

NOVEMBER 2010 DINNER MEETING

Main Program: LBNL Research on IEQ and Energy Efficiency

Thursday, November 4, 2010 (5:30 pm to 9:00 pm)

Scott's Seafood Jack London Square Oakland

Agenda:

- 5:30 pm Registration and Social Hour
- 6:30 pm Dinner with announcements and introductions
- 7:45 pm Break
- 8:00 pm Main Program
- 9:00 pm Adjourn

Speaker: William J. Fisk; Lawrence Berkeley National Lab

William J. Fisk is a Sr. Staff Scientist and Department Head of the Indoor Environment Department at Lawrence Berkeley National Laboratory. He has conducted research for 30 years at Lawrence Berkeley National Laboratory on indoor environmental quality and energy efficiency. His current research focuses on energy efficient technologies for ventilating and controlling indoor air quality, on the relationships of indoor environmental quality with health and performance, and on the economic consequences of indoor environmental quality. He serves on the Editorial Board for the journal Indoor Air, was elected to the International Academy of Indoor Air Sciences in 1999, and is an ASHRAE Fellow. Mr. Fisk received MS and BS degrees in mechanical engineering from the University of California, Berkeley and the University of New Mexico, respectively.



**Presentation
Summary:**

Mr. Fisk will summarize what is known about the impacts of HVAC on people's health and work performance. Issues addressed will include the impact of outdoor air ventilation rates and indoor temperatures on health symptoms, absence, and office and school work performance. He will provide evidence that increased use of economizers and better temperature control, particularly in winter, could reduce adverse health effects, increase work performance and also save energy. He will also summarize the

evidence that air conditioning increases the risks of widely-experienced acute health effects while also enabling sheltering from outdoor air pollutants that cause chronic, but less prevalent, health effects. Finally, he will very briefly summarize the findings of studies of the accuracy of carbon dioxide sensors used for demand control ventilation and show that sensor improvements and increased calibrations are needed.

Cost:	Before 3pm, Fri. 10/29	After 5pm, Mon. 11/1
GG ASHRAE Members	\$40.	\$50. but please register
Non-members	\$50.	\$55. but please register
Students	Free, but please register	Free, but please register
Voucher holder	\$0, but please register	\$0, but please register

Golden Gate Chapter President's Message, November 2010



Dear Golden Gate ASHRAE Members and Friends,

I am sorry for those who missed the October chapter meeting. We had a great presentation from Arash Guity with Mazzetti Nash Lipsey Burch; San Francisco, on an overview of displacement ventilation and its practical application in a healthcare environment. The audience involvement and the question and answer period was lively with a great interchange of comments, questions and ideas. Please do not miss the November meeting which looks to be equally thought provoking.

On Sunday, October 24 I was basking in the sun of a perfect Missouri autumn day, and thought I had found the Center of the Universe; on Saturday, my God-Daughter was married, the Giants had won the Pennant, Mizzou bushwhacked OU for like only the second time in 20+ years, the Kansas Jayhawks lost...and on this day, the Chiefs had just won and the Niners were looking good to pull off a Pick-6 winner for moi! Sadly we know the end of this story: No CofU found on this go....Niners found yet another way to snatch defeat from the jaws of victory.

While working on a power point technical presentation recently, I googled “rules of thumb” for whatever reason... which pointed me towards heuristics. I then found an editorial on www.enr.com by Jon Schmidt, P.E., a structural engineer in Kansas City; and September, 2010 *Designer’s Guide* on www.plumbingengineer.com, by Timothy Allinson P.E., a mechanical engineer in Long Beach. They write that engineering has a certain “social captivity” that produces market-driven value judgments rather than purely technical solutions to engineering challenges and that state-of-the-art heuristics are often compromised by social captivity.

Steven L. Goldman, the Andrew W. Mellon Distinguished Professor of the Humanities at Lehigh University argued that engineering is captive to society in two ways - intellectually, because its theory has been subordinated to science; and socially, because its practice has been limited in terms of what

problems engineers are allowed to address and what solutions are considered acceptable. These two captivities are not separate, but interdependent - the first anchors the second, which in turn reinforces the legitimacy of the first.

