

# TJC and Associates Structural, Instrumentation, Controls, and Electrical Design Services

Terry Cavanagh, S.E.  
and Paul Giorsetto, P.E.  
TJC and Associates, Inc.

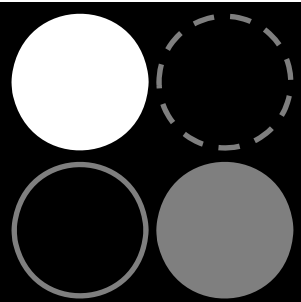
# TJC

and ASSOCIATES, Inc.

[www.tjcaa.com](http://www.tjcaa.com)

Presented at RMC Water and Environment,  
Walnut Creek  
September 2, 2009

Structural Engineering • SCADA • Electrical Engineering • Instrumentation and Controls  
• Control Systems Programming•



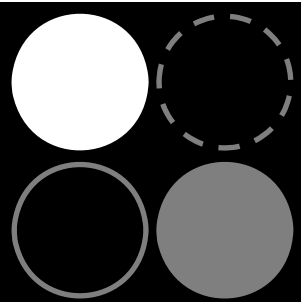
## Purpose – Why We're Here

- Lunch!
- Fill you in on recent happenings at TJCAA.
- Remind you what us guys have to offer.
- Remind us about the things that are important to you guys.



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Structural Engineering  
Piping Layout  
Civil Design  
Electrical Engineering  
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SCADA



## TJCAA – Who we are

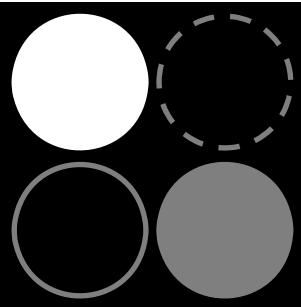
- Business Plan: we are designers in specialty disciplines for municipal clients
- Lean, efficient, experienced, with a proven record of delivery
- Oakland and Sacramento offices with engineering and CADD support
- Experience fielding full design discipline support including process, architecture, civil, and building mechanical
- Target Markets: Folks with special needs  
... THAT'S YOU GUYS!



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# TJCAA Technical Staff



- Structural (STRU)

- Terence Cavanagh, S.E. - 27 years
- Richard Thow, S.E. - 26 years
- Daisy Yu, S.E., LEED AP - 18 years



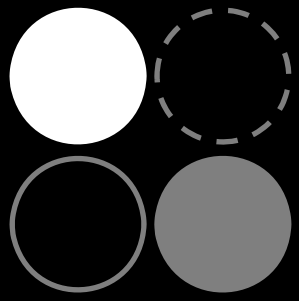
- I&C and Electrical (ICE)

- Paul Giorsetto, P.E., (Electrical and Control Systems), LEED AP – 30+ years
- Mike Erwin, P.E., 25+ years
- Elaine Tee, P.E. - 10 years
- Eileen Nakamura, P.E. – 10 years
- Wenjun Ouyang, P.E. - 5 years
- Jacqui Okubo – 6 months!

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# TJCAA Structural Design Specialists

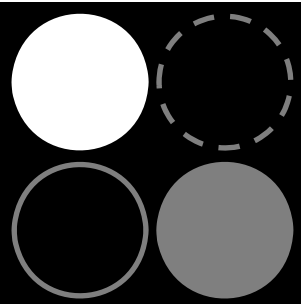
- Water and Wastewater Treatment Facilities
- Reservoirs and Pump Stations
- Seismic Evaluations
- Buildings and Structures
- Aluminum Structures



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# Lessons Learned - Structural

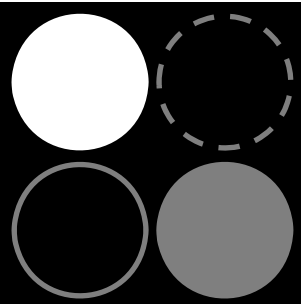
- Start Geotech early
- Start Structural early
- Things are bigger than they appear
  - Return period of 475 years
  - ACI 350
- Design big pipe supports
- Think spatially (horizontally and vertically)
- Consider an Architect even for small jobs
- Let us write your EQ, Wind and Leakage specification
- Let us review your standard details for structural aspects
- Deferred Submittals



