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The TJCAA Quarterly

2019
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Message from the President

Employment Opportunities

Changes in the CBC

TJCAA's Business Certifications

- Alameda County Small, Local Emerging Business
- Bay Area Green Business Program
- California DGS SBE
- City of Colton SBE
- City of Los Angeles SBE
- City of Oakland LBE
- Eastern Municipal Water District SBE
- Inland Empire Utilities Agency SBE
- Metropolitan Water District of Southern California SBE
- Sacramento Municipal Utilities District (SMUD) SEED Vendor
- San Diego County Water Authority SBE
- Port of Long Beach SBE
- Port of Oakland LIABE/SBE/VSBE
- PWC Registration—Dept of Industrial Relations (DIR)
- West Basin Municipal Water District SBE

Message from the President, Gianna Zappettini



Like many people this time of year, I entered a friendly fantasy football league and had to pick a roster. My choices were not based on talent, but rather on the teams I liked and the fun names of certain players. I am having a great time participating, but alas, I am not garnering many boasting rights for accumulated points. Unlike my fantasy team, TJCAA team members are very talented and hard-working and are experts in their fields. They do a great job of providing winning statistics on every project they tackle. So while my fantasy football picks may not be performing well, you can win every time by choosing the structural, electrical, and control systems engineering team at TJCAA.

Employment Opportunities



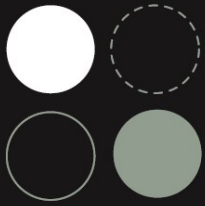
TJCAA is looking for qualified engineers to work on great projects with great people. To view and apply for open career positions, visit our website at www.tjcaa.com.

Industry News—Changes in the CBC

California has adopted the 2019 California Building Code, which will go into effect January 1, 2020. The 2019 CBC will require compliance with the updated ASCE 7-16, *Minimum Design Loads and Associated Criteria for Buildings and Other Structures*. An important requirement in ASCE 7-16 pertains to sites in Site Class D, E, or F that are in high seismic areas—many sites within our Bay Area region have these characteristics. Site-specific ground motion analysis will be required for projects on these sites unless an exemption category applies. Look for more information on this in our next edition. For now, if your project is within one of these Site Classes and will not be permitted before December 31, 2019, contact TJCAA for recommendations on what's required to complete a structural design that complies with the 2019 CBC.

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What is seismic design?



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Did you know— What is seismic design?

Around the water cooler, we often find ourselves talking about seismic design. Well, we also occasionally discuss our fantasy football league, but because our Structural Engineers are experts in seismic design of environmental structures, the more technical material also comes up. What is seismic design? TJCAA co-founder, Terence Cavanagh, S.E., explains that it means designing a structure to withstand the inertial forces associated with an earthquake.

Recalling what Isaac Newton said, inertia is an object's resistance to a change in its state of motion, regardless of whether the object is moving or still. The inertial forces we are concerned with for earthquakes occur when the ground accelerates—it moves—during a seismic event. Structures resist those forces. According to Newton's third law, the resisting force is opposite in direction to the accelerating force and is equal to the product of the rate of change in velocity and mass of the object. You know, the old "force equals mass times acceleration" concept.

Because many environmental structures, such as basins at treatment plants, are "massive" objects made of concrete, they have the potential to generate large inertial forces during an earthquake. Of course, many of these structures also contain process fluid, which can be set into motion during an earthquake, generating hydrodynamic sloshing forces that the structure must also resist.

Daisy Yu, S.E. adds that we design structures to withstand earthquakes up to a certain level. "It doesn't make economic sense for us to design structures to withstand the largest

earthquake we could ever anticipate. We design for an earthquake that has a 10% probability of being exceeded in 50 years." She recalls for us a nugget of wisdom that was passed down to her: "Anyone can design a building that can stand up, but it takes an engineer to design a building that can fail in a certain manner." This provides some insight into the structural engineering mindset, says Daisy, "underlying is the concept that, while we don't design to withstand the largest potential earthquake, we must design for what will happen if or when it occurs."

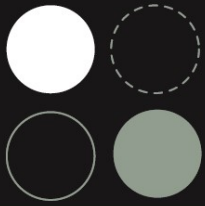
When a project involves design or analysis of a structure that could be subject to ground acceleration, it's important to have an engineer with expertise in seismic design.

We design so that in a very large earthquake, certain elements, such as anchors and rebar, can fail in a ductile fashion, which can dissipate energy while the structure continues to shake, for a less abrupt, less catastrophic result. It's sort of like the "crumple zones" in your car.

While some parts of the country have very low seismic activity, and engineers in those regions may not have the background to (or need to) consider earthquake effects, seismic design is *always* part of design in California. When a project involves design or analysis of a structure that could be subject to ground acceleration, it's important to work with an engineer who has expertise in seismic design. "How does one obtain that expertise?" we asked Terry. "School," he says, "preferably a good school!"

