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The TJCAA Quarterly

2019
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Message from the President

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/VSB
- PWC Registration—Dept of Industrial Relations (DIR)
- West Basin Municipal Water District SBE

Message from the President, Gianna Zappettini



In early December, I visited the [Point Reyes Lighthouse](#), which provided warnings to mariners for over ten decades (1870 to 1975). Today it is maintained by the National Park Service as a museum and gives visitors an opportunity to learn about the efforts that went into the design of this historic project. It was also a great observation point for whale watching that day.

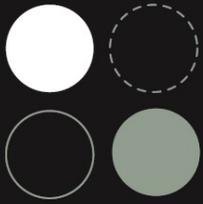
As we start the new decade, TJCAA looks forward to our continued collaboration in the design and maintenance of your projects. If you need them to be structurally sound, electrically powered, and operated by a well programmed control system, connect with one of our design experts in each of these areas. As the current decade ends, we thank you for providing us with many business opportunities and we wish you great success in the new year.

Industry News—Changes in the California Building Code

As we noted in our autumn edition, 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 classified as Site Class D, E, or F that are in high seismic areas. Site-specific ground motion analysis will be required for projects on these sites unless an Exception applies.

Sites that are assigned Site Classes E and F generally have higher mapped spectral response accelerations than Site Classes A–D for a given location. Daisy Yu, S.E. in TJCAA's Structural Group explains that these sites will have higher seismic forces when the ground shakes. Forces associated with earthquakes occur when the ground accelerates—it moves—during a seismic event. When the ground accelerates, the building resists.

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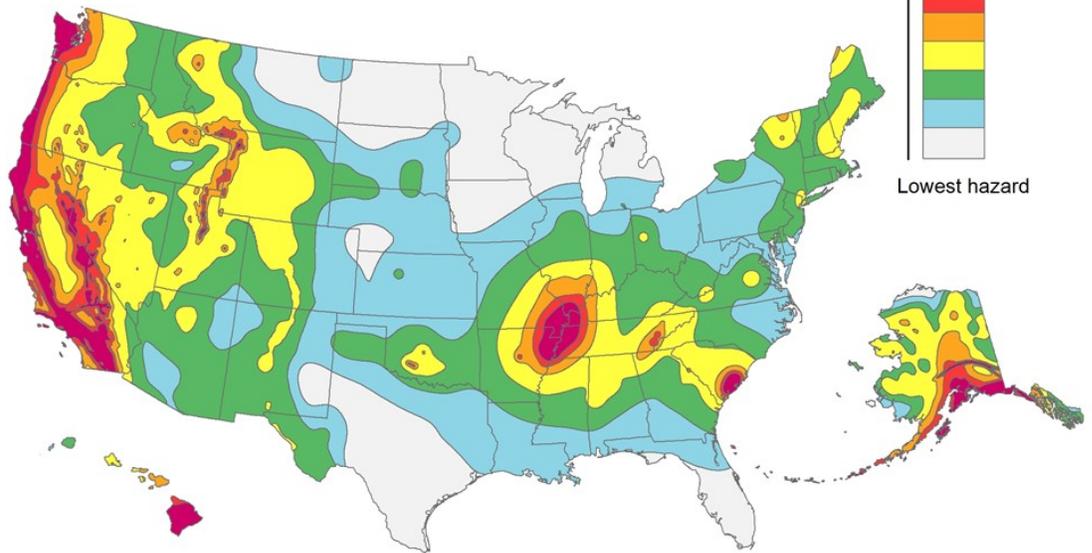
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The spectral acceleration (measured in g , the acceleration due to Earth's gravity) is a measure of the maximum acceleration of the building. The spectral acceleration gives us an approximation of the building's motion when subjected to seismic forces.

In simplified terms, Daisy says, the site-specific ground motion analysis accounts for the earthquake source, magnitude, and distance, and considers the actual subsurface soil conditions at the site (the different layers of soil and whether they are rock, stiff or medium-stiff soils, or soft clays, and so on) to

determine what the ground motions at the site will be. Site classifications and ground motion analyses are typically performed by geotechnical engineers. See "Why do I need a geotech on my job?" below.