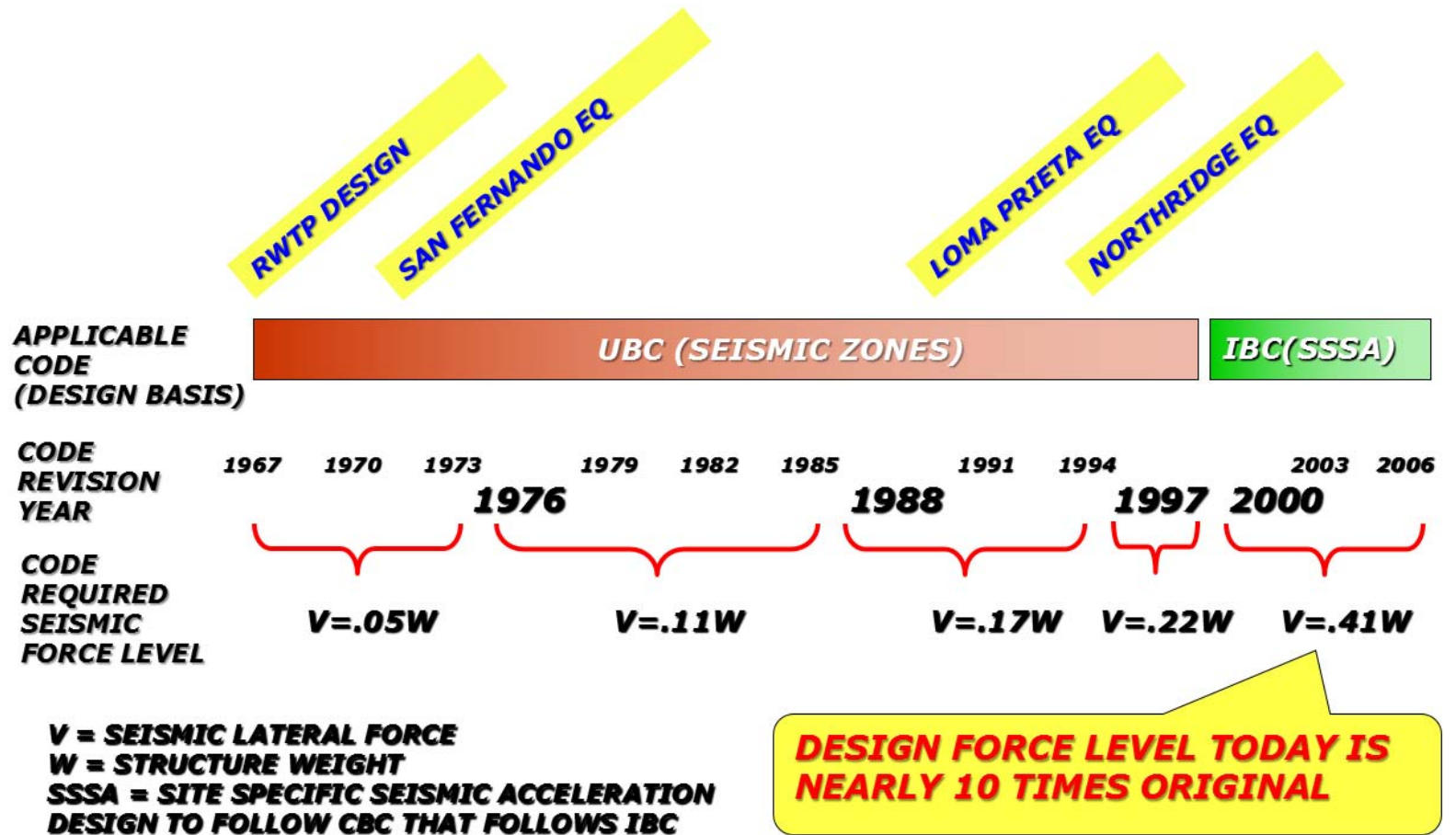
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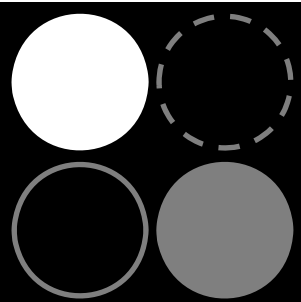


# Changes to Seismic Code: Increased Design Loads and Improved Detailing



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Why ICE? - Because Paul didn't like ECI  
(That's ICKY to you!)