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Primary Clarifier Designed by TJCAA—Currently under Construction in the San Francisco Bay Area

Terry notes that experience is also necessary, as echoed by the requirements for becoming a licensed Structural Engineer in the field. Seismic designs and analyses are part of the Civil P.E. exam in California, and further, are covered intensely in the 16-hour exam that engineers must pass to become a licensed Professional Structural Engineer. Applicants must also provide evidence of 3 years of fulltime experience in structural engineering work in addition to the experience that was required to gain an initial license as a Civil P.E. We are pleased to point out that every P.E. in TJCAA's Structural Group is also a licensed S.E.

The right experience goes beyond the design of typical concrete structures (as covered by ACI 318, the primary building code for reinforced concrete). Designers of environmental structures must also have extensive experience with ACI 318's sister code, ACI 350. TJCAA Structural Engineers are very familiar with applying ACI 350, which addresses challenges specific to

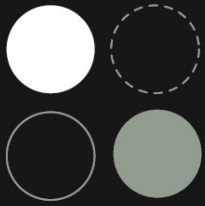
environmental structures, such as increased longevity, increased durability, leakage, and hydrodynamic design.

Every P.E. in TJCAA's Structural Group is also a licensed Professional Structural Engineer and has extensive experience in seismic design of environmental structures.

Our engineers enjoy doing seismic analysis and design for new and existing environmental structures. "It's an interesting specialty," Terry says, "and it's not something that everyone does. There is actually only a small community of engineers in the country that do this on a regular basis. Besides," he laughs, "without hydrodynamic forces, where else would you get to use the hyperbolic tangent function button on your calculator?" If you need seismic design or analysis performed, give our Structural Engineers a call.

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Featured
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Featured Employee— Amber Garcia



Our featured employee for this edition is Amber Garcia, who has been with our company for nearly two years. Amber works as an administrative professional in TJCAA's Walnut Creek Office, where she helps to support (and keep in line) our cast of Electrical, Control Systems, and Structural Engineers.

A busy parent of kids aged 10 and 14, Amber joined TJCAA after 7 years as a stay-at-home mom. Transitioning back to a role in office work at that time was "scary and was a real challenge," she tells us. We all see office equipment and software change over the years, but it presents a good challenge to meet when you need to become familiar with all of the updates at once. She was up for the task, and we're grateful for her skills and dedication.

Like many office professionals, Amber must manage a wide variety of tasks during the workday, and we asked her if she had any productivity tips to share.

Because so much of the coordination and information exchange she does is via email, she tells us, an important way that she manages that flow is by carefully using categories, color coding, and labeling. "If I'm doing work related to a project or an event, such as our TJCAA Employee and Family Event coming up, I want the information to be easy to find."

Amber has also been busy remodeling and fully updating a house that has just sold, and she's getting ready to move to Discovery Bay in eastern Contra Costa County. We noticed that Discovery Bay features a marina, homes with private docks, and access to the Delta, so we asked her about boats. "Getting a boat is definitely on the list," she responded with a smile.

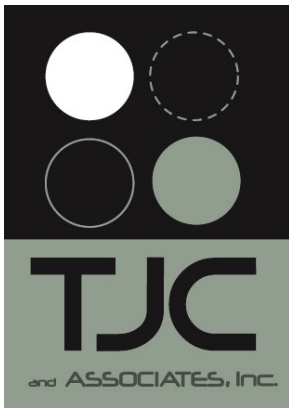
When we asked her about working at TJCAA, she told us that her favorite part is, "being around adults! It's nice to have adults depending on me for a change. It balances well with life at home."

We're glad to hear that Amber likes working with us and that it's a nice complement to her family life, which she says includes lots of crafts with the kids, hiking in scenic areas, and plenty of music. A fan of heavy metal, Amber especially likes music festivals. "I'll travel for music," she says, and counts Aftershock (Sacramento), the Carolina Rebellion (North Carolina), and the Blue Ridge Rock Fest (Virginia) as some of the great festivals she has attended.

Thanks, Amber, we're happy to have you rocking with us!

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Equipment Obituaries

Equipment Obituaries

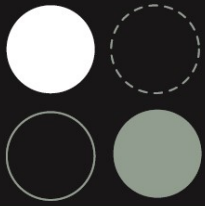
In our last edition, we introduced this new, recurring feature: Equipment Obituaries. Some control systems out there have reached a dicey state of obsolescence, and those listed here are among the “living dead” units we have spotted shambling along at various facilities.

If your control system was installed in the 1990s and early 2000s, it is most likely obsolete. Continuing to use such equipment—for which spare parts and support are no longer available—is risky. Don’t keep your zombie equipment in place; call us if you have one of these ready-for-replacement units.



