

The NEBB Professional

2016 – Quarter 3

COVER STORY: The Women of NEBB

- **Announcing Certelligence:**
NEBB's New Certification Database Management System
- **Building Enclosure Testing:**
An Essential Aid in Sustainable Building
- **Certification Board's SME Program**
Continues to Expand
- **Getting NEBB-Certified: A Stepped**
Approach
- **Business Succession Planning:**
Five Critical Questions to Consider
- **Documentation: Get the Reports Right!**
- **VAV Box Calibration Methods Reviewed**
- **NEBB's Young Professional Network:**
New Horizons Unfolding

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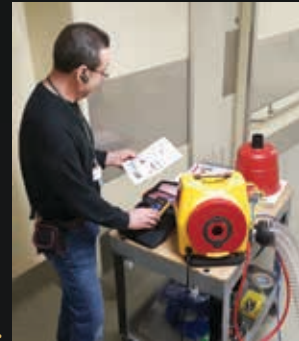
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Lihue Base, Yard Improvements

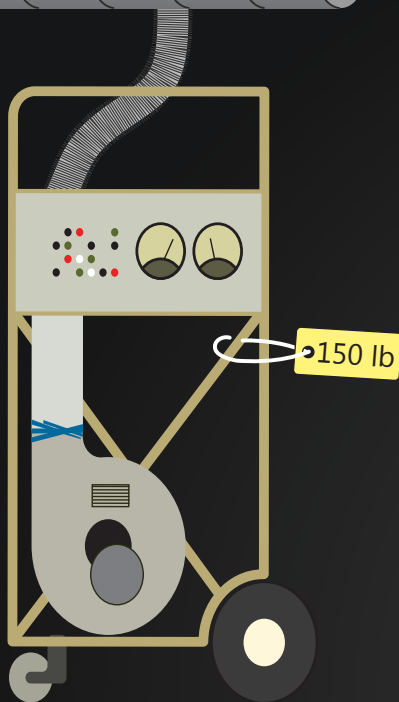
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The views, opinions and conclusions expressed in this publication are those of the authors and do not necessarily reflect the official policy or position of NEBB.

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President's Message: Summertime is Always the Best of What Might Be

By: Jean-Paul Leblanc

Summer is upon us and everyone is looking forward to vacations, spending time with family and friends and relaxing. This is when time slows down and life seems to move at a slower pace.

But not in the NEBB office!

Our staff continues their dedicated work and support of NEBB programs, volunteers, and committees, as well as helping volunteers maintain a leadership role in our business community. All this taking place while we are preparing for the NEBB summer Board meeting in Vancouver B.C. Canada.

Here's a brief list of activities taking place behind the scenes that affect you, our Constituency:

The Certelligence database transition program is nearly complete; the team is prepping to go "live" this August with a test run so you can get acquainted with the features of the database. Most of the programming is completed, but there will be that stage of fixing any bugs and fine tuning. Chapter coordinators and chapter technical coordinators were sent invitations to schedule their specific training times. The software program will be a major change in the way NEBB's certification and recertification activities and processes are handled, allowing you access to your records in real time. Read about Certelligence in this issue.

The ANSI CxPP certification is on target to be accredited towards year end. Beta testing was completed and the various review requirements are completed. Our Certification Board, psychometrician, Subject Matter Experts, and the Exam Writing Committee (all volunteers) worked diligently on the exam review to make sure all aspects of this program are properly completed. Candidates who took the Beta test exam will have received their pass or fail score by the time they read this message.

NEBB is proud to announce that its first ANSI accredited Standard (RCX) was released for public comment in July. It was a labor of love for the volunteers and staff who worked countless hours to get the Standard out for public review (after being voted and approved by the NEBB Board of Directors). (Many aspects of standard writing is tedious, following specific rules established by ANSI.) Public comments will be received by the appointed deadline, at which time the Standards Committee will review and address each comment, point-by-point.

Discipline committees are working diligently, pursuing activities to fulfill requirements for education, training and certification. Many Committees, working collaboratively with the Certification Board's Exam Development Committee, are in various stages of creating their discipline's Body of Knowledge (BoK). Every discipline must have a BoK in order to create better curriculum and build better exams, with one document being the guiding light. These BoKs are necessary in order to deliver the best training, education and exam NEBB has to offer.

NEBB's newest program, Title 24, is still unfolding with the threshold target at 300 Certified Technicians expected by the California Energy Commission (CEC). Once that threshold is met, this program becomes mandatory in the State of California. Many phases must take place to achieve the goals as established by the CEC. Training forms, as well as a Registry, need to be set up in the near future for NEBB get this program underway. Title 24 is very demanding and represents much preparation, nearly all by volunteers.

NEBB's volunteer Committee members, as well as our dedicated staff, work countless hours every day to make your organization better. They deserve a lot of respect and appreciation for their hard work and commitment.

Remember our ongoing invitation for new Corresponding and Voting committee members. Committee work is highly rewarding, providing great opportunities to make new friends who share the same concerns. It's a great forum to exchange ideas and comments and the best way to really discover our unique organization. Read about our new venture, the Young Professionals in this issue.

All NEBB seminars are set for 2016, and we've already started on 2017. By the time you read this issue, brochures will have been released online, so please register! Visit our web site for complete details. Releasing dates in advance helps everyone plan around their budget and it just makes good business sense. Moving forward, NEBB seminars will be held in technical training centers rather than hotel facilities, and in various areas of the country. This approach is more in line with the Board of Director's fiduciary objectives.

This 3rd Quarter *NEBB Professional* is full of interesting articles. Share this publication with your relatives, business partners and clients. It is the best vehicle to discover NEBB, our organization, programs and what we're all about.

President-Elect Message: Training and Education



By: Jim Kelleher

The message I want to bring this quarter is regarding the training and education opportunities NEBB has available to you and your firm. It is important that our stakeholders, as well as those outside of the NEBB community, know the benefits of these opportunities. The hard working volunteers on NEBB's technical committees develop our education materials and the informative publications available on the website. Technical seminars are presented around the country, delivered in a classroom environment, and taught by those on the technical committees with vast amounts of experience in the very aspects covered by the seminars. In the "by performers to performers" interactive format, we create an excellent learning atmosphere for all attendees.

NEBB's numerous certification programs allow individuals to apply their knowledge and experience to the certification application process and then successfully crown the achievement by obtaining the status of NEBB Certified Professional or Certified Technician. Recognizing a need to focus on developing and maintaining these certifications, NEBB created the Certification Board. The Certification Board, including all staff and volunteers who support it, sends a clear message to the industry about the significance of our certification programs.

Great strides have been made in the last two years restructuring NEBB to meet an industry recognized best-practices by separating certification from our training programs. This has led to improvements in the quality of our entire certification process, whether it is initial certification or follow on recertification activities. The Certification Board also develops new certifications as necessary and useful by the industry; most recently developing the Cx CT and CxPP certification programs. We are happy to see how well these new certifications are doing and how beneficial they will be for individuals and firms engaged in the building commissioning processes.

Applying for NEBB certification is a pivotal point in a professional's career. There is no such thing as being over-prepared for an examination; unfortunately not being fully prepared leaves an otherwise motivated individual frustrated with themselves or the process.

Besides extensive occupational experience, individuals have found our home study courses, educational seminars, and attendance at NEBB's annual conferences are tried-and-true methods for preparing for the certification and examination process. NEBB's best practices model ensures the education and certification aspects of a discipline remains separate, but both begin with a singular body of knowledge properly prepared by experts across the industry. We en-

sure that the instructors developing the curriculums and the Subject Matter Experts (SMEs) developing the certification exams are able to tie their efforts back to the points deemed relevant to the discipline.

The independence of this process from two differently managed sides of our organization ensures the certification candidate and the attendees at training and education events will appreciate a more satisfying experience.

NEBB's training and education programs also provide opportunities for individuals to better themselves in the performance aspects associated with a discipline, thus improving the services provided by a firm to their customers. Individuals attending an education seminar or annual conference achieve much more than just a step in obtaining initial certification, or receiving continuing education credits for recertification. A firm benefits from properly trained individuals and invests in itself by sending valued employees to NEBB events. Your employees will appreciate the opportunity to better themselves, and your customers will benefit from better educated individuals working on their systems. Our technical committees realize this and ensure the focus of the education presentations is on building the knowledge base, understand the means and methods of conducting the activities, understanding system interrelations, and recognizing what constitutes underperforming systems and components and how to improve those conditions.

We are working to provide more beneficial annual conference sessions and will continue to offer the three track format so widely appreciated by our attendees. The only down side I ever hear from conference goers is their wish to be in more than one session at the same time. Don't have your attendees coming back after the conference saying, "I couldn't be everywhere I wanted to be." Plan ahead for the 2017 conference: plan on sending multiple people, and don't forget your office managers who will benefit from the excellent business track being developed. Keep an eye open for full session descriptions due out later in the fall—they are sure to please.

I hope you will take a few minutes to visit our web site at nebb.org to review our calendar of fall technical seminars, and I look forward to seeing many of you at our March 2017 annual conference at Disney Springs Orlando.

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The Women of NEBB

Bert Henderson | AZS Consulting



The NEBB certification path is not one well-traveled by many women in the construction industry. In 2014, more than 9.8 million people worked in the construction industry. Of that total over 800,000 or 8.9 percent, were women. (www.bls.gov/cps/cpsaat14.pdf and <http://www.bls.gov/cps/cpsaat18.pdf>). In the current workforce, women in the U.S. earn on average 82.1 percent of what men make. The gender pay gap is much narrower in the construction industry. In construction, women earn on average 93.4 percent of what men make. (www.bls.gov/opub/reports/cps/women-in-the-labor-force-a-databook-2014.pdf & National Association of Women in Construction.) In NEBB, women number about .008% of the total NEBB associates including: Elizabeth Blankenship, Amber Ryman, Tiffany Ryman, Tonia Kinish, and Alice Wan San Yong.

“Test and balance (TAB), for a female, is not for the faint of heart,” explains Elizabeth Blankenship, P.E., BPI Testing of Bloomington IL. Her experience on the job site has shown her she needs to continually prove herself in a male dominated industry.



Elizabeth Blankenship

Blankenship started her career at Caterpillar after attending the University of Tulsa in Tulsa, Oklahoma, where she graduated with a Bachelor of Science (B.S.) degree in mechanical engineering. During her five and a half years at Caterpillar, she worked in engineering and then moved to quality control. That move sparked her interest in TAB work because TAB is quality control and directs the focus to correctly completing a construction project.

In 2008 she left the corporate world and worked for her grandfather, John Brue. Blankenship worked for him for about two years before starting BPI Testing, a successor business in 2010. John consulted with her until this year.

The reason Elizabeth acquired her NEBB certification was because of her grandfather who was certified. Blankenship attended NEBB national conferences with her grandfather and was able to pick up a lot of great information. While there,

she developed her network when she met many people in the TAB industry. Already TAB certified, Blankenship recently acquired her sound and vibration certification.

