Orange County, California
2016 – 2017

Orange Spiel

Juicy News from ASHRAE's Orange Empire Chapter

THIS MONTH'S MEETING WAS ON

TUESDAY, NOVEMBER 15, 2016

JOINT MEETING WITH SOUTHERN CALIFORNIA AND TRI-COUNTY

GREAT WOLF LODGE
12681 Harbor Boulevard
Garden Grove, CA 92840

Program . . . . . 5:30 – 8:30 p.m.

DINNER PROGRAM
"Water Chemistry & IAQ – A Soup to Nuts Look at Indoor Waterpark Environments" by **Mr. Cody Butcher, CPRP, CPOI**

THERE WAS NO TECHNICAL SESSION

Orange Spiel Editor
Robert Hagstrom, P.E., LEED AP
c/o Southern California Edison
6090-B N. Irwindale Avenue
Irwindale, CA 91702
Phone (626) 633-3432
PAX 43432
Cell (626) 609-9791
Robert.Hagstrom@sce.com

OUR NOVEMBER MEETING

WAS HELD ON TUESDAY, NOVEMBER 15, 2016

THE EVENING TOPIC WAS

WATER CHEMISTRY & IAQ – A SOUP TO NUTS LOOK AT INDOOR WATERPARK ENVIRONMENTS

Our speaker was Cody Butcher, CPRP, CPOI, the Corporate Director of Waterparks for Great Wolf Resorts. His responsibilities include planning, organizing and directing activities associated with the year-round operation and maintenance of 14 indoor waterparks. Mr. Butcher held positions as Parks and Recreation Director for City of Prosser, Washington; Aquatics Director at Highlands Ranch Community Association; and worked in waterpark maintenance for Hyland Hills Water World.

Cody is a Certified Pool Operator (CPO) Instructor and Certified Parks and Recreation Professional. He is retired from over 21 years of service in the United States Army and Army National Guard where he served in the maintenance field.

Our thanks to Cody for his informative and enjoyable presentation!

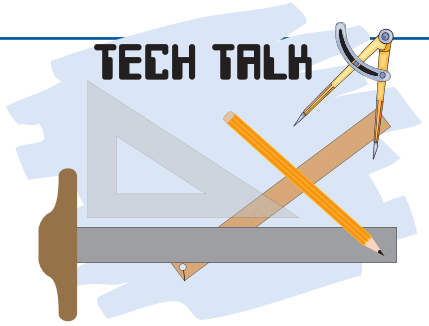
ERIC'S BLOG

Well it's a bad month to be a turkey, but a good month to be in Orange Empire ASHRAE! We concluded one of our best golf tournaments ever. We also concluded another Joint Meeting with the Orange County ASPE Chapter this November at the Great Wolf Lodge in Garden Grove. Cody Butcher did a great presentation on Water Chemistry and IAQ in regards to maintaining indoor water parks. We were also allowed backstage to check out all the pumping and treatment equipment they have to keep the park running to standard.

Next month is our Joint Meeting with the SoCal and Tri-County Chapters, and ASHRAE Society President Tim Wentz will be our speaker. It's sure to be a good turnout and discussion so please register. We are looking for raffle prizes and table-top presenters for the December meeting. If you are interested, please contact Derrick Wyka (Derrick.Wyka@aecom.com) or respond to an email blast we will be sending shortly. Thanks again for your continued support. ***Eric Decker***

WHAT IS A PONPC?

By Craig F. Hofferber, CxA



Engineers sometimes have difficulty understanding the concept of a "point of no pressure change" (PONPC) in a closed circulating fluid system. This concept is simple, but seems hard because it is somewhat abstract. There are two critical pressures in closed loop circulating systems; static pressure (no flow) and the dynamic pressure generated by pumps to circulate flow. The PONPC relates to static pressure in the system where the expansion tank and makeup fill connection is made. Regardless of the pump location in relationship to this point, dynamic pressure changes developed by the pump do not affect this pressure, which remains close to the static pressure charge established for the system by the fill pressure regulator and expansion tank. In a properly equipped closed system, the static pressure varies up or down very little as the system is heated or cooled from its static state. This is because the expanded volume goes into the expansion tank.