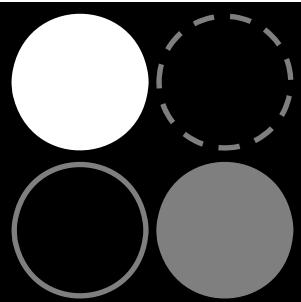
- Instrumentation
- Controls
- Electrical

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## Lessons Learned – ICE Designs

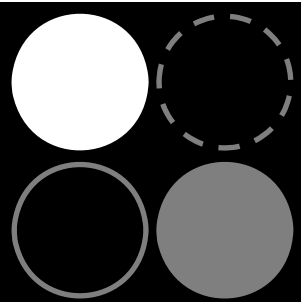
- Clearances: It's always bigger than expected and remember room for installation and access
- Equipment numbering standards!!
- Identify the applicable Code(s) early
  - NFPA 820: Even HRC, storm water, and odor control
  - Permitting generators: Air quality (BAAQMD), fuel (Fire Marshall), noise (sensitive receptors)
  - Consider an Architect for establishing occupancy requirements
- Detailed design: Find the “sweet spot” for alternative delivery projects (e.g. design/build)
- Manage Owner furnished equipment

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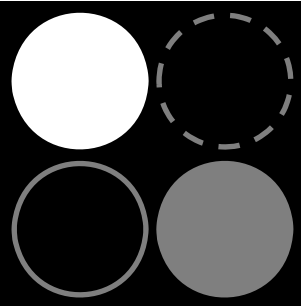
# What we're going to ask for

- Deliverables: type and schedule
- Process flow diagram
- Equipment data sheets with load (HP, kW, Amps), dimensions, and weights
- Geotechnical data
- Client naming and ID/tagging conventions
- Reliability criteria – affects big picture electrical and controls: life safety, redundancy, dual sources, critical loads
- Physical characteristics (marine, corrosive, dusty, hot, explosive)
- Define needs for future expansion
- Existing facility record drawings
- Project standards: CADD and specifications
- Backgrounds and initial civil/mechanical layouts

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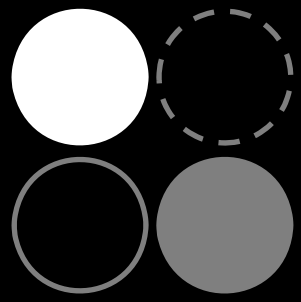
## Why CSP?

- Because there just aren't enough 3-letter acronyms in the engineering world!
- Control
- Systems
- Programming

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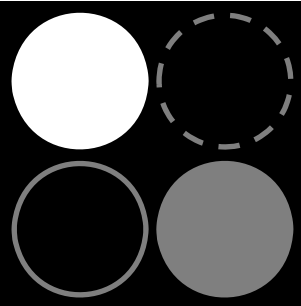
# Control Systems Programming – What we do...

- Develop control strategies that work in the real world
- Design the infrastructure to move the data efficiently
- PLC programming
- Operator interface design and programming
- SCADA system development and configuration
- Continuous customer support
- Full system integration
- Training
- **DOCUMENTATION!!!**

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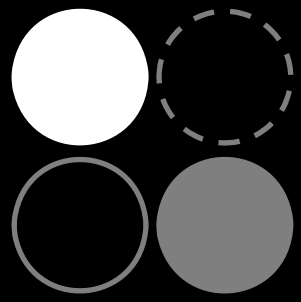
## Two Approaches

- Part of general construction contract by the contracting team
- Professional services by the engineering team

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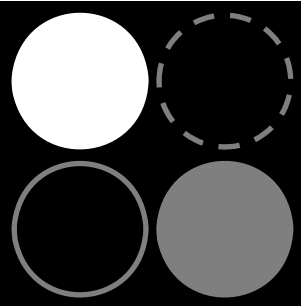
# Contractor Approach

- Requires a detailed design in the bid docs
- Typically done by a sub-sub-contractor
- Linear process
- Limited avenues of communication
- Limited flexibility
- End of the contract – See ya...
- **LOW BIDDER!**

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# Professional Approach

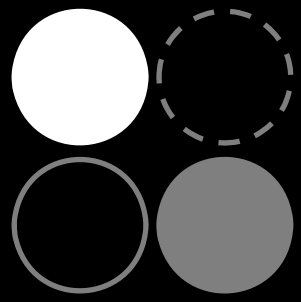
- Less detail required in the bid docs
- Iterative process
- Direct communication between developer and end users
- Maximum flexibility
- Development during construction, incorporating changes along the way
- **QUALITY!**

