Chapter News

Northern California/Hawaii NEBB Chapter

May 2018

Disclaimer: The views, opinions and conclusions expressed in this publication are those of the authors and do not necessarily reflect the official policy or position of the NEBB Chapter.

President’s Message

If you have not experienced a NEBB Annual Conference it is a real treat. A lot of hard work goes into planning and preparation for almost a week of activities. The NEBB staff works endless hours to pull off a seamless event and this year is no exception! From the golf tournament to the closing ceremonies, the staff is working hard and they do not miss a beat. Actually, it is amazing to see the energy the NEBB Staff continues to have until the last minute. I am not sure how they pull it off but I can only imagine there is a lot of blood, sweat and tears that goes into the preparation of a conference that has so many aspects to it.

The golf tournament is usually held at a world class golf course and this year’s golf was hosted at Torrey Pines, a US Open course. The Conference’s Opening Ceremony not only maintains the interest of the attendees but inspire as well. This year’s Opening Ceremony were presented by Dr. Steve Taubman. He is a motivational speaker, magician and hypnotherapist, talk about entertainment. Buses then arrived and took us all to Sea World for a Get Acquainted Party that not only allowed the attendees to get acquainted with each other but also with a few special dolphins. (This may have been one of my favorite parts.)

From Sea World to Technical Sessions we go. . . The first day of the conference allowed for so many options on classes. Too many options is a good problem to have. I personally followed Track 3 which was the Business Track. I really enjoyed these sessions and hope for a similar set up in the future. The next few days allows for networking, mentoring and mingling with the Vendors. Not a dull moment!

With all of the positive experiences one thing bothered me while I was there. I noticed there were only a handful of attendees from our Chapter as well as Southern California. Those of us that were there probably left with some inspiration and motivation to make some changes to the way we do business or even learned a few things (hopefully). What I was
disappointed with was our Chapter’s participation in an event that was held in our state. I really wish more of our Chapter affiliates were present and able to experience the Conference in the same light as I saw it. Hopefully in the future there will be more participation and if the lack of participation was due to timing you have almost a year to plan your trip to San Antonio next year. Hope to see you all there.

Amber Ryman
NorCal Hawaii NEBB Chapter President.

---

NEBB Cleanroom Performance Testing

Project Protocol

Effective on January 1, 2020, all Cleanroom Performance Testing (CPT) projects are required to have a Certified Technician performing testing. Are you or your firm ready to satisfy this requirement?

For more information on NEBB’s CPT certification program, be it for the CPT CT or the CPT CP, please contact certification@nebb.org. Please note: One must first complete the full certification process for the CPT CT certification before applying for the CPT CP certification.
The Future of Cleanroom Certification

Next Generation Handheld Particle Counter
Kanomax USA
WELCOME TO OUR CHAPTER’S
NEWEST NEBB FIRM

West Coast Test & Balance
325 South M Street
Livermore, CA 94550
sperry@westcoasttab.com
925/605-6104 Cell
925/605-8208 Office
Steve Perry, TAB Certified
THERMAL COMFORT: DETERMINING OPTIMUM OCCUPANT COMFORT STRATEGIES

Many IAQ complaints, especially those characterized by the expressions ‘STUFFY’ and “DRAFTY” are probably misdiagnosed thermal comfort problems. The ASHRAE Standard on comfort (Std 55-2004) can be misleading in terms of occupant comfort. The older versions of this standard assumed both a ‘Winter’ and a ‘Summer’ condition, shown as comfort envelopes on a psychometric chart. These envelopes are shown with some overlap, suggesting that there is a single temperature, which may satisfy both conditions.

When comfort is analyzed using the equations now incorporated in current version of the standard, very realistic conditions can be developed which do not, in fact, overlap. Shown below are two envelopes, one for an active individual wearing 1 Clo (on the left) and another for a very sedentary occupant wearing 0.5 Clo. (on the right).

It can be seen that a single setpoint, such as 75°F 50% RH, will satisfy neither individual above. Another problem results from occupant’s misdiagnosis of what is troubling them. The individual on the left, (1.1 Met, 1.0 Clo), at 75°F, will probably not complain of being too warm, as indicated, but will more likely complain of being Stuffy'. Building operators may be inclined to ignore these complaints, especially when the building is in economizer mode, as they know that 100% outside air is being supplied. A slight drop in temperature, however, will result in comments of how much ‘fresher’ the air seems now.

The individual on the right (0.9 Met, 0.5 Clo), at 75°F, will probably complain of drafts, not of being too cold. The women in the office will be the most sensitive to this phenomenon due to the fact that they are less likely than men to wear socks, and it is coldest at the floor. Cures often involve cardboard and/or tape on the diffusers, interfering with building air balance. The solution, of course, is to modify either the temperature or the occupant’s clothing.