There are local and regional certifications in Blankenship's area, but “The gold standard is NEBB,” she said. She found that her certification was valuable in marketing her firm. Most of the job specifications BPI Testing has bid on require either NEBB, Association Air Balance Council (AABC), or Testing Adjusting and Balancing Bureau (TABB).

Her company has one estimator and five staff technicians. Blankenship wants her technicians to learn the NEBB materials so when they get enough experience they can pursue NEBB's technician certification. “Having the procedural manuals from NEBB instructs my technicians what to do in a step-by-step process,” Blankenship said. “That is one of the advantages I see in NEBB that helps me with my daily TAB tasks. You don't have to reinvent the wheel.”

When conversation turns to equipment, “Buying and using superior equipment to meet the NEBB standards is better than the equipment my competitors are buying,” Blankenship states. “My equipment is calibrated to meet the NEBB standards and is maintained with accuracies that my competitors don't have. I also tell my clients that NEBB has a quality assurance program (QAP) that other organizations don't have.”

“People are very helpful at NEBB, providing quick answers to technical questions or procedures,” says Blankenship. “I had a technical question about boxes and had an answer back within 24 hours from Leonard Maiani at NEBB. I was very pleased with the support I received.”

To give back to the organization, she joined the NEBB Marketing Committee. “Seeing some of the marketing materials prior to their production and providing feedback is very interesting,” Blankenship said.

NEBB associate Amber Ryman, Certified Professional (CP), entered the TAB industry through the United Association of Pipe Fitters program for HVAC service work about 18 years ago. She now oversees the TAB group for a very large mechanical firm, ACCO, in California.



Amber Ryman

Ryman obtained her apprentice ranking in 2003 and began her career with ACCO in the System Operations Group that does the warranty work for her company. After she passed the NEBB certification exam, she was asked to come into the office and manage the TAB group at ACCO. There are 12 technicians who work

for her. Her territory covers the greater Bay area, Northern California, and into Nevada.

"I spend much of my time explaining to the project managers why they should be using the NEBB materials," Ryman says. "That allows me to communicate to my guys to do better. The NEBB structure that is in place, is very beneficial."

In 2003, Ryman attained her journey-person classification. In the next few years she slowly began to prepare for the NEBB TAB Certified Professional (CP) program. She worked with a study partner while readying herself for the TAB CP exam. "I was running my own projects and getting a feel for managing a project," Ryman says. "But when my direction focused on my journey through the NEBB certification process, I didn't realize what was involved and how much I needed to learn; the process really opened my eyes."

"My exam partner had the same attitude I did of wanting to be better than the next person for multiple reasons," Ryman said. "First, we were women working in the construction industry. We had to have that attitude to be better than any of the guys we worked with because secondly, we had to constantly prove ourselves. That is unfortunate, but as a woman in the construction industry you have to continually prove yourself to your male peers and that makes you better at what you do. I passed the NEBB test in 2010. That was definitely a grueling process."

Ryman has enjoyed where she's gone with NEBB. When someone becomes NEBB certified, volunteering in the organization is expected and in addition, benefits their career. She started to help out proctoring the hands-on exams, then moved to a committee, and then onto the Board of Directors. "I was proud that I was asked to take on different roles," said Ryman. "NEBB does a great job making you feel valued as a volunteer."

Anytime you can state that you belong to an organization with such high standards the certification means something. "My certification is not a piece of paper that I put on the wall," Ryman said. "All the hard work you put into getting that piece of paper goes on display too. The opportunities that you get when you belong to an organization like NEBB are incalculable. You can use that to your personal and professional benefit in so many ways."

Everyone she's encountered in NEBB has been extremely helpful. "There are people who are afraid to ask technical questions because they don't want to be accused of asking a dumb question," Ryman states. "Anytime I've had to go to my local group and ask a technical question I've never gotten any negative feedback. I can't think of anyone who has not been helpful."

Ryman constantly tries to mentor the people around her by selling her boss on getting all of her staff NEBB certified. That is very important in setting the standard of using quality people who really know what they are doing. There are now eight people certified in her group as NEBB certified technicians and that number continues to grow. "I make time for group study sessions in the morning before work to accelerate their success," Ryman says. "I really do try and counsel the people around me."



Tiffany Russell

Now a Partner and Chief Operating Officer for IND in Vancouver, Washington, Tiffany Russell, CPT CP, started her employment 16 years ago in a clean room testing firm, has always worked for a NEBB certified firm. She was fortunate to have a NEBB CP as her mentor during her early career.

Russell passed her NEBB technician certification in 2013. "Being NEBB certified carries a lot of weight in our industry," Russell said. "Going through the certification process is a true test of your knowledge. My certification is the third party validation I use to support my work."

"I believe the networking and the ability to contact other professionals when you encounter something you've never seen before, gives you the opportunity to get assistance from fellow professionals," said Russell. "Asking questions and getting clear concise answers is one of the biggest benefits of belonging to NEBB." She says, "In addition, there is the network and social community aspect of belonging to an industry respected organization."

"Daniel Milholland took me under his wing early in my career and taught me everything I know," Russell said. "He demonstrated that there are no stupid questions and led by example. Pat Law told me the same thing - that all I have to do is ask. I can call Emile Bordelon anytime for assistance with explanations for my customers. That is the sense of community I was referring to early. Knowing that I can call on these guys, who are competent and have years of experience, is what I think NEBB does very well."

Recently appointed as a Subject Matter Expert (SME) to participate in the writing of exam questions for NEBB, she's started the training with the second group of SME's. Each individual who is interested in becoming an SME goes through

an application and approval process. NEW SMEs go through a three week training on all aspects of exam writing. With a special appointment from the NEBB Certification Board and specialized training, you are recognized as an SME.



Tonia Kinish

Building Systems Commissioning (BSC) Certified Professional (CP), Tonia Kinish, P.E. QCxP, CEM, CBCP, GGA, BSC, began her journey into commissioning (Cx) with a Bachelor's and Master's degrees in architectural engineering (that includes mechanical, structural, and electrical engineering for buildings) from the University of Nebraska in Omaha. At the Master's degree level she majored in mechanical engineering studying indoor air quality and acoustics.

After graduation, Kinish worked for a mechanical, electrical, plumbing (MEP) consulting firm in New Jersey for four years, earning her professional engineer's (P.E.) license. After her time on the East coast, she moved back to Omaha, Nebraska, and worked for a year and a half for an engineering consulting firm doing mechanical and electrical design.

Kinish now works in Omaha, Nebraska, for Kiewit Building Group, a global company, where she wears a multitude of hats. She came to Kiewit to do Cx where she tests and verifies that other peoples' designs are implemented correctly in the field and the building functions properly. She has also performed Cx on a couple of Kiewit Underground's construction projects. "I enjoy working in the field in a more hands-on role than sitting behind a desk designing," Kinish said. "I felt like I had more things in common with the guys in the field." She enjoyed her time on Underground projects in places like British Columbia, Canada. She is now an MEP manager for Kiewit on one of the companies large construction projects in Omaha—the Madonna Rehabilitation Hospital.

"I attended the NEBB week long training course in Atlanta, GA," Kinish says. "I then took all the exams, passed and received my certification for me. I wanted to be qualified to perform and bid BSC work for Kiewit's government projects and to provide the ability for Kiewit to keep all the projects—construction and BSC—in-house. Our group was then separated out as a Cx business entity from our building group so we could do more Cx as an independent third party—that avoided the fox-in-the-hen-house issue."

"Customers do notice my certifications," Tonia said. "I was on a NEBB Cx government job at Ft. Bragg and was there because of my certifications. I know the initials after your name are very important when you're working with government personnel. I did not have a business card with me when I was in the first meeting with the Colonel overseeing the project. The Colonel was frustrated because I didn't have my busi-

ness cards. That night I sent him an email with my signature including all of the abbreviations after my name. The next day he treated me very differently."

"The NEBB course and exam on Cx is very difficult and the pass rate is not very high. So when you do pass the exam you are in an exclusive group making you more valuable," Kinish explained. "I'm the only one at Kiewit who has passed the exam. Passing the exam is kind of a pride thing for me. The exam is hard, but having the NEBB certification raises my marketability."

"In my organization, the people who I work with take time training each other in their areas of expertise," she says. "I try to mentor not only some of the people I work with, but also high school and college students in my area of expertise. I do the 'pink hard hat' day—a summer camp for girls to learn about construction and engineering. If someone reaches out to me, I try and help."



Alice Yong

Alice Wan San Yong, NEBB CPT, TecnicAire Services Sdn Bhd, Kuala Lumpur, Malaysia, is the owner and manager of her privately held company. With a Master's degree in administration management, she is responsible for the day-to-day operations of her firm. She started as a secretary for 10 years then moved

ahead as a branch manager in an engineering firm for many years. In 2005 she joined a NEBB Cleanroom Performance Testing (CPT) Certified Firm to gain her CPT knowledge and experience until 2013 when she set up TecnicAire Services Sdn Bhd.

Yong passed her NEBB CPT in 2014. "Being NEBB certified is certainly very important in our business," she said. "Going through the certification process is a validation of my knowledge and is a way for me to provide to my customers the confidence that the services they get from me are the very best."

Yong became a NEBB Certified Professional to use the NEBB network, guidelines, and procedures in the performance of her métier. The standards and operations for cleanrooms are very important to her. "To have the cleanrooms up to NEBB standards for my customers is very significant," says Yong. "Most of my work is in the construction of hospitals here in Malaysia."

The majority of her skills come from hands on operations. "I've found great help and assistance from Daniel Milholland and Pat Law who are two of the professionals at NEBB," says Yong. "They are very helpful and have a tremendous amount of knowledge, coupled with years of experience and expertise that I can depend on. There is a NEBB CPT professional,



This series of pictures were taken while Yong was doing Cleanroom Performance Testing at a leading pharmaceutical factory. The main production area is under Grade D classification. Occupancy Mode is under at rest condition. From left to right, Picture 1: Yong checking airflow volume from the diffuser by using TSI Alnor Flowhood. Picture 2: Yong on a completed job that required taking the room pressure using TSI Balometer. Picture 3: Yong conducting an airborne particle count test using Lighthouse Solair counter.

Mr. Ganesh Rajendran, in Singapore and my present partner, Nairee Othman, who is a NEBB CPT with about 16 years of experience in CPT; they both are extremely helpful to me with procedures if I encounter any on-site technical difficulties.”

“I mentor people around me when the opportunity is presented,” Yong says. “I encourage contractors and others in the pharmaceutical industry who might be interested in becoming CPT certified, to be more aware of the CPT requirements.” Yong encourages the contractors to have the knowledge of NEBB Standards so they can build their cleanrooms and controlled environments based on those standards. She wants to be part of getting those international standards achieved all across Southeast Asia.

Yong and her partner, Nairee Othman, are doing end user seminars to raise the awareness of the NEBB CPT Standards. She also educates her clients on how to maintain and operate their clean room environments. Yong is proud to carry the NEBB banner in Southeast Asia. “My journey as a NEBB professional is incredibly meaningful and very satisfying,” says Yong.