Circulating pumps generate a potential for flow in a circulation system, somewhat akin to the 120 V voltage potential at the wall outlet that causes current to flow through an appliance, once plugged-in. The differential pressure generated by the pump raises the potential for fluid to move from a higher pressure point (pump discharge) to a lower pressure point (pump suction) while the fluid circulates through the system. When the pump takes suction from the same line where the makeup and expansion tank are connected, its intake pressure remains at the same pressure as the system static pressure, reflecting the PONPC.

The system is considered "static" when it is not in circulation, and the fluid is being neither heated nor cooled. The system static pressure is affected slightly by heating or cooling of the circulating fluid that causes static pressure rise or fall in relationship to atmospheric pressure; assuming that there is a place for the expanded volume to go once expanded. The system static pressure must always be positive when the fluid inside is at its coldest temperature to avoid ingesting air backward through the high-point air-relief valves as the system cools down.

The system static pressure is determined by the makeup pressure regulator set for a few PSIG higher than zero pressure at the highest riser in the system. Usually this pressure is set between 6-12 psig when the regulator and expansion tank are also located at the high point (e.g. roof). When the makeup and expansion control equipment is located lower than the highest riser elevation, the pressure increase due to gravity makes it necessary to add this increased pressure to the makeup regulator and expansion tank pressures so that the static pressure at the highest elevation can still be maintained 6-12 psig above atmospheric pressure. This margin of pressure is often referred to as "blanket pressure"

An expansion tank is required for holding the expanded volume of fluid as it warms up. Otherwise, the pressure in the system would rise to infinity, since water is an uncompressible fluid. The expansion tank releases this stored fluid back into the system by gravity as it cools down again. Modern systems use bladder tanks to keep the fluid separated from the air in the tank, where the fluid is contained inside the bladder and the tank is pressurized by nitrogen or air to hold the system at its proper static pressure.

Positive system pressure keeps air in suspension until it can be mechanically separated and expelled. In older systems, the expelled air returns by buoyancy up into the "cushion tank" or "compression tank"; maintaining the blanket pressure at the makeup regulator setting without necessarily adding makeup water unless the tank is emptied. Note that compression tanks absolutely have to be located at the highest point in the system plus a few feet so that the recovered air can percolate up into the tank. This is why you can sometimes see a tank well above the equipment screen on the roof of some buildings.

*(See **TECH TALK** page 3)*

TECH TALK

(continued from page 2)

Bladder tanks fill the bladder with fluid and do not recover air. They can be located in the mechanical room at roof level or lower and therefore are less obtrusive to the skyline. Of course the tank and the makeup regulator should be located in the same place for convenience of system pressure checking but they can be separated assuming the bladder tank and the makeup regulator pressures are each compensated for elevation differences. Designing the system this way is devious, leaving traps for the operator to fall into since most operators know very little about how these devices work together to maintain an air free system. Air is the enemy of system life and can often make an operator's life miserable. Problems include flow blockage with loss of heat transfer, rushing and cracking or pounding noise, valve wear, pump cavitation, water hammer and internal corrosion.

Ridding the system of air takes an air separator. An air separator accumulates suspended air in the fluid, allowing it to be vented to atmosphere through a high capacity automatic air vent valve until there is no more air to vent. While this venting process goes on, the makeup water valve will admit new water into the system to hold the static pressure at the targeted 6-12 psig above atmospheric pressure. When the system reaches equilibrium where no air is relieved and no new water is admitted, it is ready for chemical treatment of the circulating fluid for corrosion protection. Often when tenant work is done, isolated parts of the system are opened to add new coils and piping. When the isolation valves are opened to allow these new coils to receive water, the air in the piping and coils is displaced into the system and must be removed. Once removed from the system, new water volume is automatically added by the makeup regulator, necessitating another chemical residual check to be sure critical mass is maintained at concentration for proper corrosion protection.

Air separators use various design techniques. Common among them combines vortex and direction change where the water is slowed, swirled and forced downward. The drop in pressure and direction change separates the air, letting it rise to the top of the chamber to be vented. Another method uses coalescing screens and a velocity reduction. The screens coalesce the air, separating it from the water while the reduced water velocity lets the air rise to be vented.