This new requirement for site-specific analysis is based on research findings that previous Codes in the United States may have underestimated the earthquake accelerations for these Site Classes. The site-specific information will help to make sure that our structures are not under-designed.



Earthquake hazard map showing peak ground accelerations having a 2 percent probability of being exceeded in 50 years, for a firm rock site. The map is based on the most recent USGS models for the conterminous U.S. (2018), Hawaii (1998), and Alaska (2007). The models are based on seismicity and fault-slip rates, and take into account the frequency of earthquakes of various magnitudes. Locally, the hazard may be greater than shown, because site geology may amplify ground motions. (Map and description from usgs.gov)

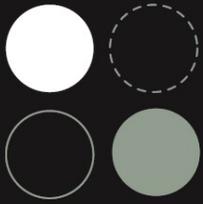


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Daisy notes that the Code writers did not have time before approval of this edition to determine whether a factor or factors could be introduced into the Code to account for the higher levels of acceleration. Future Code editions, she continues, may end up incorporating such factors in lieu of requiring the site-specific analysis.

The site classes have a range of characteristics, with Site Classes A and B being rock sites. Site Class C may also be assigned to rock sites, and Site Class D's profile is "stiff soil." Site Classes E and F are associated with soft clay soils (E) and highly organic clays, very high plastic clays, or liquefiable soils (F). Fortunately, Daisy tells us, we don't run into Site Classes E and F very often in our projects, but they can be found in California. Examples of Site Class E can include areas with Bay Mud. One of our recent projects near San Francisco Bay in Richmond is in Site Class E.

The implications for your project are that the team may need to include someone with geotechnical expertise. Many of our moderate to large-sized projects already have a geotechnical engineer on the design team, and site-specific analysis can be included in their scope of services. Note, however, that not all geotechnical firms have the capability to perform site-specific ground motion analysis.

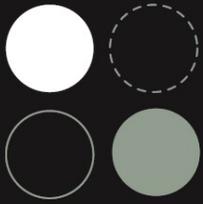
For smaller projects that don't have a geotechnical engineer on board, sometimes one of the Exception categories in the Code applies. If the project can use the Exception, increasing the calculated seismic force by 20 to 50 percent will be required.

If your project is within Site Classes D through F and will not be permitted before 12/31/19, contact TJCAA for recommendations on what's required to complete a structural design that complies with the 2019 CBC.

Site Class	Site Profile Name
A	Hard rock
B	Rock
C	Very dense soil and soft rock
D	Stiff soil
E	Soft clay soil
F	Soil requires site response analysis. <i>Liquefiable soils, peat, high plasticity clay</i>

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Why do I need a Geotech on my job?

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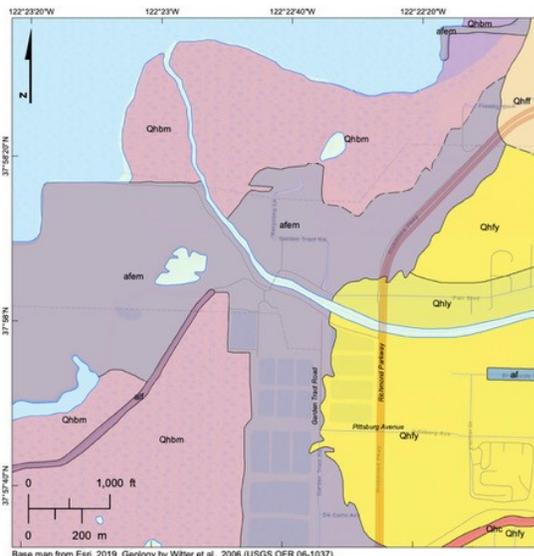
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Did you know—Why do I need a Geotech on my job?