A heuristic refers to experience-based techniques for problem solving, learning, and discovery. Heuristic methods are used to come to an optimal solution as rapidly as possible. Part of this method is using a rule of thumb, an educated guess, an intuitive judgment; but as Schmidt wrote, "...a heuristic is any plausible aid or direction in solving a problem that is, in the final analysis, unjustified, incapable of justification and potentially fallible." Plumbing engineers use the Hunters Curve to equate fixture units to demand flow rate and is an example of a heuristic. Allinson writes that "...while it cannot be proven absolutely, its basis is practically derived and it has been used successfully for many, many years. However, one has to use Hunter's Curve discreetly. You would not use it, for example, for a sports arena, because the assumed diversities of the curve do not apply to halftime in a stadium, when your diversity is nearly 100%.

Heuristics can be seen to draw a line in the sand that should not be crossed, and crossing that line can lead to failure. When social captivity is involved that line can be pushed. If the line is pushed and no failure occurs the heuristic is redefined to a new limit point and social captivity will continue to push the limits until a failure occurs, and then we know where the line truly belonged-ahead of the failure. It was the social captivity that caused the failure, in an effort to save time or money or both, not the engineering.

That is why many engineers dislike the concept of value engineering. It is a form of social captivity that strives to determine the extent to which the engineer's design can be compromised in order to save money. The counterargument that supports value engineering is created by the engineering community itself. Too many engineers are guilty of putting too much fat in their designs, whether by not being secure in the design numbers or an addiction to the concept that more is better." Design pump head is a common area where I see this occurring with varying added safety factors of unknown magnitude or origin.

I was called out to inspect a condenser water system/cooling tower operation at a hospital central plant. The plant had been in operation for over 10 years by the time I arrived on scene. I did a walk-around and noted that the cooling tower was located about 50 ft. from the condenser water pumps/chillers, and in my head I did a quick SWAG (heuristic) of a design at 40 ft. TDH. To my surprise, I found that the pumps were rated for 80 ft. of TDH, operating way out on their curve and over-pumping, which overflowed the tower hot basins. This in turn caused the facility engineers to think that the cooling towers were undersized. I investigated the cooling tower manufacturer's data and found that the design engineer had also over sized the towers for a wet bulb temperature 6°F higher than the 0.1% ASHRAE Region X Weather data. I wrote a report on my findings, and advised them that they could solve their problem by installing larger diameter hot basin distribution nozzles and/or trim the impellers; a simple solution for a project where "more was better". For whatever reasons, my advice was not heeded and the hospital went ahead and spent hundreds of thousands of dollars to replace the towers. Clearly some value engineering early on would have been warranted in this case, but with OSHPD to deal with and different agendas by those involved, once this job started down the wrong track, the probability of an incorrect outcome was assured.

Another recent job value engineered a primary-only condensing boiler design to a primary-secondary non-condensing boiler. As this was a system designed for temperatures of 180°F-150°F, the value

engineering can be justified, even though the building will be shut down each evening and on weekends and during start-up there will be condensing of the boiler flue gasses. To protect the non-condensing boiler, three-way valves used in a mixing application, would provide temperature control on the return water and prevent flue gas condensation inside the boiler. On this project, the three-way valves were also value engineered out.

The contractor claim that a “primary-secondary system inherently protects the boiler from condensing during start-up” appears to adhere to the Schmidt definition of heuristics where the solution will be fallible. To see where this stood, I did the calculations on a typical 1000MBH boiler system, using 286 gallons of water (from expansion tank estimating software) in the system and start-up 80°F rise (60°F to 140°F) = 13.5 minutes of condensing. This assumes the controls are set to delay start-up of the AHU until the system gets up to temperature. The equipment longevity and operation may not be too severely compromised, if only condensing 13 minutes per day as the flue gas condensation will be burned away by the hotter flue gasses after the initial start-up time.

One common pitfall in implementing a heuristic method to meet a requirement comes when the engineer or designer fails to realize that the current data set does not necessarily represent future system states. In this case, if the controls are such that the AHU are on-line during start-up, then the amount of time that the non-condensing boiler flue gasses are condensing cannot be calculated and will result in boiler failure.

Henry Petroski, a professor of engineering and history at Duke University, writes that heuristics have limits of applicability that are not always explicit; major failures are often due to the fact that a project pushed them just a bit too far but revealed, however, the range over which the heuristics employed in its design were valid. This suggests a paradox: Anticipating failure breeds success, because it exposes where the line is that should not be crossed; repeated success leads to failure, because the line’s location remains unknown.

Your thoughts, comments and feedback are most welcome to: gharbison@calhydro.com

Best regards,

Gary Harbison
Chapter President 2010-2011

Return for the Year

Tom Gilbertson, Chapter Historian

“November”

“When the frost is on the pumpkin....and the fodder in the shock”....that was the first line of the poem....(James Whitcomb Riley)....that signaled the real change of Seasons....and the Chicago Tribune used to run, on their front page, each year in November, the same blue and gold set of drawings that conjured up the image of Fall...with the corn shock turning into an Indian teepee...in the second picture....or am I the only one who remembers that “annually historic” front page?....how many of you know what “fodder” is...or for that matter, what a “shock” is...or how to make one?

