolt spacing between 3” and 6”, depending on the load. The fabricator’s shop was set up to allow for this variation and they agreed that this approach would save money for the project. All these efforts measurably reduced the cost of the project.



Due to the unique nature and challenges of a vertical expansion, the team had opportunities for innovation. These challenges included the lateral force resisting system and alignment of new columns with the existing columns below.

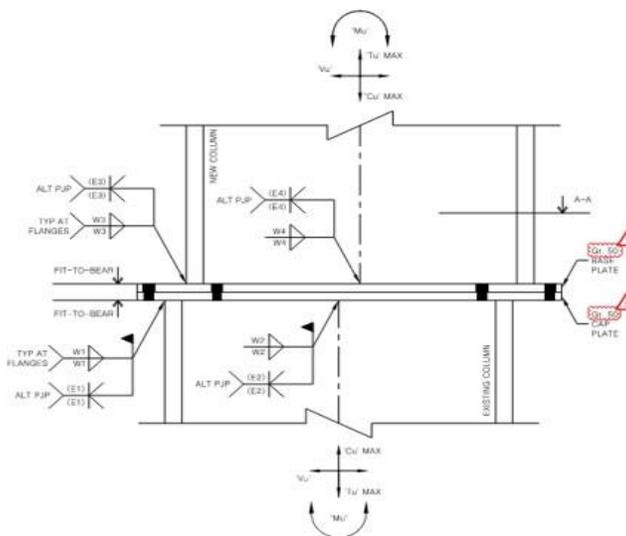
LATERAL SYSTEM OPTIMIZATION The existing lateral system designed by the Phase 1 design team for the first four stories includes moment frames on the north and south edges of the building and

braced frames along the east and west edges of the building with an additional single frame in the middle. Additionally, 3 concrete core shear walls were provided at the Southwest, Southeast and Northeast corners of the building. It was a very robust design with redundant load paths. MBJ sought ways to make the lateral system more efficient during Schematic Design to reduce the baseline project cost prior to creating the Part 1 fabrication model above. This optimization of the lateral system resulted in a net savings of approximately 30 tons per floor which equated to about \$1 million in construction savings over the previous design.



COLUMN ALIGNMENT Another challenge with vertical expansion is the need to align with existing columns. Multiple surveys were conducted which established that existing column stubs did not align with the design team’s idealized grid.

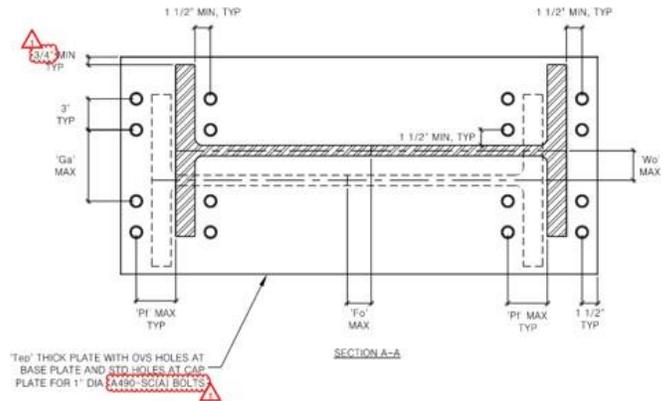
The survey was completed after the drawings were issued for permit, so the team was faced with the



- NOTES:**
1. SEE QM01 FOR GENERAL CONNECTION DESIGN NOTES.
 2. CONNECTION IS CONSERVATIVE FOR A HEAVIER SECTION WITHIN A GIVEN SHAPE GROUP.

SP03 NEW TO EXISTING COLUMN SPLICE CONNECTION
NOT TO SCALE

decision of aligning new columns with the existing columns or attempting to reestablish the idealized grid. Ultimately, the design team determined keeping the idealized grid was best for ease of construction on this project and future expansions. To reconcile the survey discrepancy, the team shifted the grid to minimize the offset of the existing columns from the idealized grid. The existing columns were checked for the eccentricity that would be applied due to the misaligned columns. The Connection Design Team produced a cap plate design that was better able to handle the eccentricities and loads that were present at these connections.



The design team and the contractor also added value for the owner by designing future expansions to be as seamless as possible. Structure, stairs, elevators and exterior envelope were all designed for the next vertical expansion. This innovative optimization process resulted in a \$1.2 million savings on the steel for the project!