Even though occupant productivity is a difficult thing to measure, the economics of thermal comfort are easily calculated. Several factors illustrate why it is important to maintain occupant comfort.
• Occupants who occupy 150 sq.ft. and are paid $30K / year, cost $200/Sq.Ft., annual salary.
• Buildings seldom cost more than $2.00/Sq.Ft.-year to heat and cool.
• Adjusting thermostats to save energy is unlikely to save more than 5% (interior and perimeter zone) HVAC energy use, or 1/2000 of the salary cost.
• We seldom spend more than $20/Sq.Ft. on HVAC, First Cost, on a building. (In Europe, they spend as much as $70 / sq.ft.)
• Any heat produced in a commercial building will be paid for twice (once to make the heat, once to pass it through the cooling coils)
• Occupants will do whatever they can to maintain their own comfort levels.

Obviously, we cannot afford to have people uncomfortable in buildings.

EMERGENCY BUILDING TEMPERATURE REGULATIONS
Imposed by President Carter in the late 70’s, the EBTR established 68oF heating and 78oF cooling set point in federal buildings, in response to the Arab oil embargo. These regulations found their way, in various forms, into other state, local, and corporate codes, regulations and guidelines.

Several studies and many observations have all confirmed that in fact, energy consumption often increases when these arbitrary set points are enforced, and while the negative effect on productivity cannot be measured, it is obvious. It is rumored that the GSA actually had a study confirming this increase in energy use (one of the authors saw a draft of the study), but it was never made public. Nonetheless, in response to the recent energy crisis in California, the EBTR was again imposed on federal buildings there.

Calculations show that with a few climatic exceptions, the maximum savings is on the order of 1% / degree set point modification for the HVAC system. The discomfort created by this causes occupants to add their own measures, such as fans or heaters, and when system conflicts result, the actual effect is to actually increase the energy consumption of the building. One should remember that a cooling fan is in fact a 100% energy to heat converter, which adds to the interior load to be sent to the cooling system. In one building investigated in the early 80’s, the occupants had installed 1.5 w/SqFt. of fans to offset the 80F-space temperature that resulted from the 78F set point. Buildings with constant volume reheat systems such as the Library at the University of Richmond used more gas for heating in July than in January. Humidity levels in schools can be significantly increased resulting in better breeding grounds for mold and mildew.

ACOUSTICS: ACCURATELY PREDICTING END USE
All manufacturers provide two sets of acoustical data: performance and application. Performance data are intended to be determined in accordance with a test code. Application data typically include assumptions about end reflection loss, sound power division through multiple outlets, lined discharge duct, ceiling transmission loss, etc. It is assumed that application data is based on the rated Sound Power submitted to ARI. There may be a significant difference, however, between ARI rating sound power and calculated application data, even given the same application assumptions.

The obsolete ADC Test Code permitted the application of a 10-dB reduction in sound power levels when calculating performance NC values for VAV boxes. Ceiling transmission loss, however, has been a matter of some dispute. The combination of ceiling material and the plenum in which the unit is located is difficult to quantify in a traditional laboratory. A number of tests, however, with full-scale mock-ups at several manufacturers have resulted in a consensus "ceiling/plenum" effect, included in the ARI 885-90 Standard.
This table was again revised in the 1998 version of the ARI standard, reflecting data from an ASHRAE research project. At present, room and ceiling plenum effects have been combined, in the 1998 version of ARI 885.

**Unit Selection**

Proper selection of a unit on the basis of acoustics requires an understanding of all the above issues by both the specifying engineer and the provider of the product. In general, the specification provided by the engineer is typically vague. Almost always, an NC is required (typically an NC 35), without any supporting documentation on the assumptions required to achieve that space sound level. In addition, in order to accurately predict sound power levels, the unit inlet static must be. If both are given, the selection is straight forward, and a selection program can easily perform the analysis and generate a submittal.

Lacking that, however, the supplier has to make some assumptions. ARI 885-98 provides a list of typical assumptions, and these are a good starting place.

**Duct Lining Issues**

Parallel fan boxes and single duct boxes are not nearly as sound critical, when lined duct and flexible duct are involved in the design. If duct lining is not allowed, add several NC to the predicted space sound level. Some Single duct units with Foil lining, even if no lining is provided in the discharge ductwork, will still probably result in an NC<35 at all rated flows. With others, it may be significant. The following are the available linings for many VAV boxes (not all linings available with all units – check the price pages and catalogs). Some selection software accounts for lining options in preparing sound performance data, others do not.