“Frost” triggered the first real understanding of psychometrics.....in was about 1903 when Willis Carrier.... traveling as the “chief engineer” of the Buffalo Forge Fan Company....was forced to wait for a train in the railway station at Pittsburgh, PA....when he entered the station...on the south bank of the Monongalia River...across from the Pittsburgh-downtown...the station’s large windows were “clear”.....within an hour the cold-North wind had dropped the surface temperature of the window glass to “below” the dew point....and glass fogged (frosted) over.....Willis Carrier become so enthralled with the phenomenon of the condensation of the moisture on the station’s windows that he forgot to board his train when it arrived at the station....The story is that at that point, the concept of “air-conditioning” was first born...and the conditions that spawned our industry were observed, and realized.....”Historically”.....it was sort of fun to sit in that railway station...it is now restored as a restaurant...and relive the conditions that Willis Carrier was smart enough to recognize...and actually see those windows “frost” over.

Like many “discoveries” the person to whom the unusual “conditions” were presented...just happened to be prepared enough to be able to understand the significance of the events....Carrier went on to expand and appreciate the phase-change of the moisture as it reached its “dew point”...a term he later invented.....and from that experience....develop the concept of “air-conditioning”.

Be prepared!!!!....just like the Boy Scout motto....and who knows what you might recognize as a discovery???.... The story of the discovery of penicillin by Fleming has a similar tale...Fleming was allegedly one of the two or three men in the World who had the experience and training to recognize the significance of fact that something had prevented the growth of bacteria in a certain laboratory vessel.

And how do you become “prepared”?....according to one book “The Outliers” a person has to do something for 10,000 hours to be able to fully excel at the activity....Gates and Allen had spent more than 10,000 hours writing code for computer programs when the concept for Microsoft was born....they had been virtually sequestered in “computer-code-writing” (make that software-activity)...by the time they left high school!

The Beatles had played together as a band for 8 years....8 hours a day for 10 months of each of those years...until they came forth as the “Beatles”.....and were able to exhibit their skills. They were hired to perform in Hamburg, Germany when they were teenagers...and they worked “cheap”....so they had the chance to work all of those hours.

What have you been doing for “10,000 hours” so that you can display a dramatic level of skill and capability?...possibly recognize a situation...and capitalize on the observed conditions?

Golden Gate Chapter minutes from 1947.....read where “member-Fred Weir” made a report on the upcoming Golden Gate Chapters 1947 Christmas Party....by the way that is the father of Bob Weir....see....ASHRAE Members are historically, a pretty “with-it” group.

Student Activities

John G Williams, Student Activities Chair

Contact Info – john-g.williams@arup.com (415) 946 0230

YEA Activities

Michelle Dionello

The Young Engineers of ASHRAE (YEA) is committed to encourage participation from our Golden Gate members 35 years old and below. Please contact Michelle Dionello (michelle.dionello@arup.com) with any comments or if you are interested in becoming more involved with setting up events.

Upcoming Events

YEA Bowl Night- November 11th- 6:00-8:00pm

The YEA committee will be hosting bowling night at Yerba Buena Bowling in San Francisco. Please come join other young engineers for pizza, bowling, and fun!! Cost: \$10 for Golden Gate members and \$15 for non-members. Pictures below show how much fun we had last year at this event. Evite will be sent for everyone to reserve, if you do not receive the invite or might not be on the list, please contact Michelle directly.

Sponsorship

Also, please contact Michelle Dionello if you are interested in being a sponsor for this event! This event encourages younger engineers to meet each other and become more involved in ASHRAE! Thank you to our continued sponsors from last year- Nazzaro and Associates, California Hydronics Corporation, and Golden Gate ASHRAE Board.



LBNL Window/Daylighting Lab Tour- December 3rd 3:00-5:00pm

This is a joint event with International Building Performance Simulation Association (IBPSA). We will be touring the Lawrence Berkeley National Lab (LBNL) Window/ Daylighting Lab. Learn about how Solar Heat Gain Coefficients and U-values are tested and meet other engineers in IBPSA! There are limited spots available so please reserve quickly if you are interested in coming with michelle.dionello@arup.com.