“The most exciting thing for me is going to the NEBB meetings, either locally or internationally, and seeing and speaking to other CPT professionals and speakers,” Yong said. “We have a chance to talk, share with each other, and catch-up

on what we’ve been doing or discuss technical details of the jobs we’ve worked on or are working on.”

“NEBB has a great relationship with their women associates. We have outstanding women involved in the organization at all levels including our board of directors,” says Eric Jenison, NEBB Marketing Committee Chair. “Everyone in NEBB is encouraged to participate and give back. There is no discrimination. Everyone, no matter the gender, is strongly encouraged to have a hand in the organization.” ■

About the Author

Bert Henderson, M.Ed., APR, is a consultant with AZS Consulting in Gainesville, FL, for sustainability, renewable energies, and did cutting edge “green” building product research with AZS. He is a national speaker in sustainability and writes and delivers professional training programs in sustainability, renewable energies, and “green” construction for utilities, building contractors, HVAC contractors, renovators, building officials, architects, professional engineers, building inspectors, interior designers, and homeowners in all aspects of sustainability, energy efficient design, and building construction. Bert is also a retired Energy Extension Faculty with the Programs for Resource Efficient Communities at the University of Florida (UF) and was the lead building science faculty for the Bushnell Center for Sustainability at UF.

Southern California Chapter Mentoring Upcoming Generation of NEBB Women!



The future Women of NEBB! Pictured here are the young ladies who attended Camp, showing off the bags that NEBB donated.

During the week of June 20-24, the Orange County Chapter of the National Association of Women in Construction (NAWIC OC) held Camp NAWIC, a day camp for high school girls, exposing them to the possibility of a career in the construction industry. In its eighth year, this week-long camp is provided by the chapter, free of charge, to local high school girls.

Students are introduced to career options in construction by local contractors. This include completing small projects daily and exposing them to trades such as electrical, plumbing, concrete, and sheet metal. Projects included a concrete vessel of their own mix, a desk lamp from galvanized pipe, and a wooden tool box. This year's campers also visited a jobsite with an engineering geologist before a stop at a materials testing lab, toured a city planning and building department, with an introduction to blueprint reading and drafting and performed tasks at a welding shop. The week ended with the girls being introduced to some heavy equipment before closing festivities. These field trips show the sequence of a construction project and expose them to the management side of projects, meeting with project architects and engineers, project managers, safety managers, and superintendents.

NAWIC OC utilized affiliations with industry partners and other associations for skills training and site visits. Jim Rosier, Southern California NEBB Chapter Coordinator, participated with a presentation on air balance, touching on what it is, where it's implemented, and why it's important. ■



Jim Rosier explaining what Air Balance is to the young ladies who had no idea that this field existed.



The girls are introduced to a flow hood for some hands-on training.



Jim Rosier showed the girls how the flow hood worked and how to take a reading.

Announcing Certelligence: NEBB's New Certification Database Management System

At its core, NEBB is about protecting the public, promoting quality, and establishing trust, all of which requires consistency in certification requirements, standards, training, procedures, and processes. The way everyone manages data, combined with effective organizational communication, contributes to achieving NEBB's mission statement.

This fall, NEBB will complete a major goal of the NEBB Board of Directors' Strategic Plan with the implementation and launch of Certelligence™, a new certification database. This new and state-of-the-art system will streamline and automate every aspect of the organization, from Application for Candidacy submissions and processing, event registrations, collecting and verifying continuing education credits, to e-commerce and billing and invoice payment processing.

As a tangible investment in NEBB's future, the Board approved the implementation of the new database because it was necessary for the growth and development as a credentialing organization.

"We recognized the time and financial investment would be extraordinary, but ultimately, it benefits everyone with an extremely high return on investment. Selecting the right system was difficult decision. They are so many software programs on the market and NEBB's officers wanted to make sure this long-term capital investment would serve NEBB for many years to come," said Jean-Paul Leblanc, NEBB President. "The beauty of this new database is the fact that it was tailored according to our needs with the input of all our staff who participated in the development of this program from the early stages of the process."

Utilizing 21st century technology, NEBB's new database easily integrates with web and mobile sites to give NEBBs constituency 24/7 access to valuable online features and personalized resources in real time.

"For years, we talked about how our NEBB processes need to be enhanced and now

we have the method to modernize our operations," said President-Elect, Jim Kelleher. "The Board of Directors and staff are very excited about the prospect of automating many of our procedures so that the organization has a more streamlined process for our Certificants and Firms to interact with NEBB."

Benefits of the New Database System

1. Streamlines certification and recertification processes by automating manual and paper-based approaches, reducing staff and candidate frustration, thus saving time and money.
2. Enables multiple credentialing streams to effectively track candidates and certificants as they progress through programs.



3. Improves the online experience, providing Firms, Certificants, Candidates, and Applicants with 24/7 self-service access to applications, content, reports, and credentialing resources.
4. Simplifies logistics by automating the creation and distribution of verification letters, certificate reprints, consent forms, committee applications, badges, and more.
5. Strengthens financial performance and enables integration and reconciliation of accounting activity across all aspects of the organization.
6. Promotes timely billing and payment processing for greater accuracy and certificant satisfaction.
7. Automates Firm and Individual certification management processes.
8. Simplifies online submission of Candidate applications, eligibility requirements, and all electronic documents.

Jimmy Nguyen, Project Manager, and Tiffany Suite, Director of Operations, are overseeing the organization's move to the new technology platform. Assisted by all of the NEBB Staff,

development has been in stepped phases, beginning in late summer 2015.

"Firms and chapters will greatly benefit from this new database because there will be a component whereby Chapter Coordinators and a point person at the Firms will be able to access their profiles anytime, anywhere to do updates or make business transactions," stated Tiffany Suite, Director of Operations, NEBB. "Convenience with Certelligence was a primary goal for everyone."

Firms and individuals will be able to create and update their profiles online, make payments, upload CEC submissions, submit Applications for Candidacy, Applications for Certification, register for training seminars or the Annual Convention, make a renewal payment – all in one place, at a time convenient for the NEBB Firm, Certificant, or Candidate.

While every conceivable aspect of the transition process has been discussed, reviewed, tested, and retooled, the rollout of any new system may uncover some bugs or nuances, so be prepared to possibly encounter this during the first month or so. The official rollout is planned for the end of Q3 and NEBB Staff will be on hand to help answer any questions that arise. ■

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NEBB Begins Exam Metrication Process

October 20, 2015 began a serious recommitment towards embarking on a monumental worldwide journey – metrication of NEBB’s exams.

Initially prompted by the Australian Chapter nearly four years ago, a metricated TAB CT exam was completed at that time with some Candidates testing the original TAB CT metric. However when NEBB changed from its former exam management system to Kryterion, the metric exam was undeveloped until NEBB’s new Certification Board took hold and prioritized the initiative.

Currently all NEBB exams are calculated using the Imperial Standard. The first exam slated for re-metrication was the TAB CT and based on the success of that overall process, plans include metricating a second exam -- the TAB CP, with the potential of moving onto other exams.

“It was beyond time to meet the needs of our Constituency with the metrication of the TAB CT and other exams,” said NEBB’s Director of Certification, Cynthia Hereth. “When digging into the project, we quickly found out that metric doesn’t necessarily mean the same thing depending on the country you’re from. Metric formulas can be different from one country to another, so it was imperative to have different countries represented going through the entire process.”

Working collaboratively with Australian Chapter Coordinator Lyn Dyason, the Certification Board reached out to select members worldwide to assist with the metrication process. The Metrication Team included Paul Chasteauneuf, Keith Pearson, and Lyn Dyason who focused on the realignment of the exam. Then an extensive peer review was conducted by Rob Allisey, Jonathon Lloyd, Ray Mutch, Scott White, Sam Green, and Oguzhan Ardic.

The metrication of the TAB CT exam took 6 months to work through the project with over 1000 hours of collective volunteer time which included vetting each question for grammatical appropriateness to countries outside the U.S, adjusting questions, removing and replacing other questions, all the while maintaining the integrity of the exam as it mirrored the U.S. TAB CT exam.

“Working on the metrication of this exam was exciting because the Metrication Team felt a unique sense of purpose,”

said Lyn Dyason, Australian Chapter Coordinator. “Everyone was committed to the project and understood the magnitude of what we were doing on this first exam – and it’s especially gratifying because now TAB CT Candidates worldwide will have options when they select their exam.”

The TAB CT Metric exam is now in the hands of the Exam Development Committee for review and processing. The anticipated rollout date for the new TAB CT Metric is in Q3 2016.

NEBB Metrication TAB CT Team



Lyn Dyason



Keith Pearson



Paul Chasteauneuf

Moving forward, the Metrication Team has expanded its reach for the metrication of the TAB CP and will include:

- Oguzhan Ardic, TAB CP, S&V CP, Turkey
- Keith Pearson, TAB CP, Australia
- Adrian Sims, TAB CP, S&V CP, Ireland
- Brian Weldon, CPT CP, Ireland ■

CALL FOR SPEAKER ABSTRACTS

NEBB 2017 Annual Conference

The Science of Buildings: Operations, Performance & Testing
Hilton Orlando Lake Buena Vista, Orlando, Florida
Thursday, March 30 – Saturday, April 1, 2017



The quality of any conference vitally depends on participation and submission of quality speaker presentations which is evident from attendee feedback. NEBB encourages proposals from industry leaders and forward-thinking professionals to submit Speaker Abstracts for its 2017 NEBB Annual Conference.

The aim of the Speaker Abstract is to write a complete and concise description of the proposed speaking content to encourage and entice potential readers into “wanting to know more” about the proposed topic for inclusion into the 2017 NEBB Annual Conference. Please use the following guidelines when developing your Speaker Abstract.

NEBB is the premier international association of certified firms that perform building enclosure testing, building systems commissioning, building systems retro-commissioning, fume hood testing, sound and vibration measurement, cleanroom certification, and testing, adjusting and balancing of environmental systems. NEBB is the leading source of industry information through its standards, procedures, publications, specifications, text books, study courses and newsletters.

Core Areas. NEBB desires to receive Speaker Abstracts in the specific core areas listed below. Please indicate which core area your presentation will discuss.

- | | |
|---------------------------|----------------------------------|
| 1. TAB | 7. Cleanroom Performance Testing |
| 2. Sound Measurement | 8. Business Practices |
| 3. Vibration Measurement | 9. Leadership Skills |
| 4. Building Commissioning | 10. General Business Practices |
| 5. Retro-Commissioning | |
| 6. Fume Hood | |

1. To obtain a Speaker Abstract, please email cindi@nebb.org.
2. Abstract deadline: **on or before Tuesday, September 6, 2016.**
3. Selected speakers will be contacted by October 7, 2016.



Building Enclosure Testing: An Essential Aid in Sustainable Building

Frank Spevak | The Energy Conservatory



Building enclosure test using two Minneapolis Blower Doors.