The proper location for an air separator must be at the warmest point in the system. This is because air naturally comes out of suspension after having been heated. In a heating water system, the air separator goes in the line right after the heat generation device (supply) where the water is as hot as it is going to be. In a cooling system, the air separator goes in the line just before entering the cooling device (return) where the water is as warm as it is going to be. Often this practice is forgotten, leading to air locking problems and noise. Occasionally one finds a system designed without air separating devices, which guarantees that air remains in the system, generating trouble for years while shortening the life of the heating and/or cooling equipment due to corrosion. Often chemical treatment is forgotten as well, leading to system failures and expensive early component replacement.

The location for the heater, cooler and/or other devices is relatively uncritical except for the pump. Most engineers don't want to pump into a heater because it raises its internal pressure relative to atmosphere, possibly causing a pressure safety lift if the heater has a lower pressure withstand rating (25 psig), thus the PONPC and pump suction can be located after the heater, and obviously after the air separator. Chilled water pumps sometimes get located after the cooler for the same reason, however the air separator must be located before the cooler (warmest place) to get rid of that air. Regardless of the pump location, the PONPC does not change and remains where the makeup valve connects to the system. Whenever possible, the pump suction should be at the PONPC to avoid suction pressures going into a vacuum, possibly causing NPSH and other pump issues.

In cases where large atmospheric tanks are connected to closed loop systems, such as in thermal storage systems, the TES tank itself becomes the expansion tank and pumps should be arranged to take suction from the tank for best performance overall. The metric to check is that the water level at the top of the tank can provide the 6-12

*(See **TECH TALK** page 5)*

HELP WANTED
Mechanical Designer / Engineer (Carlsbad/Vista)

Overview:
Ranked as one of the top engineering companies in San Diego by the San Diego Business Journal, and the only MEP firm to make the list, T-Squared Professional Engineers, Inc. is a 24 year-old, privately held, industry-leading consulting engineering firm specializing in HVAC, Electrical, and Plumbing Systems Design as well as Photo-Voltaic Systems Design.

We offer a stimulating work environment with competitive salary & benefits and opportunities for advancement. We are proud to offer a variety of benefits including medical, dental, and vision insurance, 401K match, and much more.

Immediate opening for a Mechanical Designer/ Engineer to join our team. The successful candidate will be professional, self-motivated, energetic and enthusiastic with excellent communication and inter-personal skills. Previous consulting engineering firm experience required.

Responsibilities, Technical Skills and Abilities:
- Strong technical skills to produce accurate and timely HVAC systems designs for commercial, educational, health-care and military facilities
- Design and documentation.
- Develop layouts and detailed schematics for HVAC systems
- Piping and hydronic designs
- Energy Conservation Reports
- Title -- 24 calculation.
- LEED design with focus on energy efficiency and sustainability
- LEED documentation and coordination

Qualifications / Requirements:
- Bachelor's degree in Mechanical Engineering (or related industry experience) and a minimum fo 4 years' experience in Mechanical design, or equivalent combination of education and experience
- Recent relevant experience in the engineering/ construction field
- Experience in packaged equipment and central plants
- Knowledge of California Energy Standards -- Code Requirements
- EIT or PE certificates helpful but not required.
- LEED – AP preferred
- Team-player: Demonstrated ability to effectively manage a projects and/or take direction from project managers
- Proficiency with MS Office (Excel, Word) and CAD
- Strong verbal and writing communication skills

At T-Squared Professional Engineers, we believe our current and future success depends on hiring, developing, and retaining high caliber people. We are always interested in hearing from exceptional candidates, and we invite you to learn more about us. Please view our website at www.tsqeng.com.

Please send your resume, a cover letter and your salary requirements to
reginaschnell@workplacesymphonies.com.

Please be sure to include the following in your cover letter:
1) Why you are interested in this position,
2) What special talents or strengths you will bring to our team, and
3) An example of a success that demonstrates your skills and abilities for you are particularly proud.

HELP WANTED
Commissioning Agent CxA (San Marcos)

Axiom Commissioning Group, Inc.
A forward-thinking, San Marcos-based company is seeking a commissioning agent (CxA) to join its team.