YEA PE Study and Application Session- December 8th 6:00-7:30pm

This is a friendly reminder that the PE exam application deadline is coming up- application must be postmarked by December 17, 2010. The exam is on April 8, 2011. At this session, make sure that you have all your paperwork together and get tips from past exam-takers! The session will be at Arup, 560 Mission St, Suite 700, San Francisco. Please let Michelle Dionello now if you have any questions.

Marble Draw

Sheila Ruder

A big thank you to Swegon and George Yardley Co. who graciously donated prizes for the last meeting! **Since nobody won the marble draw in October, the prize is up to \$1106!!!! Somebody please win already!** If you like free money, this is the time come to an ASHRAE meeting. The odds this time are 1 of 4. As always, we are in need of sponsors for each meeting. If your company donates prizes, your company's logo will display on a slideshow during the non-speaker portions of the meeting. Since I'm moving to Chicago, one lucky ASHRAE member will have the opportunity to take my place as marble draw coordinator. It's a coveted dream job I know you have all been longing for. Please contact Annie Foster, Tom Weaver or Kristin DeMartini for more details. Thanks everyone! It has been a pleasure selling you raffle tickets.

Chapter Technology Transfer Committee (CTTC)

Tyler Bradshaw, ASHRAE Golden Gate CTT Committee Chair

2010/2011 Technology Awards

Once again, we had an excellent showing for the national level Technology Awards with the Golden Gate Chapter taking home 21% of the total awards given out this year. If you weren't able to participate in this year's competition, it's not too early to start thinking about next year's competition!!! Contact me directly or visit the chapter website to learn more about the program. <http://www.ashrae.org/members/page/1646>

The Chapter would like to congratulate this year's participants at the Technology Awards.

Category I - Commercial Buildings – New

1st Place – David Brower Center, Peter Rumsey

Category II - Institutional Buildings – New

1st Place – Stanford Y2E2 Building, Amit Khanna

Honorable mention – College of the Siskiyous, Emergency Services Training Center, Tony Costa & Chris Del Core

Category III - Health Care Facilities – Existing

Honorable mention – Marin Health & Wellness Center, Jeff Blaevoet

Category V – Public Assembly – New

Honorable mention – Valley Hi-North Laguna Library, Jeff Blaevoet

The Road to 2030: Deep Energy Reductions in Existing Buildings

Our seminar committee has once again put together an excellent free all day seminar for the benefit of both our chapter members and the public. Turnout was very good and speakers were engaging.

If you have a chance at one of our upcoming meetings, please take the time to thank any of our seminar committee members for their generous donation of time and effort in once again putting together a free and exciting seminar.

Seminar Committee:

Chair: Clark Bisel – WSP - Flack + Kurtz
Robert Marcial – PG&E
Glenn Friedman – Taylor Engineering

Bill Burke – PG&E
Tyler Bradshaw – Integral Group
David Okada – Stantec

We would also like to thank our seminar sponsors for this year (listed below). All proceeds will go towards ASHRAE research and local student scholarships!

PLATINUM



GOLD



SILVER



Join the CTTC Committee

If you like to assist the chapter and get involved with ASHRAE, the Chapter Technology Transfer Committee is one of the best places and we could use your help. Talk to a board member or contact Tyler Bradshaw at tbradshaw@rumseyengineers.com.

2010 - 2011 Event Calendar

<i>Date</i>	<i>Venue</i>	<i>Presentation Topic</i>	<i>Speaker(s)</i>
Thursday, October 7 5:30 pm - 9:00 pm (map)	PG&E Pacific Energy Center, San Francisco	Alternative ventilation strategies for healthcare facilities	Arash Guity Mazzetti Nash Lipsey Burch
Thursday, October 20 9:00 am- 4:30pm	PG&E Pacific Energy Center, San Francisco	The Road to 2030: Deep Energy Reductions in Existing Buildings	Various
Thursday, November 4 5:30 pm – 9:00 pm (map)	Scott's Seafood, Oakland	HVAC affects and demand controlled ventilation	Bill Fisk, LBNL
Thursday, December 9 5:30 pm - 9:00 pm (Joint meeting with San Jose Chapter)	TBD	Modeling in a Sustainable World	Lynn Bellenger Society President Pathfinder Engineers and Architects LLP
Thursday, January 13 11:30am – 1:30 pm	PG&E Pacific Energy Center, San Francisco	TBD	TBD
Thursday, February 3 5:30 pm - 9:00 pm	Scott's Seafood, Oakland	TBD	TBD

Photos

Courtesy of John D. Velasquez, Publicity Chair