Commercial building tenants and owners spend millions of dollars every year conditioning air to provide a comfortable living and work environment. Because this is a costly necessity, we want to make sure buildings are as energy efficient as possible. One way to improve efficiency is by testing the building for air tightness to determine where and how much air regularly leaks through the building's envelope and then sealing the various cracks or vents in the wall and roof structure. Building enclosure tests also ensure a building complies with increasingly strict standards for sustainability, such as those set by the International Energy Conservation Code (IECC).

What Is Building Enclosure Testing?

Building enclosure testing, also referred to as air tightness testing, is a quantifiable value that determines the ability of a building to retain air. This testing process serves several purposes:

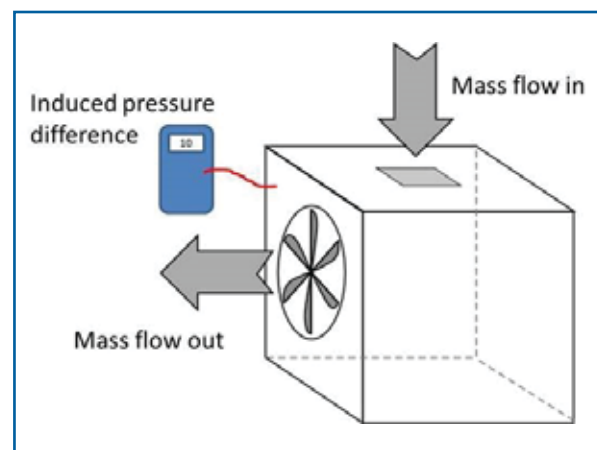
1. To design a pressure management solution or resolve a problem caused by unplanned airflows in a building,
2. To find air leaks in existing buildings or during the installation of air barriers in buildings under construction, and

3. To check for compliance with state regulations.

Think of a building as a box that is placed outside. When a box is sealed on all edges, no air goes in or out. The desire is to keep the air inside the box perfectly conditioned at 72 °F, even though the temperature outside the box varies from below zero to more than 100 °F. To keep the box at 72 °F, it needs a cooling or heating mechanism and a fan to distribute the conditioned air. (Remember, this is a really large box.) If we have a small box with small holes or no holes and a large fan, then it is inefficient to condition the air because the fan and conditioning costs more money than is required to maintain proper conditions. Likewise, if we have a small box with a lot of holes, we have to use a large fan to condition the air because it constantly leaks.

The ideal situation is to have a large box with minimal holes and a small fan. This makes conditioning air efficient because we are using the smallest fan required to maintain air temperature inside the box.

The goal of building enclosure testing is to provide information on the leakiness of the enclosure to contractors, archi-



A simple example of a blower door test. A fan exhausts air from an otherwise airtight box with a single hole in the box.

itects and designers so they can appropriately determine if the HVAC systems can meet the building demand. This also aids in determining building code compliance. The result from a building enclosure test is a number, usually expressed as the amount of airflow at a specific building induced pressure value, e.g. 6,000 cubic feet per minute (CFM) at 75 Pascals (0.3 inches of water column). But this number by itself is of little value until we compare that to the building. When taking into consideration its size, volume and surface area, we can calculate a leakage value in CFM per square foot of floor space, air changes per hour, or the amount of leakage per square foot of the surface envelope or enclosure of the building.

Planning for Air Sealing during Construction is the Most Effective

When a building is being constructed, it is easier to incorporate air sealing and other energy efficient measures into the building's architecture, instead of adding the measures once construction is complete and hoping that the building will pass when it is tested. During the construction phase, the team has access to areas within a building structure that often become inaccessible once it is finished. During this phase, energy efficient measures can be implemented that will be impossible or far too expensive to include after the fact -- such as sealing a crack within the building envelope, or gasketing between joints in the wall, wall intersection or floor. The tradeoff is the building may initially be a little more expensive to construct, but the life cycle cost of the building will be much less than a conventionally-constructed building.

During commercial construction, the burden of responsibility for an energy efficient building falls on the builders, not the management team or tenants. Once a building is complete and turned over, the process of applying energy efficient measures can be difficult because of conflicting interests between the building owner, management team and tenants. Building owners can avoid this issue by invoking the resources of quality, certified professionals for building enclosure testing during the planning stage of construction.

What's on the Horizon for Building Enclosure Testing?

Over time, standards for a building's energy efficiency have become stricter because of regulations set by the IECC. This code mandates improvements in energy efficiency to allow home and building performance contractors to adapt to more sustainable practices.

Presently the 2015 IECC for commercial buildings is 0.4 CFM of leakage per square foot of building envelope at 75 Pa or represented as 0.4 CFM/ft²@75 Pa. This is similar to the requirements of ASHRAE Standard 90.1 and 189. A non-

commercial standard used by the Army Corps of Engineers for all federal buildings requires 0.25 CFM/ft²@75 Pa.

The IECC is constantly upgrading to keep up with the current energy efficiency needs of buildings in each state. The latest IECC marks a high, but achievable, standard for energy efficiency, and most states are choosing to update the energy related portions of their building code. Each state has a different energy standard that contractors are required to meet.

By the end of 2016, 8 states have or will have adopted the 2015 IECC and have chosen to incorporate the updates into their statewide building codes. Along with those 8 states, 13 states operate under the 2012 IECC; 19 operate under the 2009 IECC; and 10 states either operate under the 2006 IECC or older, or have not adopted an IECC at all.

These energy goals start with a realistic recommendation before they progress to a mandated code. The recommendation for energy efficiency is set with a manageable number so nearly any builder can achieve each state's goal.

As contractors continue to achieve these energy recommendations, the easily achievable code value of a previous standard starts to tighten with the new standard. Eventually the building code for each state will move to the values that are established in the IECC. As contractors continue to achieve these energy goals, we will see a higher standard for building enclosure tests become the new normal. For this reason, it's important that energy raters strive to meet higher standards, even if it is not yet mandated in their states.

Another commercial trend we're seeing is a carryover from residential buildings, where building enclosure testing is moving from recommended to mandatory. Many large cities have placed ordinances requiring commercial buildings to have an energy audit. Standards are moving slower on the commercial side, but we predict this trend will continue in coming years.

Building enclosure tests help determine how much air regularly escapes from buildings and how sustainable buildings are. To ensure adding energy efficient measures is cost effective, it is best to plan for this during the construction phase. As we see the energy standard for buildings become higher, energy raters will rely on building enclosure tests as an essential part of achieving the overall integrity and efficiency of a building. ■

About the Author

Frank Spevak has more than 30 years of experience in the HVACR industry, with expertise in air and pressure measurement equipment. He is the marketing and sales manager at The Energy Conservatory, a Minneapolis-based company known for manufacturing the Minneapolis Blower Door, the Minneapolis Duct Blaster, and digital pressure gauges.

Certification Board's SME Program Continues to Expand

NEBB Exam Development Committee made great strides over the past two months, adding seven new members to its growing pool of Subject Matter Experts (SME).

"The NEBB organization is fortunate to have such a skilled and expert group of volunteer SMEs who have stepped up to the plate to participate in such a valuable way. They use much of their personal time in this endeavor and have participated in many off-hour training exercises, work sessions and exam writing assignments," stated Brian Keller, Certification Board Member and Chairperson of the Exam Development Committee. "The knowledge and proficiency they bring is invaluable. If we added up all of their collective experience in hours, we could easily reach hundreds of years of experience."

The slate of new SMEs include:



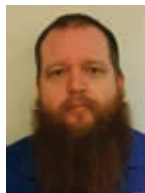
1. Mike Peak, TAB CP, BET CP, S&V CP, Testcomm, LLC, Washington



2. Tiffany Russell, CPT CP, IND, Vancouver, Washington



3. Brian Weldon, CPT CP, Delta-P Ltd, Ireland



4. Glenn Putnam, PE, TAB CP, BSC CP, Brant, Texas



5. Leonard Maiani, Former Technical Director, Idaho



6. Adrian Sims, TAB CP, S&V CP, SiBS, Ltd, Ireland

7. Kevin Marinkovich, TAB CP, Environmental Testing Services, Michigan

The second class of SMEs joins the initial 10 SMEs and the Metrication SME Team for a total of 23 Subject Matter Experts working on a wide variety of projects, all in various stages of completion. A sample of the types of work NEBB's SMEs delve into include: writing a second CxCT exam, writing new TAB CP and TAB CT exams, refreshing various discipline exams, working on a draft CPT Body of Knowledge, reviewing possible tests for technicians to use as an educational preparatory step towards CT certification, and assisting with Angoff Scoring of exams.

"The knowledge and proficiency they bring is invaluable. If we added up all of their collective experience in hours, we could easily reach hundreds of years of experience."

The importance and impact that volunteers have to an organization cannot be undersold, according to SME Tiffany Russell.

"There's a big difference between someone saying they are going to do something and them actually doing it. During each of my training sessions, I appreciated each and every person's participation time as being a SME is not a paid position. I recognized that I was a participating member of a team that was truly working together for the greater good of our organization and our future members," stated Russell. "And that was a very rewarding feeling."

All SMEs sign confidentiality agreements, agree to participate in three training sessions held in the evenings for three consecutive weeks, from 8:00 pm to 9:30 pm Eastern Time zone, and go through a three-month Refresher Training. Not only are they busy, but they're committed to NEBB!

"The impact they are making on the system will significantly support NEBB's ability and objective with continuing to push forward by creating new programs and improving and expanding our current certification programs and processes," wraps up Rick Farrington, Certification Board Vice Chair.

For more information on becoming an SME, contact cindi@nebb.org. ■

Getting NEBB-Certified: A Stepped Approach

Sheila Simms | NEBB Certification Manager



More than a few people think that getting a NEBB certification involves attending a training course and taking a test. While those two aspects can certainly be part of the overall certification process, becoming NEBB-certified involves much more than that.

Being part of a professional certification program is a stepped approach, with individuals going through the proper procedures in a timely manner to get the most out of the certification experience and achieve NEBB certification.

A Quick Overview

Those who apply for any NEBB certification program are considered **Applicants** and must meet specific prerequisites of that discipline's certification program (education and/or professional experience) and must submit documentation that verifies the information. Applicants meeting all eligibility requirements are then granted the status of **Candidate**.

Candidates are encouraged to advance their knowledge through self-study, attendance at specific training courses, on-the-job training. When they are fully prepared, they may then sit for and pass all necessary exams. Adhering to NEBB's Code of Ethics and Professional Conduct is also part of earning certification. The end result is applying for the actual certification, paying a fee to receive the Certification Number and formal certificate.

Step 1: The Application for Candidacy

The first step of the certification process is acquiring the necessary prerequisite education and training for the specific certification. Once those requirements are met, Applicants may obtain the appropriate Application for Candidacy by emailing certification@nebb.org. *Application processing takes time* and everyone is encouraged to start the process as soon as they decide to pursue certification.