This Hach turbidimeter became obsolete in July 2018.

Manufacturer	Model or Series	Obsolete Status	Replacement
Microsoft	SQL Server 2008 and 2008R2	July 9, 2019	SQL Server 2017
Microsoft	Windows Server 2008	January 14, 2020	Windows Server 2019
Microsoft	Windows 7	January 14, 2020	Windows 10
Rockwell	MicroLogix 1500 Series	May 18, 2017	CompactLogix 5370 Series
Rockwell	1768 CompactLogix Series	June 30, 2020	CompactLogix 5370 Series
Schneider Electric	Modicon Quantum PLCs	December 1, 2018	M580
Schneider Electric	Modicon Quantum I/O	December 1, 2021	X80 I/O Series
General Electric	90-30 Series PLCs	December 1, 2017	RX3i Series
General Electric	Genius Series I/O	June 1, 2017	RSTi Series or VersaMax Series
Hach	1720E Turbidimeter	July 27, 2018	TU5 Series



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Upgrading Legacy Control Systems

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Upgrading Legacy Control Systems

TJCAA's Control System Programming Group leader, Michael Erwin, P.E. offers the following reminder: when replacing obsolete control system equipment, the legacy control software of the 1990s and early 2000s should also be changed out for modern software implementations that are more reliable, easier to maintain and troubleshoot, and more efficient to implement. While most hardware and software manufacturers have provided tools that can convert or translate the old software, we recommend using new software that can take advantage of modern programming techniques.

Mike recently taught a seminar on this topic at the CA-NV AWWA Water Education Seminars, and if you missed that, you can catch his presentation, "Methods for Upgrading Legacy Control Systems Software" at the [CA-NV SECTION AWWA Annual Fall Conference](#), October 21-24 in San Diego.

TJCAA engineers can apply a phased approach to help make these improvements while minimizing downtime. Call us and we'll help you upgrade your system.

Upcoming Presentation

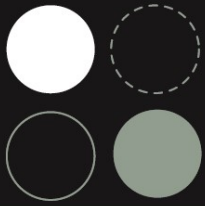
TJCAA's Michael Erwin, P.E. will be presenting "Methods for Upgrading Legacy Control Systems Software" at the [CA-NV SECTION AWWA Annual Fall Conference](#), October 21-24 in San Diego.

Those attending can expect to learn about the following:

- Differences between pre-2010 and modern control system programs
- Alternative approaches for upgrading control system software
- Costs and ramifications of using the wrong approach
- Benefits of incorporating user-defined data structures in SCADA software
- Other considerations, including transition to high-performance HMI displays

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Entertainment
Review

Dates to Note

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Entertainment Review— Shazam!



Image: istock.com/aspensrock

In an entertainment world filled with superheroes, it's nice to meet one who feels new, even if his character was first introduced back in 1939. The movie "Shazam!" (DC 2019) ventures away from the more somber territory that the DC movie world seems to have been occupying lately. "Shazam!" features a teenaged boy, Billy (played by Asher Angel) who is granted a dual identity with a strong, superpowered adult (Zachary Levi) by a mysterious wizard (Djimon Hounsou). Viewers can enjoy some laugh-out-loud moments as Billy and his foster brother (Jack Dylan Grazer) attempt to determine which powers Billy's second identity possesses and identify what opportunities that might create. There are plenty of good comic book battles, of course. The real bonus is that Billy's quest, and the relationships he forms with his foster family, round this movie out with feeling, making this a refreshing entry in a crowded market. (PG-13, 2 hours 12 minutes, available for streaming)

Dates to Note

- Sep 23 The Autumn Equinox
- Sep 28 TJCAA Employee and Family Event at Delta Bowl in Antioch
- Oct 10-13 [ASCE Convention](#), Miami, FL
- Oct 16 Dictionary Day
- Oct 19 [World Solo Drumming Championships](#) at Glasgow Caledonian University, Scotland
- Oct 22 74th NBA Season begins
- Oct 22 115th MLB World Series begins
- Oct 23 Kelly Park Band, 12 PM, Oakland City Center (Free Concert)
- Oct 21-24 [CA-NV SECTION AWWA Annual Fall Conference](#), San Diego, CA
- Oct 27 Kelly Park Band, 5-7 PM, [The Sound Room](#), 2147 Broadway, Oakland
- Nov 3 Daylight Saving Time ends
- Nov 6 Saxophone Day
- Nov 23 122nd Big Game: Cal at Stanford
- Nov 23 Fibonacci Day
- Nov 28 Red Planet Day
- Dec 10 Dewey Decimal System Day
- Dec 13-14 Geminid Meteor Shower