Started by mechanical engineers, Axiom Commissioning Group focuses solely on commissioning projects. Axiom is looking for experienced, like-minded candidates for an immediate position who are either ACG certified or interested in becoming an ACG certified commissioning authority.

Qualifications & Requirements:
- 3-5 years experience in mechanical building design, including commissioning projects design review, commissioning specifications, startup review and all testing
- Functional Performance Testing (FPT) and Performance Verification Testing (PVT), and final commissioning report composition
- Technically proficient in HVAC systems design, DDC control systems and lighting control systems
- EIT or PE certification required
- Must hold certification with ACG as a Commissioning Authority for military, commercial, and hospitality projects
- Excellent written and verbal communications and some travel (mostly in Southern California) are required.

We offer a stimulating work environment with competitive salary & benefits and opportunities for advancement. We are proud to offer a variety of benefits including medical, dental, and vision insurance, 401K match, and much more.

At T-Squared Professional Engineers, we believe our current and future success depends on hiring, developing, and retaining high caliber people. We are always interested in hearing from exceptional candidates, and we invite you to learn more about us. Please view our website at www.axiomcx.com.

Please send your resume, a cover letter and your salary requirements to
reginaschnell@workplacesymphonies.com.

Please be sure to include the following in your cover letter:
1) Why you are interested in this position,
2) What special talents or strengths you will bring to our team, and
3) An example of a success that demonstrates your skills and abilities for you are particularly proud.

HELP WANTED
Plumbing Designer / Engineer (Carlsbad/Vista)

Overview:
Ranked as one of the top engineering companies in San Diego by the San Diego Business Journal, and the only MEP firm to make the list, T-Squared Professional Engineers, Inc. is a 24 year-old, privately held, industry-leading consulting engineering firm specializing in HVAC, Electrical, and Plumbing Systems Design as well as Photo-Voltaic Systems Design.

We offer a stimulating work environment with competitive salary & benefits and opportunities for advancement. We are proud to offer a variety of benefits including medical, dental, and vision insurance, 401K match, and much more.

Immediate opening for a Plumbing Designer/Engineer to join our team. The successful candidate will be professional, self-motivated, energetic and enthusiastic with excellent communication and inter-personal skills. Previous consulting engineering firm experience required.

Responsibilities, Technical Skills and Abilities:
Design and assist in designing Plumbing Systems for commercial, educational, health-care and military facilities.
- Prepare detailed layout for all drainage and water supply systems for all types of facilities, piping and hydronic designs
- Research and select equipment from various manufacturers
- Complete fixtures / equipment schedules
- Perform calculations for a project, such as equipment selection and sizing, fixtures calculations, product specifications, and design and layout for roof drains, sanitary lines, and water lines.
- Estimate construction costs and evaluate feasibility of construction
- Code Compliance
- Provide drafting support using AutoCAD and BIM to drafting staff

Qualifications / Requirements:
- A minimum 4 years of directly related experience in plumbing design or equivalent combination of education and experience.
- Recent relevant experience in the engineering/ construction field
- Plumbing design from Schematic Design through Construction Administration
- Comprehensive knowledge of pluming engineering fundamentals
- LEED – AP preferred
- Team-player: Demonstrated ability to effectively manage a projects and/or take direction from project managers
- Proficiency with MS Office (Excel, Word) and AutoCAD
- Strong verbal and writing communication skills

At T-Squared Professional Engineers, we believe our current and future success depends on hiring, developing, and retaining high caliber people. We are always interested in hearing from exceptional candidates, and we invite you to learn more about us. Please view our website at www.tsqeng.com.

Please send your resume, a cover letter and your salary requirements to
reginaschnell@workplacesymphonies.com.

Please be sure to include the following in your cover letter:
1) Why you are interested in this position,
2) What special talents or strengths you will bring to our team, and
3) An example of a success that demonstrates your skills and abilities for you are particularly proud.

ASHRAE ORANGE EMPIRE CHAPTER

2016-2017 PARTIAL ROSTER

SPIEL DEADLINE!!
The December deadline for articles or ads is FRIDAY, DECEMBER 2, 2016!