Step 2: From Applicant to Candidate

Information provided in the Application for Candidacy and the supporting documentation is used to determine the Applicant's eligibility. The Application for Candidacy form, all supporting documentation, and a non-refundable application

fee must be submitted before going to the next step. Applicants are also required to sign the NEBB *Code of Conduct* and NEBB *Agreement to Arbitrate* and acknowledge having read and be bound by NEBB's current Bylaws, Operational Procedures and Procedural Standards.

Upon approval, Applicants are considered Candidates and receive an email confirmation along with instructions for registering and scheduling their specific exam. The email will include authorization to take the exam along with information about the date, time, and location of the exam, be it taken online at a Kryterion Test Center or as a paper-based exam at a specific NEBB event.

Step 3: Study and Prepare

Candidates are strongly encouraged to prepare for their exams through a combination of self-study, attendance at industry training events, and participating in peer group study sessions that enhance their area of knowledge and expertise. A wide variety of publications are available at www.nebb.org and more information can be found in the appropriate certification appendices located at the back of NEBB's Comprehensive *Certification Candidate Handbook* located on the NEBB website under "Become NEBB Certified."

Step 4: Scheduling Exams -- Written and/or Practical

Each NEBB certification requires an exam, be it online or paper-based, and in some cases is combined with a practical written exam or a practical hands-on exam.

1. Computer-based Written Exams may be taken at Kryterion test centers located worldwide.
2. Paper-based Written Exams are offered at specific NEBB events held throughout the year.
3. Practical Hands-on Exams may be taken at a designated test center.
4. Practical Written Exams may be scheduled at a national test center OR at a specific NEBB event.

Computer-based exams are offered on demand at more than 350 test centers within the United States and more than 700

test centers worldwide. Specific, computer-based exams locations are listed on Kryterion's website: <http://www.kryteriononline.com>.

Paper-based exams are also made available periodically in conjunction with NEBB events, such as specific discipline seminars or the NEBB Annual Conference.

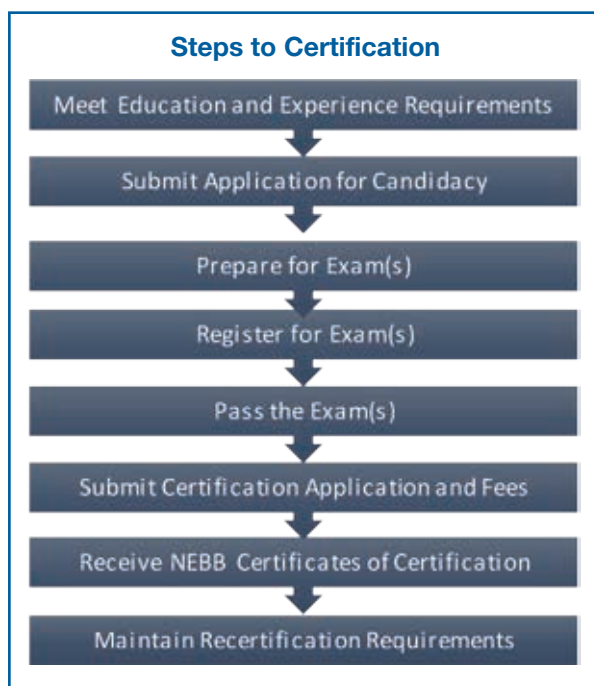
Many of NEBB's certification programs require a practical exam in addition to a standard written exam. Practical exams can be administered in two forms: Written Practical or Hands-on Practical.

1. Written Practical Exams can be scheduled through NEBB or at select locations throughout the U.S. Contact the NEBB office or certification@nebb.org for more information.
2. Hands-On Practical Exams can be scheduled through the Candidate's local Chapter or through a NEBB Chapter closest in proximity.

Step 5: Awarding of Certification

Upon successful completion of all the prerequisites and passing the certification exam, Candidates receive notification about how to complete the final step to achieve their new certification status, which is completion of the Application for Certification and payment of their certificate fee.

Upon receipt of the required documentation at the National Office, Candidates will be sent their official certificate and Certificant number and are now known as "Certificants," joining the ranks of those who raise the level of professionalism within the HVAC and related fields. ■



Adherence to Certification Procedures

Moving forward, there will be stricter enforcement of NEBB's certification application processes, particularly when it comes to those attending discipline seminars.

Those attending discipline seminars with the intent of taking the paper-based exam at the end of the seminar must begin the certification process well in advance of taking the exam. The main purpose of enforcing compliance is to ensure individuals are fully engaged and ready to sit for the exam by allowing the proper amount of time to study and prepare.

Beginning in fall 2016, the application process will be strictly enforced. Those attending any discipline seminar with the intent to sit for the paper-based exam at the completion of the seminar will be required to have their:

1. *Application for Candidacy submitted and approved one month before the paper-based exam date.*
2. *Related application fees paid.*
3. *Exam pre-registration payment made.*
4. *Individual profile entered into Kryterion prior to taking the exam.*

Again, the purpose of adherence to the procedures is NEBB's vested interest in its Applicants and Candidates, ensuring the best possible exam experience. NEBB's Certification Personnel are always available to answer questions, or guide an Applicant through the process. For more information, contact certification@nebb.org.

About the Author

Sheila Simms is the Certification Manager for NEBB. She has worked with NEBB Applicants, Candidates and Certificants for over a decade and is the familiar voice when people call in asking questions about "How do I get certified?"

Business Succession Planning: Five Critical Questions to Consider

Jeff Kraai | Exit Strategies 360, Inc.



For some, the thought of selling “The Business”—much less delving into business succession planning—creates a feeling of euphoria; for others, the feeling is terror. After decades of successfully owning and operating your company, the thought of selling may have crossed your mind. When it does, shouldn’t your emotions be closer to that of euphoria than terror? For many owners, this is not the case.

Before jumping into the ABCs of preparing your business for sale, please consider five critical questions, and answer thoughtfully. The answers should have a profound effect on your ultimate timing and transition from your business.

1. Who am I without my business?

Let’s face it, business ownership comes with perks. As business owners you are needed. People depend on you and your opinion is paramount because, at the end of the day, you’re the boss. Being “important” can become a way of life, and may even provide a sense of ego gratification.

When considering a sale or transition it may be troubling that you won’t be as important or have the responsibility you once did.

Years ago I sold a business for an 83 year-old who had started the company in 1949 at the age of 29. The sales process

and due diligence were going smooth until two weeks prior to closing, when I received a call I’ll never forget. He was struggling with his decision to sell, and with his voice crackling he exclaimed, “Without my business, who am I?” After over 50 years as a business owner, he didn’t know who he was going to be without it.

Your case may not be this extreme. However, make sure you have a place to “land” and that you have something or somebody pulling you away from the business—your family, hobbies, etc. Without it, both your decision and journey become more difficult.

2. Selling—are you making it a process or choice?

Done improperly it looks like this: during a frustrated moment you decide to sell what took you years to create. You’ve crossed the emotional hurdle of wanting to sell and now just want to close this chapter of your life and move onto the next. Probably at the end of your rope and with no energy or desire to prepare your business for sale, you discover that options are minimal and you sell for significantly less than you thought. Plus, the IRS gets more than their fair share.

The reality is simple—not planning is costly.

Done properly, it’s a deliberate yet basic course of action requiring you to plan for the road ahead. With a handful of questions asked and a nominal effort, you’ll be able to save tens or hundreds of thousands of dollars at the point of sale and in resulting taxes. With answers, you’ll also significantly reduce your emotional angst and stress in the three to five years prior to selling.

The results are obvious, the return on investment (ROI) due to your intentional preparation will be returned to you 10-20 times over. Most owners get one chance at successfully selling their life’s work... why not do it right?





3. Is your spouse ready to have you home?

If your family works like mine, any important decision takes two “yes” votes. With the chaos and stress level of owning a business, being at home for weeks on end probably sounds appealing as it would allow you the opportunity to finally clean the garage and get caught up on the honey-do list.

Then what? The decision to retire is a big one—it should not be made lightly and it should be made together. If both of you are eagerly looking forward to the transition, then you have your answer. If there is hesitancy with either of you, then a meaningful discussion is probably overdue.

Being on the same page with this decision will go a long way toward the planning and preparation process.

4. Once I sell, can I continue to work?

Most owners assume once they sell they have to stop working, but this is not the case. In your mind separate working from owning. You may be at a point in your career where you’re tired of the hassles and headaches that come with owning a business, but maybe you’re not ready to stop working. It doesn’t need to be one or the other.

The solution for some is to sell their business and stay on as a sales manager, project manager, or estimator. This allows you to take some chips off the table and boost your retirement accounts. Additional benefits include: staying connected to the office and clients, earning a decent wage and benefits for a time period suitable to you and your family, and in many cases you’ll be allowed a very flexible work schedule. Another added bonus, when the work day is over, you get to leave work at work. Though not appealing for everybody, this can make for a wonderful transition period between owning the business and full-time retirement.

5. What are you going to do with the money?

Many owners can get laser-focused on wanting to sell, never stopping to think about what they’ll do with their net proceeds. Would you pay off your home or rental property? Buy another rental or two? Place the funds in the stock market or mutual

funds? Buy gold or silver? Establish a college fund for your grandkids? Become involved in charitable organizations?

There is no wrong answer. However, it deserves to be (at least minimally) talked about. Your nest egg is not something to be taken lightly. Some clarification and expectations on what your proceeds will be used for and where they’ll be placed is a critical variable in your decision.

Beyond the obvious questions (business value, taxes, preparation, confidentiality, etc.), there are important variables to consider when the thought of selling crosses your mind. Without any forethought or preparation, the road is guaranteed to be a bumpy one.

In our next article we’ll offer some simple steps on how to best prepare your company for sale and answer several key questions along the way. ■

About the Author

Jeff Kraai is president of Exit Strategies 360, Inc., specializing in the preparation and brokerage of construction-related companies. He can be reached confidentially at Jeff@ExitStrategies360.com.

The above is not the opinion of this NEBB publication or NEBB management, but solely that of the author.



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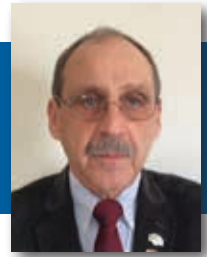


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Documentation: Get the Reports Right!

Bohdan Fedyk | NEBB Technical Director



Just a little reminder: A NEBB Certified Report is the last part of the testing protocol and the permanent record of what was actually done. Doing it right is critical. A neat, concise final package, the NEBB Required Document, is also a protection for the certified firm, certified professionals (CP), certified technicians (CT), and NEBB.

The data compiled in the final report is the when and how—providing documentation for reproducible and defensible verification of the work completed. In my past life, spending many years in the field either performing, supervising, or verifying and certifying reports, there were many instances of people reducing flows or changing conditions before I had even left the building. While there is recognition that it is their facility, the tinkering usually results in unfavorable conditions for the tenants of the spaces. Being able to replicate the original report conditions and verifying the results can alleviate numerous costly call backs or even lawsuits while allowing the firm to actually recoup charges for additional work.