- **1/2" 1.5lb Density (Std):** Dual density fiberglass insulation with a tough outer layer.
- **1" 3lb Density:** A thicker version of the above.
- **Duct Board (Foil inside) w/Steel flanges (adds 7-10 NC to the 45K):** High density duct board with a heavy foil facing on the exposed surface. Steel strips seal all edges.
- **Double Wall, solid (adds 12 NC) and perforated (adds 8 NC to the 45K), 5 insulation options.** The perforated is a 23% free area perforated sheet.
- **Foil Encapsulated Glass - becoming obsolete in the industry, and no longer available on the 35E (0.5 and 1") (Adds 7-10 NC to the 45K):** This is a ‘pillow’ of light density fiberglass with a foil/scrim/kraft facing (duct liner) installed with the

---

**TABopts covers all aspects of your TAB business...**
- ✔ Estimating
- ✔ Quoting
- ✔ Project Management
- ✔ TAB Reporting
- ✔ Accounting

**Customized Test & Balance Software**
- ✔ Automate your TAB business with Software you already own. We have software that was specifically designed for your business that uses the software you already have and are used to using.
- ✔ No monthly fees/charges.
- ✔ Call or email for more Information.

**A division of Ameritech Data Solutions**
Where Data and Ideas Come Together

**828.394.0050 sales@TABopts.com**
**www.TABopts.com**
foil on the side exposed to the air stream. Edges are taped with foil tape and tucked under.

- **Cellular (Adds 3-5 NC to the 45K):** A closed cell plastic-type foam, meeting NFPA-90a and UL-181 characteristics. Note; this is not an ‘armaflex’ insulation.

- **No liner (Adds 12 NC to the 45K):** Unit must be externally wrapped to avoid condensation.

The effect of linings is different in each octave band, and must be carefully applied, by band, to a units reported sound power / pressure. The effect in the resultant NC is shown above for a quiet series flow fan terminal. The effect is quite different with a lower cost series flow fan terminal, due to differing base sound level spectra.

Because of the combined effects of diffuser, terminal, and ductwork noise generation, it may be difficult to pinpoint the source of noise in a space. The two sources of box noise (fan and VAV) are also different. The catalog data for airborne sound performance assumes the sound is transmitted to a diffuser outlet. This sound is reduced for "room effect", to calculate airborne NC.

Catalog radiated performance data is a measurement of the radiated energy of the box. Application NC values for both airborne and radiated sound includes further reduction factors. Not included in the assumptions are sound radiated by flexible and rigid duct sections. These radiated sounds are, however, included in the measured values when verifying sound levels in an installed installation. When comparing measured and predicted sound levels, these duct radiated sound levels seldom add significantly to the critical 125 Hz and 250 Hz octave bands measured underneath the terminal unit. The effect of varying the ceiling components has also been seen to be minimal.

**FIBERGLASS DUCT LINING**

Many building owners are eliminating all exposed Fiberglass insulation in their buildings. While this will reduce the potential for moisture to become trapped, and will make systems easier to clean, fiberglass, or other similar materials, is the only thing we have to provide fire-safe sound attenuation of airborne HVAC noises. We know of several cases where excessive noise has resulted in a space from this practice.

Vinyl core, lined Flexible duct (used with discretion) can have a significant attenuation in a building. Installing this when the building is under construction is easy, but is complicated and expensive to add after complaints come in. An acoustician should be utilized in evaluating any design before eliminating duct linings.

Contrary to a commonly understood ‘fact’, there is no evidence that the Fiberglass insulation used in today’s buildings offers any long-term health hazard. It is not going to be, as we have heard often, ‘the next Asbestos’ threat. In fact, it was recently removed from the ISO list of “Potential Cancer Causing” substances. What is important, however, is to keep duct linings a clean as possible (change filters regularly) and above all, keep them dry. ASHRAE Standard 62.1 2004 prohibits exposed lining for a short distance downstream of any cooling coil. It will not prohibit exposed linings. There are millions of square feet of buildings operating just fine with fiber-lined ducts, and with no complaints.

Another problem coming to the surface is low frequency noise. This often results from poor duct configurations immediately downstream from an air handler. These low frequency noises can result in subtle stress on building occupants. Low frequency noises are suspected of causing a number of poorly understood complaints, and can result in an overall feeling of ‘oppression’, and is often overlooked is solving occupant complaints.
ACOUSTICAL SPECIFICATIONS

The specification of acoustical parameters is an important issue in the selection of VAV terminals. Certified octave band sound power data has been available since the 1980’s through ARI Standard 880, originally released in 1981 (Updated in 1991, 1994 and 1998). Following ARI 880, an application standard, ARI 885, was developed, and released in 1990 (updated in 1998). This standard provides accepted methods of determining the path attenuation factors for estimating and specifying sound levels, both in the room (typically as NC), and at the source (as octave band sound power).