There are all kinds of subsurface soil conditions that can affect a project. We simply don't know what's underground without a geotechnical investigation. If your site requires site classification or a site-specific ground motion analysis, you'll need a geotechnical engineer—someone with special training and experience in soil and rock mechanics.

As described by the Geo-Institute (geoinstitute.org), one of ASCE's nine specialty organizations, the field of geotechnical engineering includes many specific areas:

- Foundations
- Retaining Structures
- Soil Dynamics
- Engineering Behavior of Soil and Rock
- Site Characterization
- Slope Stability
- Dams
- Rock Engineering
- Earthquake Engineering
- Environmental Geotechnics
- Geosynthetics
- Computer Modeling
- Groundwater Monitoring and Restoration
- Coastal and Geotechnical Ocean Engineering



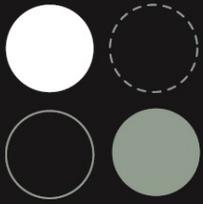
Legend	
af	Artificial fill
afem	Artificial fill over estuarine mud
alf	Artificial levee fill
Qhc	Historical stream channel deposits
Qhly	Latest Holocene Alluvial fan deposits
Qhly	Latest Holocene Alluvial fan levee deposits
Qhbm	Holocene San Francisco Bay mud
Qhlf	Holocene Alluvial fan deposits, fine facies

Regional Geologic Map

For the types of projects TJCAA works on, a geotechnical engineer (G.E.) investigates the soils at the project site, including subsurface conditions, to determine whether the soils can adequately support the planned developments (such as structures, utilities, and paving). To gain insight into subsurface conditions at a site, a G.E. typically makes borings (i.e., drilled holes in the ground) to take samples of the soils in order to classify the soil type. The samples are also sent to a lab for a series of tests to determine their physical and mechanical properties.

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The project G.E. can assess whether there are any potential issues regarding soil stability and strength, including slope stability, seismic liquefaction, and anticipated ground settlement and provide recommendations for appropriate foundation types depending on the soil conditions at the site. Here in California, most geotechnical engineers also provide Design Seismic Ground Accelerations and an evaluation of potential seismic hazards at the site, such as liquefaction or displacements due to seismic faulting.

We use the ground acceleration information provided by the G.E., in combination with the details we have regarding our structure, its foundation, its materials, and its contents, and we determine how our structure will accelerate (move) because of an earthquake. This analysis allows us to design for structure behavior that meets our clients' objectives. In contrast to some buildings that may need to be replaced after a seismic event, many of the structures we design are critical infrastructure that must remain in operation after an earthquake or have only limited damage such that the facility can be repaired and be put back into service.

If you have questions about how your site's characteristics may affect your project, give us a call.

Manan Bhatt Elevated to IEEE Senior Member



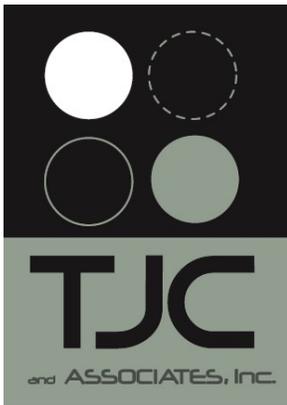
We are pleased to announce that TJCAA's Electrical Designer Manan Bhatt has been elevated to the grade of Senior Member of the Institute of Electrical and Electronics Engineers. IEEE is a professional organization whose core purpose is "to

foster technological innovation and excellence for the benefit of humanity." With more than 422,000 members in more than 160 countries, IEEE identifies itself as the world's largest technical professional organization. The organization's membership includes electrical engineers, scientists, and "allied professionals" such as computer scientists, software developers, information technology professionals, physicists, medical doctors, and many others. (Source for info in this article is iee.org)

The roots of IEEE reach to the beginnings of the electrical engineering profession. Its parent organization (the American Institute of Electrical Engineers) was formed in 1884 and included members such as founding President Norvin Green of Western Union, representing the telegraph industry, and others such as Thomas Edison from the power industry and Alexander Graham Bell from the telephone industry. Its other parent organization was the Institute of Radio Engineers, formed in 1912. The AIEE and IRE merged to form IEEE in 1963. At that time, IEEE had "only" 150,000 members.