It cannot be stressed enough how important proper documentation of all aspects of a project is from start to finish. In some disciplines it is mandated by industry regulations but it should be common practice no matter the discipline or project. A firm's standard operating procedure (SOP) should cover everything the firm does (testing, safety program, training, reporting, etc.), allowing for uniformity throughout all aspects of the business.



My first six months as NEBB's Technical Director have been spent clarifying the instruments and documentation required for the NEBB firms, CPs, and CTs in the various updated *Procedural Standards*. While the old phrase "that's how we always did it" comes up a lot, it doesn't fly. Most of the issues have not changed; the procedures just aren't being followed.

With the advent of the mentoring program that allows us to work with firms that have minor issues on report format or procedure, we have been able to identify some commonality in report formatting issues. There should always be standardization in certain aspects of the report, such as:

1. **Title Page** – list the Project and the various stakeholders in the project including, but not limited to, the owner, engineering/design firm, mechanical contractor, the balancing and commissioning firms, etc.
2. **Table of Contents** – with individual report pages clearly numbered for ease of locating pertinent data in the document.
3. **Project Summary Pages** – one of the most important and overlooked items, this document identifies why (purpose), how (procedure), and outcome (issues).

While it is a foregone conclusion that a majority of the recipients of the report rarely read the entire report or even understand most of the technical data, the project summary pages provide a synopsis of the project and are an integral part of the Certified Report, which is the accurate historical representation of the project completion. This very important document is a factual depiction of the condition of the facility or system at a specified time, providing a baseline for verification or for future modification.

The various NEBB discipline *Procedural Standards* provide requirements for each of the specific test report pages but not the specific page formatting, allowing for either vendor or company generated reports. Report pages must be clearly identified by number and section, if required, with unique system to allow for ease of locating pages or units as required.

Some of the items that are generic to all reports include the following:

1. Individual Report Pages

- a. Project name*
- b. Name of individual performing test*
- c. Date (time would be helpful but not required)*
- d. Include sequential numbering designation –page number, etc.–*
- e. Remarks section for pertinent information*

2. Instrument List

- a. Type*
- b. Manufacturer*
- c. Model number*
- d. Serial number*
- e. Calibration data*

3. Abbreviation List

- a. List all abbreviations utilized in report*
- b. Recommend to use standard abbreviations as indicated in TAB PS for consistency*

4. Drawings

- a. Pertinent contract drawings and schematics*
- b. Verify they are legible and easily understood for content and location*

Best practices should be followed throughout the project, including reporting. All reports must be easy to follow, locate issues immediately, and allow the reader to find pertinent information quickly and easily. The report is the final document on a project – a synopsis of what was done. Equally important is that this report is a reflection of your company and NEBB. We take that very seriously. ■

About the Author

Bohdan (Don) Fedyk is NEBB's Technical Director and has been in the industry for nearly 30 years. He is a Certified Professional in TAB, Sound, Vibration, Fume Hood and Building Systems Commissioning. Don says that even though he tries to hide, technology keeps finding him – so for questions on reporting requirements or any other issues, track him down at don@nebb.org.

Did You Know?

NEBB Released New Webinar on Cleanroom Performance Testing ISO 14644-1

This special webinar will give you a better understanding of how the recent changes to ISO 14644-1 will affect the certification of cleanrooms. The NEBB Cleanroom committee developed this presentation which covers the changes to this very important document, along with what is expected during the execution of the Cleanliness Classification test. This information benefits both the certifier as well as the cleanroom owners' Quality Assurance personnel. If you currently certify Cleanrooms, send a link about this webinar to your clients, as they will find the information presented valuable as well.

NEBB Has An Updated NEBB-approved Formula Chart

That NEBB's Technical Director, under the auspices of the Certification Board, created a new Formula and Psychrometric Charts Document? The new document was vetted by members of each NEBB Committee and the Board of Directors and the most recent version is on NEBB's website, signed and date-stamped by NEBB Technical Director, Don Fedyk. New and improved, the new Formula Chart has been attached to the appropriate exams on Kryterion and is available – free! An excellent training and reference item, feel free to check it out at www.nebb.org.

NEBB Comprehensive Candidate Handbook Is Now Available

NEBB's Certification Board released in early June, its first comprehensive Certification Candidate Handbook. Complete with overviews on the stepped approach to becoming certified, exam testing procedures and locations, plus separate Appendices for each NEBB discipline which outlines specific details pertaining to that certification is wrapped up in one comprehensive handbook. Available online at www.nebb.org.

That the First Step to Certification is Making Sure You Have the Pre-requisites?

True fact. If an individual is interested in becoming certified, the first step is to make sure they have the pre-requisite requirements of education and training for the specific discipline. The second step is completing and submitting the Application for Candidacy. For more information on becoming certified in any of the NEBB disciplines, email certification@nebb.org.

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VAV Box Calibration Methods Reviewed

Leonard Maiani | NEBB Technical Director (Former/Retired)



As the popularity of the various permutations of VAV systems has dominated the HVAC industry, the TAB firm's responsibilities has included calibrating the volume controls on the various VAV box configurations. The two most common methods of calibrating these controls has been to (1) totalize the connected diffusers or (2) measure the differential pressure on the VAV box inlet grid and compare it to the 'pressure vs volume' chart provided by the VAV box manufacturer.

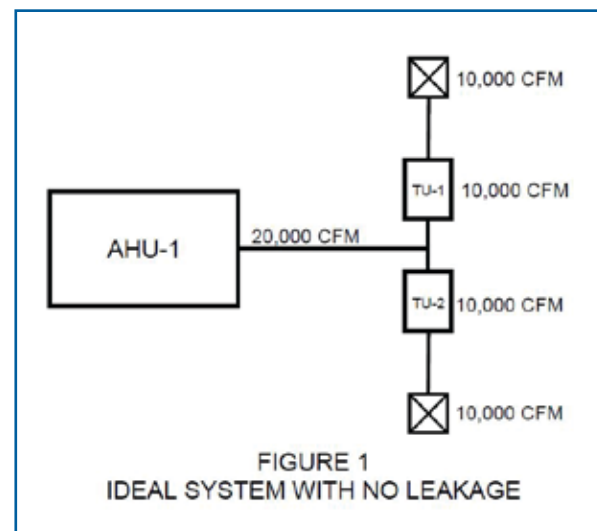
These two methods usually do not provide the accuracy required to **factually** report the condition of the system in a NEBB certified report for the following reasons:

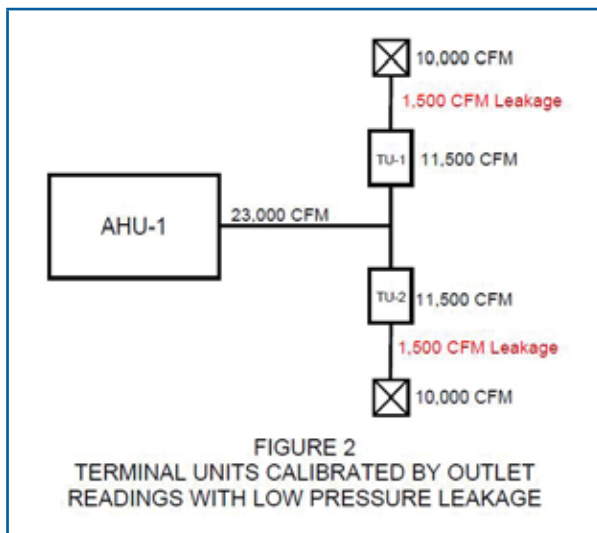
- A) Totalizing the outlets/diffusers does not take into account ANY leakage that may occur in the VAV box or the downstream low pressure ductwork. This results in an inaccurate reporting of the actual airflow at the box inlet grid.
 - 1) This method implies that there is zero leakage from the VAV box to the outlets.
 - 2) When the VAV box total is compared to the system total air duct traverse, the implication is that the high- or medium-pressure ductwork is leaking excessively when, in fact, it is probably the only duct that was pressure tested.
- B) Using the differential pressure and VAV box chart is a completely erroneous method of calibrating the box controls.
 - 1) The box controls are engineered to measure a differential pressure, not an air volume. As such, any condition that creates turbulence or non-laminar flow at the inlet will cause the controls to adjust for the proper differential pressure and the air volume could be all over the board. The grid and control sensor need to be calibrated as a unit which requires that airflow be measured solely with TAB firm equipment.
 - 2) Many of the control companies are using a flow through sensing device in lieu of a true diaphragm, differential pressure device. When the TAB firm connects their differential pressure meter to the sensor

hoses, the flow thru device creates a short circuit from the high to the low ports, thus causing an inaccurate measurement. The only way to make this even remotely functional would be to lock the VAV box damper in a fixed position, disconnect the sensing hoses from the control device to get an accurate differential pressure, calculate your correction/calibration factor, and then reconnect the sensing hoses to the control.

- 3) This method assumes there is no problem (cracked grid, blocked holes, poorly attached sensing hoses, debris caught on sensing grid) with the sensing grid provided with the VAV box.

The perfect system would have all of the air flows in complete agreement as shown in Figure 1. Since the perfect system has yet to be installed, the TAB firm has a duty to provide the most accurate representation of the installed system. Method "A" above would result in a report showing the outlets and the boxes being equal and the AHU would be attempting to produce more air than it was designed to produce (Figure 2). In this case, the fan would be sped up to make the VAV boxes appear to be moving design airflow, when they are actually moving design airflow PLUS any and all leakage occurring after the VAV box sensing grids. Accurate? Hardly. One clue to the inaccuracy of this method is the wide range of correction/





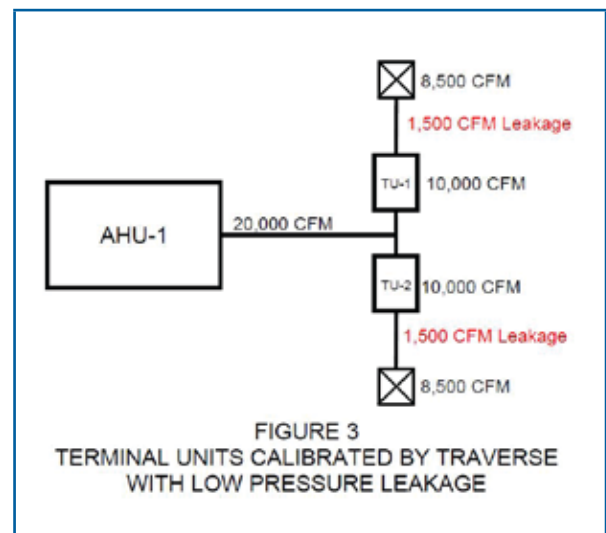
calibration factors, which could be due to varying amounts of leakage at each VAV box. Remember that, as the airflow at the fan increases, the brake horsepower increases to the cube of the flow. To make matters even worse, typically, fans are no longer selected to include any system leakage.