In the consulting engineer poll mentioned above, the engineers were questioned regarding awareness of the ARI 885 standard. Of those polled, only 5 actually had copies of the standard, which is available at no cost from the ARI website (www.ARI.org). Even today, specifications are frequently received requiring tests to the ADC test code (obsoleted in 1984 in favor of the ARI standard) or worse, per ASHRAE 36B, which was obsoleted in 1972. Many times, these specifications require a set room NC level based on one of the above obsolete test codes with no guidance on the acoustical assumptions to be employed in the analysis. These specifications often omit significant variables such as design inlet static pressure, which is critical to any analysis. Other specifications simply contain a favored manufacturer’s published sound power, or worse, published estimated NC levels, which may be based on nothing that is specific to the design.

When no guidance is given, the supplier has the option of selecting whatever application factors favor his selection. As the engineer has probably been burned in the past with this approach, products are often specified at much lower sound levels than necessary. This results in oversizing of units and/or the addition of unnecessary silencers, which in turn results in poor operation, poor ventilation, excessive energy use and shortened motor life. Sound power should be used to compare products, and each octave band should be reviewed within the design parameters to insure the desired outcome.

SUMMARY

In summary, a number of issues need to be understood in providing an acceptable indoor environment. These include a number of non-IAQ items that have a strong influence on perceived air quality. Issues include a need for occupant education and awareness of their own response to slight hot and cool environments (‘Stuffy’ & ‘Drafty’ are key terms). Don’t fix the wrong thing. Occupant control of their environment is a major step forward. Don’t worry about the energy spent in providing comfort; it is insignificant compared to salary costs (or the costs of what occupants will do to maintain comfort).

Codes need to be written and understood in a way that doesn’t cause moisture and IAQ problems in buildings. Owners who eliminate insulation from ducts often get very noisy buildings. Fiberglass is seldom the problem; dirt and moisture often are. Moisture is the real enemy. Keep it dry!

Overall, we need to understand how our buildings operate. We need to train operators on what is happening, how occupants respond, and we need to design systems that can be understood. We are finding that cutting costs and saving energy can be very expensive.

As an industry, we have conducted significant research into the proper way to apply systems to buildings to maintain energy efficiency, first costs, comfort and productivity. These lessons have apparently been lost on many in the design community, as well as the agencies and politicians affecting the operation of buildings. The information is available, often in the ASHRAE Handbooks, and certainly in the body of ASHRAE sponsored research.

Manufacturers are being asked to provide products that we know will not perform when installed. Due to competitive pressures, we often have no choice but to meet the flawed specifications with products that
will cause discomfort when applied as specified.

The mandatory setting of uncomfortable temperatures has repeatedly been shown to create reduced productivity, and to often actually increase energy consumption as occupants do what they can to maintain their comfort levels, thereby causing the systems to be operated in ways contrary to both their design and good sense.

How the situation looks, however, depends on the observer. Architects and Engineers have their own concerns on the design, many times not to the benefit of occupants. Rules of thumb are used to avoid costly analysis. Developers and contractors are concerned with first costs, and getting on to the next project. Occupants and owners, however, want safe comfortable spaces. And when there are problems, ‘call in the lawyers’.

NORTHERN CALIFORNIA/HAWAII NEBB CHAPTER’S ANNUAL RECERTIFICATION MEETING

Join us on Friday, September 21, 2018

In Monterey, California at the

Monterey Plaza Hotel & Spa

Plans are shaping up with great speakers, familiar and new Vendors. Be sure to mark your calendars and stay tuned for more information!

This Year’s Vendors
ACCURATE. DEPENDABLE. VERSATILE.

TSI provides the most accurate, dependable and versatile ventilation and indoor air quality measurement instruments on the market today.

TSI offers a full line of:
+ Hydronic Manometers
+ Capture Hoods
+ Thermal Anemometers
+ Indoor Air Quality Monitors
+ Micromanometers

To learn more, visit www.tsi.com/comfort
Featured Member

Carter Air Balance

Carter Air Balance was started in 1985 by Glenn Carter and in 2001, under the ownership of Vic Congi, Carter Air Balance became NEBB certified. In 2015 the day-to-day operation of Carter Air Balance was handed over to Vic’s son, David Galli. David has worked at Carter Air Balance for 17 years starting out as an estimator, apprentice TAB technician, and obtaining his NEBB CT certificate in 2008. David became a NEBB Certified Professional in 2016 as the Vice President and Co-owner of Carter Air Balance. David handles all day-to-day operational aspects of the company including, project management, estimating, project quality control as well as all aspects of the firm’s certification requirements. He is currently on the Northern California/Hawaii NEBB Chapter’s Board of Directors as the NEBB Marketing Chair and is also involved as the YPN (Young Professionals Network) Chapter Liaison to NEBB.