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# PLC Programming

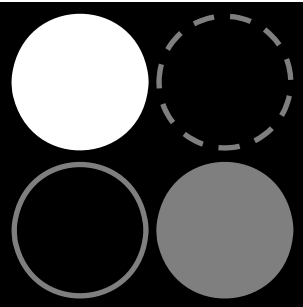


- Taking the mystery out of the magic “black” box
- Proven algorithms
- Structured/Organized/Documented
- Efficient data transfer
- Owner modifiable

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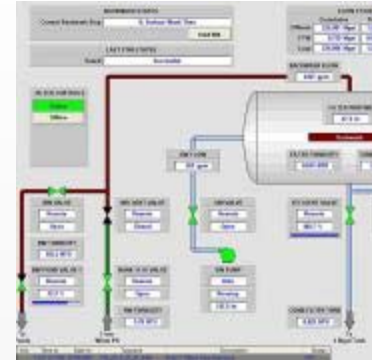
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# Operator Interface

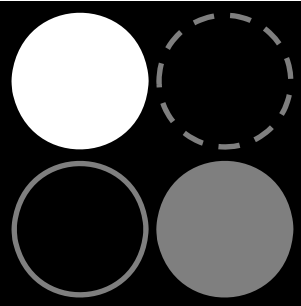
- Effectively convey process status
- Intuitive control interface
- Efficiently handle alarms, failures, and emergencies
- Merging of Art and Engineering



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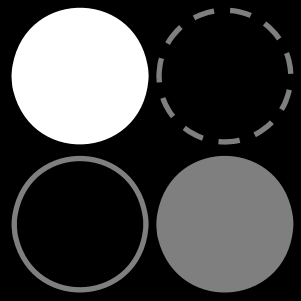
## Beyond the Basics

- “Intelligent” equipment integration
- Power monitoring and energy efficiency control algorithms
- District/City wide automation
- Water Quality Reports
- CMMS integration
- There’s an app for that!

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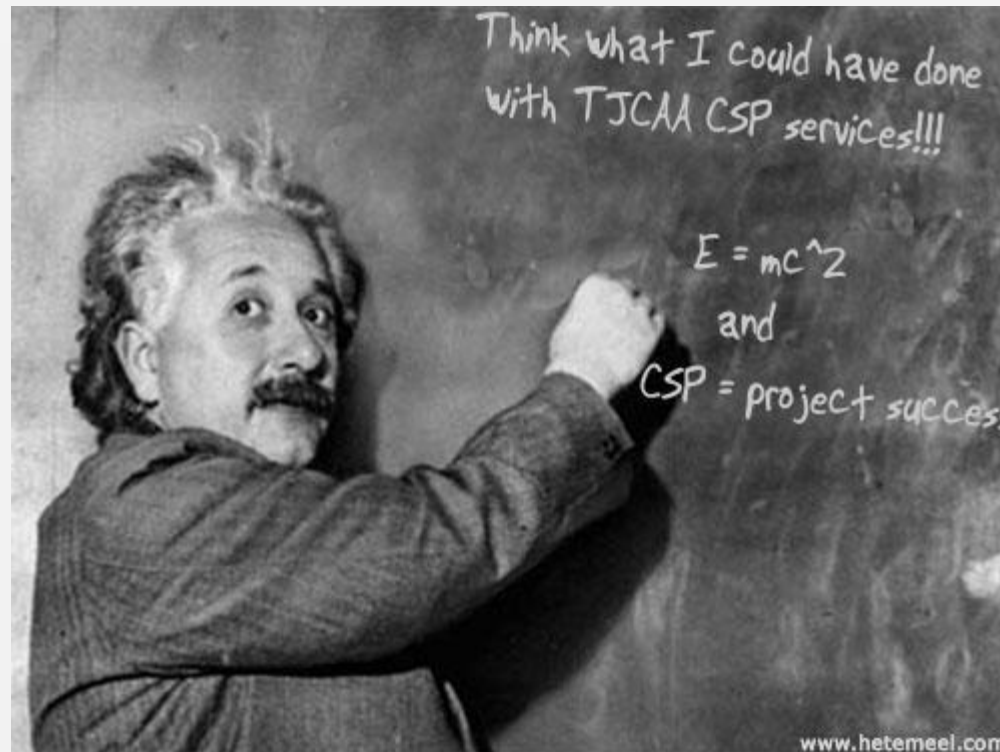
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# Support and Training

- Customer support from the planning stage through the warranty phase.
- Operator and technician training



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