I won't go into a lot of detail with Method "B." This method does nothing to calibrate the inlet grid to the actual CFM. It implies that you have design flow if you have design differential pressure (See B.1 above), regardless of inlet conditions and integrity of the flow sensor. I would classify this as less than useful.

So, what to do? How do we provide accurate information that an owner or design consultant can intelligently assess the condition of the system?

The only way to truly verify the flow at a VAV box is to perform a duct traverse at the inlet of the VAV box and as near to the flow sensing grid as possible. The designer may need to make provisions for this traverse to be as accurate as possible in their VAV box detail. Once the VAV box is calibrated to produce design air flow, then the outlet readings should be proportioned

and documented. They may be somewhat short of design (Figure 3), depending on the leakage rate of the low pressure ductwork and VAV box, but it shows the owner and designer where their problems are and gives them the information they need to correct the situation. They may opt to increase the box set point (not the calibration) or they may have the contractor seal the low pressure duct work. The fact remains that the TAB firm has provided accurate information so that intelligent decisions can be made. When the designer says he has to have design air-flow in a room, he knows where the problem is, whereas our previous methods leave them scratching their heads because we provided erroneous data. Erroneous data is not acceptable in a certified report. ■



About the Author

Leonard Maiani is a former NEBB Technical Director who retired in 2015 and continues to be involved with the organization as a Subject Matter Expert. Working collaboratively with the Certification Board's Exam Development Committee, Leonard assists with the writing and review of exam questions for NEBB's various discipline exams.

Got an Article Idea?

Contact the NEBB Professional Magazine
(communications@nebb.org) with your story idea.
You don't have to write a word just talk with the staff writer
and your story will be put together for you. Just ask any of
the NEBB professionals who have appeared in this
section how easy their story was to write.



Chapter News

NEBB Canada: Dave Lipsit, President



Dave Lipsit

NEBB Canada is turning 30 and we thought it fitting to have a celebration this year, so we are going to Niagara Falls for our annual re-certification seminar. We have packed a lot in this 1 ½ day conference, with excellent educational speakers and special guest speaker Bob Gray, a Guinness World Book of Records holder. We'll lunch at the KEG

restaurant with an exceptional 9th floor view of the Falls, and our Friday night Get Acquainted Celebration will host a cake-cutting while being entertained with live music from The Crack Pops of Montreal.

On Friday we have a Guest/Spouse Wine Tour with Niagara-on-the-Lake sightseeing. This is a great outing and a chance to see and taste the wine industry up close.

Come out and see what NEBB Canada has to offer and get your recertification hours. It is an honor to be part of the NEBB organization and on behalf of myself, my wife Brenda, the NEBB Canada Board of Directors, and our chapter coordinator, we hope to see you all in Niagara Falls.

Our event is being held on September 30 - October 1 2016, at the Embassy Suites in Niagara Falls. Please contact our Chapter Coordinator at info@nebb.ca for more information.

AR NEBB Chapter: Jo Kinley

NEBB required six-hour Recertification Seminar is scheduled for Friday, September 30, 2016, from 7:00 a.m. - 4:00 p.m. The registration fee is \$100.00 for Certified Professionals and \$50.00 for Certified Technicians. Breakfast and Lunch are included. Seminar topics include: Yaskawa session on VFDs and Motors; Griswold Valve session on Circuit Setters; and Fluid Solutions session on Pumps. We are privileged to have Jim Whorton, NEBB Board Member, coming in to give an update on NEBB. Seminar will be held at the Harrison Energy Training Center at 1501 Westpark Drive, Little Rock, AR. For more information and registration form contact Chapter Coordinator Jo Kinley at mcaaicasa@sbcglobal.net.

Florida EBB: Terry Wichlenski

In sunny Florida, we are genuinely excited to be celebrating our 35th Annual Recertification Seminar and Business Meeting in October. This year we will be staying at the Villas of Grand Cypress in Orlando from October 6-7, 2016. We will be having our 4th Annual Golf Tournament and our 1st Corn Hole Tournament on Thursday morning. These are two fundraising activities, with the profits going to a scholarship for a Florida junior or senior student in college for engineering. Our scheduled guest speakers from NEBB are Jim Kelleher, President Elect, and Steve Clark, TAB Chairman. We are thrilled to welcome them to Florida and we would be pleased to have any and all Certified Professionals, Technicians, and Firms join in our 35th Annual meeting.

We have our last scheduled TAB Practical Exam for Certified Professional Candidates on August 20, 2016. We will be planning our 2017 schedule in October and will have it ready for NEBB's website shortly after. If you are in need of a practical exam, please contact Terry Wichlenski, Chapter Coordinator, at FebbCoordinator@gmail.com about a special date that we can set up for a minimum of two candidates.

MEBB Chapter: Ginger Slaick

MEBB is traveling to Perdido Beach Resort in Orange Beach, AL, this year for our Recertification Seminar and Annual Meeting on October 1-2, 2016. Presentation topics include technical sessions, business insight, and NEBB updates. Guest speakers include Nic Bittle, Work Force Pro; Steve Wiggins, Newcomb & Boyd; Hooman Daneshmand, Pro Hydronic Specialties; Brad Croasdale, Dwyer; and Bill Kinnard, Grandy & Associates.

New this year, MEBB will be hosting our first-ever Vendor Exhibit. Confirmed exhibitors include Instruments Direct, Inc.; Testo, Inc.; Ameritech Computer Consultants; Retrotec; Evergreen Telemetry; Pro Hydronic Specialties; and Dwyer.

Not only does the MEBB Recertification Seminar provide the necessary continuing education hours required by NEBB, it is also a great opportunity to interact with business associates, fellow certified professionals, and technicians. MEBB welcomes attendance from any and all seeking NEBB continuing education hours.

MEBB is also excited to announce the launch of our new website. Visit us at our web address at www.midsouth-ebb.com. There, you will find information about our chapter, NEBB, Recertification and Recertification Forms, Events, and Resources. In the near future, certified technicians will be able to view technical sessions by accessing the technician login via the website. This feature will provide technicians the opportunity to obtain the NEBB required continuing education hours for recertification.

For additional information about our chapter or to register for the Recertification Seminar and Annual Meeting, please contact MEBB's EVP/Chapter Coordinator, Ginger Slaick at 678-407-2754 or by email at gslaick@midsouthebb.com.

NEBB Committee Reports



Testing, Adjusting & Balancing (TAB) Committee

Steve Clark, Chairman
Clark Balancing Ltd.

Representatives from the TAB Committee and the Certification Board, along with NEBB's Technical Director and a TAB Subject Matter Expert representative, met in person the early part of June for two days to work on developing the TAB CP and TAB CT Body of Knowledge.

The **Body of Knowledge (BoK)** is a primary foundational document for certification development. It is from this document that curriculum and exams are created. Curriculum or exams cannot be developed properly unless a discipline has a solid foundation to reference which is its core Body of Knowledge.

The TAB CP/CT BoK Development Team reviewed their preliminary work from early June, made changes and has sent the documents for review and comment. Anticipated approval and release date of the TAB CP and TAB CT BoK is estimated for mid-August.

Once the TAB BoK is approved, it will be used by TAB Instructors to create a new curriculum and by the Exam Development Committee and its SMEs to write new exams for the TAB CP and TAB CT with an estimated roll-out date of January 2017.

Industry Events: SPREAD NEBB EXPERTISE

**Share NEBB with the High
Performance Building Industry
and Increase your Visibility!**



Current Call for Abstracts/ Presentation Opportunities

Did you know there are tons of opportunities to tell the world about NEBB? Consider submitting a Call for Presentations for one of the following industry events. Tell related colleagues in other industries about what NEBB is, what NEBB does, what NEBB stands for! Help us spread the word and help yourself boost your visibility and your career!

IFMA Facility Fusion 2017 US & CA

April 4-6, 2017, Las Vegas

Due date is listed on website:

<https://www.ifma.org/events/call-for-presentations>

NEBB Annual Meeting 2017

March 30-April 1, 2017, Orlando

Due date September 2, 2016:

<http://tinyurl.com/CallforSpeakersNEBB-2017>

IAQA 20th Annual Meeting

January 30-February 1, 2017, Las Vegas

Submit a Session or Workshop proposal
before June 1, 2016 at

www.iaqa.org/IAQA2017CallforPresenters

NEBB's Young Professional Network: New Horizons Unfolding



The growth and excitement of any organization is the involvement of the incoming generation and NEBB is no exception. This year, NEBB is forming a Young Professionals Network (YPN) where its professionals, aged 20-40, will have a venue to network, socialize, and become better acquainted with their own constituents.

It's a new program, still in development, but according to NEBB President, Jean-Paul Leblanc, this has been something high on his list of personal priorities for NEBB.

"We know that while young professionals want to help our organization, they typically don't want to be part of the traditional structure," said Leblanc. "It's important they have an organizational structure they can call their own. We need to make them feel empowered, and leadership realizes that while we're tempted to micromanage them, we aren't looking to do that."

Leblanc envisions this as an evolving program, letting the YPNers essentially operate on their own but within set parameters. He wants them to create their own rules, provided they fall into reasonable guidelines. Operating under the auspices of NEBB's Marketing and Communication Committee, the YPN group will have a designated point of contact on the Mar/Com Committee as well as their YPN Committee.

"This is a great idea for NEBB, and something that's really needed, especially in today's business climate," said Eric Jenison, Chairperson of the Marketing and Communications Committee. "At the chapter level, we recognize and work with our younger, up-and-coming professionals on a regular basis, plus there are opportunities to learn from each other and a great deal of mentoring takes place. That invaluable."

While a new venture for the association, it's one that has high potential, especially since there are many younger professionals who "grew up" in the industry, learning the intricacies of the business from their fathers or grandfathers. The YPN group will provide an opportunity to explore new horizons, try new things, and possibly show there's a

different way to do things!

If you're interested in learning more about NEBB's newly forming Young Professionals Network, contact cindi@nebb.org.