TECH TALK

(continued from page 3)

psig blanket pressure at the highest heat exchange device on the closed system (thus preventing it from air binding). If the top of the tank is NOT high enough to do this, then the fluid circuit with the highest elevation will need to have a pressure sustaining valve installed in its return line to mechanically maintain the 6-12 psig blanket pressure at the highest elevation.

This valve could (should) be located at an elevation where the TES tank achieves the 6-12 psig blanket pressure and the valve would be set to sustain the increased elevation head plus the 6-12 psig blanket pressure needed to keep the upper extremities of the system air free. Keep in mind that pressure sustaining valves exact a dynamic pressure drop forcing the main distribution pumps to work harder, so in addition to the sustaining valve, a small booster pump is usually warranted having a VFD, whose speed command is controlled by the upper coil supply air temperature PID loop (without a coil control valve) to prevent penalizing the entire distribution loop just to satisfy a small load at a higher elevation.

Another solution would involve a plate and frame heat exchanger and another closed circuit circulation pump to isolate the highest elevation riser. This solution is much more expensive to install, and more maintenance intensive than using a sustaining valve and a booster pump but, it could get the job done a different way. Problem is, a heat exchanger always takes a LMTD, which means 2-3°F warmer chilled water reaches the upper systems. This could be a problem for some systems needing the colder water to perform adequately.

There should be NO extra makeup valves or expansion tanks connected to the systems served by the TES system. This issue normally comes up in campus systems where a TES tank is added to previously designed closed systems. Also, special care must be taken to flush and change the chemical treatment mix since now, the system is not really a closed loop because the TES tank is open to the atmosphere. In these systems, the most effective treatment is by using a carbon-dioxide generator that kills microbes and displaces oxygen for corrosion protection. While expensive to purchase, they are a cost-effective method of system protection.

Now that you know why these devices are needed and located where they work best, you can become a better system designer and the commissioning agent will not bother you about design changes to eliminate air in the system after construction is completed. It is always easier and cheaper to design it right to begin with, than to change it in the field later. -END-

ORANGE EMPIRE CHAPTER

WINTER/SPRING 2016/17 SCHEDULE

OUT MEETING LOCATION WAS AT:

GREAT WOLF LODGE
12681 Harbor Blvd.
Garden Grove

SEPTEMBER 27, 2016
Dinner: *Arena Ventilation*
Theme: *Membership Appreciation*
Place: *Holiday Inn*

OCTOBER 25, 2016
Technical: *Optimizing Tomorrow's Steam System Through Knowledgeable Design Today*
Dinner: *How Not To Design a Steam System*
Theme: *Steam Night*
Place: *Holiday Inn*

NOVEMBER 15, 2016
Event: *Water Chemistry & IAQ – A Soup to Nuts Look at Indoor Waterpark Environments*
Theme: *Joint Meeting with ASPE*
Place: *Great Wolf Lodge, Garden Grove*

DECEMBER 13, 2016
Dinner: *TBD*
Theme: *Joint Meeting with So Cal and LA Chapters*
Place: *SoCal Gas ERC, Downey*

JANUARY 17, 2017
Dinner: *TBD*
Theme: *Refrigeration and Membership Night*
Place: *TBD*

FEBRUARY 28, 2017
Dinner: *A New Air System Design Concept Using Chilled Boxes*
Theme: *Research and Past Presidents Night*
Place: *TBD*

MARCH 28, 2017
Dinner: *TBD*
Theme: *Joint Meeting with San Diego, Hosted by Orange County Chapter*
Place: *TBD*

APRIL 25, 2017
Technical: *TBD*
Dinner: *TBD*
Theme: *Student Night*
Place: *Holiday Inn*

MAY 23, 2017
Theme: *Officer and Board Installation and Golf Tournament*
Place: *TBD*

Orange Spiel

ASHRAE Orange Empire Chapter

www.oeashrae.org

Orange Empire ASHRAE
P.O. Box 15603
Santa Ana, CA 92735

THIS MONTH'S MEETING WAS ON

TUESDAY, NOVEMBER 15, 2016

DINNER PROGRAM
"Water Chemistry & IAQ – A Soup to Nuts Look at Indoor Waterpark Environments" by **Mr. Cody Butcher, CPRP, CPOI**

THERE WAS NO TECHNICAL SESSION