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IEEE Senior Member

Entertainment Review

The IEEE's modern statistics are impressive. As an organization with extensive reach and involvement, IEEE has 39 technical societies and seven technical councils and carries upwards of 5 million documents in its digital library. IEEE develops and publishes standards, as well as journals and magazines, and sponsors more than 1,900 conferences in 103 countries. Member connections are fostered by IEEE Sections, student chapters, and local groups. Affinity groups—543 of them—provide networking opportunities for local members with similar interests. Manan serves as the Oakland-East Bay Young Professionals Affinity Group Chair.

Manan's senior member grade is the highest grade for which IEEE members can apply. Only 8% of IEEE members have achieved senior grade, which recognizes technical and professional excellence for members who have been in professional practice for at least 10 years. As a senior member, Manan is eligible to hold executive IEEE volunteer positions. Congratulations, Manan!

Entertainment Review— No Spoilers!

By the time you read this, at least three members of our TJCAA extended family will have viewed "Star Wars: The Rise of Skywalker," which opened this weekend (PG-13, 2 hours and 22 minutes). This is the final episode in the expansive Star Wars saga, which changed the cinematic and sci fi world with the debut of "Episode IV: A New Hope" in 1977. The true fans in our midst might be a bit shocked to find out that some of you have not seen the Star Wars movies yet. In case you haven't, we suggest watching your catch-up episodes in either the original release order (IV, V, VI, I, II, III, VII, Rogue 1, VIII, Solo) or the "Machete" order (Episode IV, V, I, II, III, Solo, Rogue 1, VI, VII, VIII), which according to its fans, intensifies the great cliff-hanger mid series. There are of course proponents of chronological order; however, we're not among them.

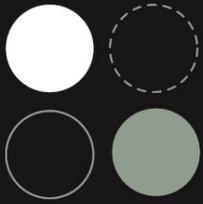
Over the years, several animated TV series and comic book series have also taken place in the Star Wars universe. "The Mandalorian," a live-action TV series, is streaming now. This fresh show, created by Jon Favreau and starring Pedro Pascal, Gina Carano, Giancarlo Esposito, and Carl Weathers, is visually stylish and action-packed. As a bonus, it's the source for many current memes.



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Dates to Note

Employment Opportunities

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Dec 21	The Winter Solstice	Feb 2	Groundhog Day
Dec 21-22	A Solstice Journey Through Time , 2019 Christmas Revels, Sanctuary of First Congregational Church of Oakland	Feb 2	Super Bowl LIV
		Feb 16	The 62 nd Daytona 500
		Feb 29- Mar 1	USA Sevens Rugby, Los Angeles
Now-Jan 5	PigPen Theatre Co.'s The Tale of Despereaux: A New Musical , Berkeley Repertory Theatre	Mar 4	March Forth and Do Something Day
		Mar 6	Employee Appreciation Day
Dec 29	Kelly Park Band, 5-7 PM, The Sound Room , 2147 Broadway, Oakland	Mar 8	Daylight Saving Time
		Mar 14	Pi Day (If you listen carefully, you can hear the cheers from new MIT students at Tau time!)
Dec 30	Redbox Bowl, Levi's® Stadium (Cal vs. Illinois)		
Jan 1	106 th Rose Bowl Game (Oregon vs. Wisconsin)	Mar 15	Formula 1 70 th Season opens in Australia (We think it's the year of the Prancing Horse!)
Jan 8	Earth's Rotation Day		
Jan 10	Cut Your Energy Costs Day	Mar 15	NCAA Basketball Tournament Selection Sunday
Jan 16	TJCAA 22nd Anniversary		
Jan 25	Chinese New Year (Year of the Rat)		



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.

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