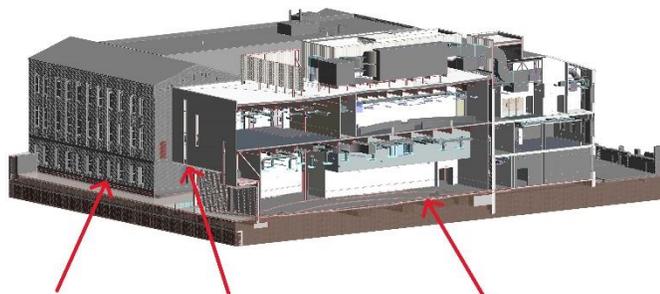
2023 SEAOA Excellence in Structural Engineering Winner: Martin, White & Griffis Structural Engineers *Forensic/Renovation/Retrofit/Rehabilitation: University of Arizona, Old Chemistry Building Renovations, Tucson, AZ*

Andy DiLeo, PE, SE
 Warren White, PE, SE
 Thomas Griffis, PE, SE

The Chemistry-Physics Building, now called “Old Chemistry” was one of five buildings Sundt Construction constructed on the UArizona campus in the late 1930s as part of a building program funded by the Works Progress Administration (WPA). Originally a three-story red brick structure with two main entrances, the Old Chemistry building has since had additions in 1948 and 1968.



This 75,000-GSF renovation/addition project required creativity and innovation in order to preserve the historic 1936 building while constructing the new "The Commons" building over existing service/utility tunnels.



Existing
 Historic
 Old Chem
 Building

Section of new
 “The Commons”
 building looking
 north

The renovation consisted of demolishing the 1968 addition, reconstructing the new portion of the building, "The Commons," to house lecture halls, and renovating the remaining buildings. Historic requirements did not allow the exterior of the existing Old Chemistry building to be significantly modified.

The project was a Design/Build contract. From the start of the project, the contract identified the existing tunnel on the site, which could be demolished. The site is located between several buildings, and this limited the use of cranes. The steel fabricator determined the size and sequencing during the project's development, which required that some of the steel beams be fabricated in two pieces and field spliced together on site. Repairing one of the existing brick walls at the west entrance to the commons required a special sequence of the brick placement. A portion of the existing brick wall where the 1968 addition connected to the 1936 building was reconstructed. The 1968 addition was demolished, and the face of 1936 was reconstructed to its original brick appearance. New steel ledgers were bolted to the exposed brick surface, supporting new brick matching the historic appearance.



The resulting interior space between the new “The Commons” building and the existing 1936 and 1946 buildings exposed a common lobby area. Two existing areas on the north side of the 1936 building were demolished and reconfigured to allow accessible entrances and a new elevator. The main and largest lecture hall on the first floor of “The Commons” building was framed with steel beams supporting a metal desk and concrete topping. This space is two stories tall, allowing mechanical and other utilities to pass under the 3rd floor and above a ceiling.

The location for “The Commons” building is next to the existing unreinforced brick-bearing wall over existing tunnels and demolished tunnels. Several of the tunnels were demolished and removed, but a tunnel at the West and South sides of “The Commons” building had to remain. Removing the tunnels disturbed the soil to depths of 10 feet or more while compacting the soils to depths of 10 feet or more next to the unreinforced brick walls could cause significant cracking and damage to the brick building. To avoid excessive vibrations, aggregate piers were used versus deep-engineered fill. Foundations were able to be placed near the existing tunnels, and portions of “The Commons” building were placed on reinforced concrete grade beams spanning over the existing tunnels.



The entrance to the existing building on the north side was revised to provide accessible entrances and a student gathering area. Portions of the second floor and third floor were removed. The north wall, originally

braced by the second floor, was strengthened with reinforced concrete masonry piers between the windows. The original exterior brick wall with piers between windows is not impacted.



After almost two years of construction and several years of planning and design, renovations of the Old Chemistry resulted in an innovative teaching hub including seven state-of-the-art classrooms, a new three-story auditorium, new study spaces, improved areas for the facility, staff and researchers, universally accessible entrances, and sensitive historic preservation.



2024 SEAOA Convention and Excellence Awards

The 2024 SEAOA Convention and Conference is tentatively planned for June 20-22 in Phoenix. A Save the Date announcement will be forthcoming. Please reach out to info@SEAOA.org if you would like to help in the convention planning, have speaker suggestions, have any suggestions. Keep an eye out for the Call for Entries for the 2024 Excellence in Engineering Awards which will be sent out in March.