The firm has 1 full time Journeymen (David), 1 apprentice (David’s brother, Nicholas) working in the field and 2 full-time office staff. Amanda Edwards (David’s sister-in-law) has been with the firm for 4 years and is their administration assistant who handles scheduling coordination, report processing, bid processing, and assisting with project management as well as answering the phone. Laurie Congi (David’s mother), is also a co-owner, the company’s president, the office manager and is the company bookkeeper.

Although located in Napa, California, Carter Air Balance serves clients throughout Northern California, Northern Nevada and Hawaii (when the opportunity presents itself!). They perform TAB services over a broad spectrum of industries that includes healthcare facilities, telecommunication facilities, laboratory facilities, federal, state and local government facilities, universities, schools & libraries, retail and commercial tenant improvement projects and local commercial kitchens. Carter Air Balance’s goal is to provide total system balance for their clients, implementing NEBB’s Standards and working in cooperation with their respective contractors, owners & engineers.

What benefits do your NEBB certification bring to your business?

Our NEBB certification ensures clients that we’ve performed our services utilizing rigid national standards. It is more than “you know what you’re doing, the paper says so”, it’s a guarantee that we have balanced their system(s) using nationally standardized methodology with calibrated instrumentation and that all data recorded is accurate and unbiased. This has allowed our company to build wonderful business relationships with clients that endure today and our goal is to build on that into the future.

Do your customers understand the importance and value of your NEBB certification?

Our clients know that when they hire Carter Air Balance they are getting tremendous value added to their project. We provide total system balance, great client support services, and we work hard to ensure there are no call-backs. Our NEBB certification is the “icing on the cake” for our clients, they understand that our performance is highlighted by the NEBB procedural standards from start to finish on every project.
David Galli, Carter Air Balance, is not only our Northern California/Hawaii NEBB Chapter Marketing Director, but he is also our NEBB YPN Liaison.

What is YPN? YPN is the Young Professionals Network for NEBB. If you are a NEBB Certified Professional, Certified Technician or an Approved Candidate for certification between the ages of 20 and 39, then this is for you! If you are a young professional who wants to learn, share and expand your knowledge and make a difference, with the long-term goal of participating in NEBB and continuing the rich legacy of those who went before you in this industry, then YPN is for you!

If you want more information on YPN or feel you can contribute, WE WANT TO HEAR FROM YOU! You can contact the Chapter at akearns@nocalhawaiinebb.org or contact Dave Galli at dave@carterairbalance.com.

We are looking for Northern California/Hawaii Chapter Professionals to help us get YPN off to a productive start here on the local level and are forming a committee of interested individuals. This is your chance to voice your opinion and start at the ground level. We are planning on kicking off our committee and ideas at our Chapter Annual Meeting in September in Monterey. We want to hear from you to help us plan this event.

YPN Mission Statement

“Serving as a resource for young professionals to cultivate the growth of NEBB for generations to come.”
Upcoming Events

**FUME HOOD PERFORMANCE TESTING SEMINAR**

June 4-5, 2018  
All Day Event  
Labconco, Kansas City, MO  

Contact the NEBB Office to sign up or to receive more information at www.nebb.org

**TESTING, ADJUSTING AND BALANCING CP SEMINAR**

June 11-13, 2018  
All Day Event  
NEBB TEC  
Gaithersburg, MD  

Contact the NEBB Office to sign up or to receive more information at www.nebb.org

**SPECIALTY CERTIFICATE COURSE FOR BUILDING SYSTEMS COMMISSIONING**

July 9-13, 2018  
All Day Event  
NEBB TEC  
Gaithersburg, MD  

Contact the NEBB Office to sign up or to receive more information at www.nebb.org

**NEBB WEBINARS AND EDUCATIONAL SEMINARS**

For more Training and Educational seminars and Information,

---

Follow us on Facebook at  
Northern California/Hawaii NEBB

---

Northern California/Hawaii NEBB  
7100 Stevenson Blvd.  
Fremont, CA 94538  
Phone: 510-386-1270  
E-mail: akearns@nocalhawaiinebb.org  
www.nocalhawaiinebb.org