Four Fact about Millennials: Did You Know –

1. *They may reach for their networks before they reach for their wallets.*
2. *They have a short attention span but they can dance for 36 hours straight for a cause.*
3. *They want to do it themselves, even if that means failing.*
4. *If you bore them, they'll move onto another cause that doesn't.*

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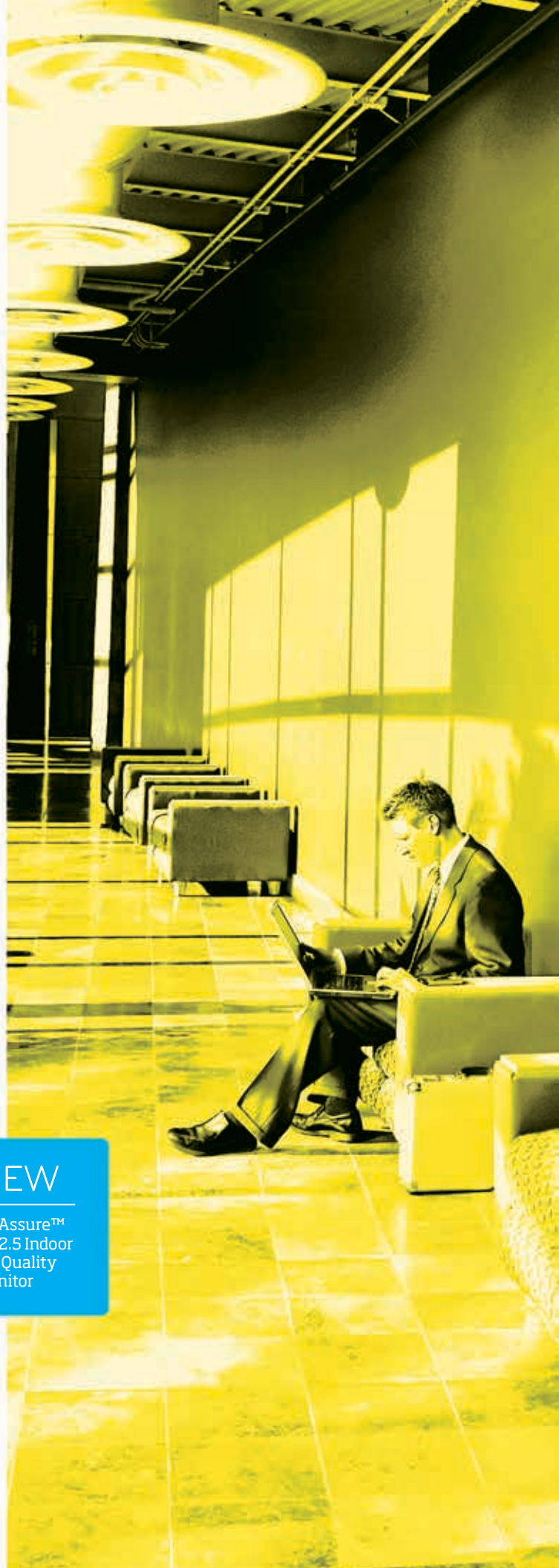


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NEBB NEWS

Neil Marshall Honored at Australian ARBS Celebration

On the evening of May 18, 2016, the Air Conditioning Refrigeration & Building Services (ARBS) Industry Awards winners were announced in Melbourne, Victoria, Australia.

ARBS is the premier industry exhibition and conference event held in Australia every two years. At each ARBS Conference, the three partnering organizations –AMCA (Air Conditioning & Mechanical Contractors' Association of Australia), AREMA (Air-Conditioning & Refrigeration Equipment Manufacturers Association), and AIRAH (Australian Institute of Refrigeration, Air Conditioning and Heating)—, nominate a person worthy of admission into the ARBS Hall of Fame. At this event, the AMCA named Mr. Neil Marshall a worthy Inductee.

When presented with this prestigious award, Neil, in his typically modest and humble style, acknowledged past and present AMCA and NEBB friends for their support—a trait of a truly worthy recipient.

Neil had previously taken on the roles of Victorian AMCA president, National AMCA president, and was the Australian representative for NEBB at the time the NEBB Australia Agreement was formulated.

In 2007, Neil joined the NEBB Board as the NEBB Australia representative, having spent many years of board and committee involvement in his home state (Victoria) and at the national level in Australia. As a member of the NEBB Board, he strengthened the position of NEBB as the quality certification body for the various HVAC and building services disciplines.

Neil was one of the first International Accredited Supervisors to complete the NEBB Study Course in 1980, Written Examinations (in Air, Hydronics and Fundamentals of Air Conditioning Systems), and a rigorous Practical Exam.

In 2009, he was appointed to the NEBB Executive Finance Committee (EFC). The EFC includes the top officer positions of NEBB. As a result of his valued service, he was the first Australian to be elected NEBB President in 2012, presiding over a very successful NEBB Conference at Disneyland in that year.

Instrumental in strengthening the financial position of NEBB, his work enabled the association to become an international leader in the HVAC testing, adjusting and balancing (TAB) and building system commissioning in commercial buildings throughout the world.

Neil was a member of the EFC when the decision was made for NEBB to undertake ANSI accreditation for the certification of all NEBB Professionals and Technicians. This process is nearing completion and has certainly strengthened the NEBB certification program worldwide.

In his retirement, Past President Neil continues to join the Australians at their annual conferences, as well as attending NEBB's April 2016 conference in Albuquerque, NM, with his wife Sandra. Congratulations to Mr. Neil Marshall!



Mr. Neil Marshall (center) being feted during the ARBS Awards Celebration with his son Mr. Cameron Marshall (left), also a NEBB Certified Professional, and Mr. Chris Wright (right), Chairman of NEBB Australia and NEBB Board Member.

NEBB Fall 2016-2017 Seminar Schedule

September

RCx Seminar: Monday – Thursday, September 26-29, 2016

Registration Deadline: Monday, September 12, 2016

RCx CP Paper-based Exam Date: Thursday, September 29, 2016

Boland Training Center, Gaithersburg, MD

October

BSC CxCT Seminar: Thursday – Saturday, October 6-8, 2016

Registration Deadline: Thursday, September 22, 2016

BSC CxCT Exam: Saturday, October 8, 2016

Karges Faulconbridge, Inc., St. Paul, MN

Fume Hood Seminar: Monday – Wednesday, October 10-13, 2016

Registration Deadline: Monday, September 26, 2016

Fume Hood Paper-based Exam Date: Tuesday, October 11, 2016

Fume Hood Practical Exams: Wednesday & Thursday, October 12 & 13, 2016

Labconco, Kansas City, MO

Cleanroom Performance Testing Seminar: Wednesday – Friday, October 12-14, 2016

Registration Deadline: Wednesday, September 28, 2016

CPT Exam Day: Friday, October 14, 2016

Bass Lake Retreat Center, Holly Springs, NC

TAB Seminar: Monday – Thursday, October 17-20, 2016

Registration Deadline: Monday, October 3, 2016

TAB CP or TAB CT Exam Date: Thursday, October 20, 2016

IMI-TA, Rosewell, GA

November

BSC Seminar: Monday – Thursday, October 31 - November 3, 2016

Registration Deadline: Monday, October 17, 2016

BSC CP Paper-based Exam date: Thursday, November 3, 2016, 8:00 am – 2:00 pm

Boland Training Center, Gaithersburg, MD

March 2017

BET Seminar: Monday & Tuesday, March 27 & 28, 2017

Registration Deadline: Monday, March 13, 2017

BET CP Written and Practical Exam Day: Wednesday, March 29, 2017

Hilton Lake Buena Vista @Walt Disney World Resort, Orlando, Florida

NEBB 2017 Annual Conference: Thursday – Saturday, March 30 - April 1, 2017

Registration Deadline: March 3, 2017

Hilton Lake Buena Vista @Walt Disney World Resort, Orlando, Florida

For complete details and the informational brochure, visit www.nebb.org or email training@nebb.org

Save the Date!

NEBB Annual Conference

ORLANDO 2017

Thursday, March 30 – Saturday, April 1, 2017

HILTON LAKE BUENA VISTA @ WALT DISNEY WORLD RESORT



Hotel Room Reservation Deadline Date:

FRIDAY, MARCH 3, 2017

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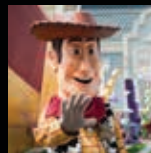
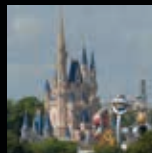
Convention Registration will open **November 1, 2016.**

Check www.nebb.org for ongoing updates!

**2017 NEBB
Annual
Conference**

Orlando
FLORIDA

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NEBB Certified Firms, Professionals and Technicians

FIRMS Certified January 2016 through July 2016

NAME	COUNTRY	TAB	BSC	RCx	FHT	BET	CPT
Professional HEPA Certificate	USA	YES			YES		YES
QV Test Co. Ltd	Thailand					YES	
Elite TAB LLC	USA	YES					
Y.H.H. Containment Services Pte Ltd	Singapore					YES	
CML International	UAE	YES					
Air Balance Professionals	USA	YES					
American Air Balance, LLC	USA	YES					
Technical Balance, Inc.	USA	YES	YES		YES		YES
Outcome Construction Services, LLC	USA		YES	YES			
Highline Technical Services, Inc.	USA	YES					
Verus Test and Balance, Inc.	USA	YES					
Williams and Urns Contracting Pty Ltd	Canada	YES					
Team Arabia	Saudi Arabia	YES					
Exact Cleanroom Compliance, Inc	USA	YES					
Precision Air Balance Co., - San Diego	USA	YES					
Precision Air Balance Co., - Las Vegas	USA	YES	YES				
Pro Building Solutions, LLC	USA	YES					
Commtech Commissioning Technologies Pty Ltd	Australia	YES					
Advanced Air Balance, LLC	USA	YES					
Certified Air Balance, LLC	USA	YES					
ACE Mechanical HVAC Services	Australia	YES					

PROFESSIONALS Certified January 2016 through July 2016

NAME	COUNTRY	TAB	BSC	RCx	FHT	S/V	S	BET	CPT
Patrick J. Braham	USA	YES							
Christopher W. Palmer	USA	YES						YES	
Patrick A. Curley	USA			YES					
Eric V. Schneider	USA	YES							
Kevin Bernhardt	USA	YES							
Isaac C. Rochester	USA	YES							
Matthew C. Lemieux	USA								YES
F. Les Miller	USA								YES
Robert L. Alderman, Jr.	USA								YES
Tiffany A. Russell	USA								YES
Stephen D. Williams	USA		YES						
Cameron L. Warner	USA	YES							
Steven L. Andesen	USA			YES					
Brian D. Cooper	USA			YES					
Michael K. Davis	USA			YES					
David M. Galli	USA	YES							
Mark C. Kaufmann	USA	YES							
Jerry O. Jaime	USA	YES							

NAME	COUNTRY	TAB	BSC	RCx	FHT	S/V	S	BET	CPT
Billy A. Owen	USA	YES							
Kevin R. Holleman	USA	YES							
Brad J. McAndrew	Canada	YES							
Vatsal Desai	Canada	YES							
Joseph A. Marshall	USA	YES							
Richard H. Tympel	USA	YES							
Ramiro S. Espiritu	Singapore			YES					
Justin D. Langley	USA		YES						
John A. Meppen, Jr.	USA	YES							
Sean P. Morris	USA	YES							
Matthew E. Lininger	USA	YES							
Brian J. Barnard	USA	YES							
Jim Stagg	USA		YES						
John A. Cobb	USA	YES							
Justin E. Magill	USA	YES							
Adam B. Hughes	USA	YES							
Larry M. Moore	USA	YES							
Edward M. Petruno	USA	YES							
Stephen C. Wiggins	USA		YES						
Perry T. Jones	USA			YES					
Ufuk Yeni	Turkey	YES							
James Tyler Hall	USA							YES	
Matthew O. Marshall	USA		YES						
Sami Ahmad Al Kayyali	Saudi Arabia	YES							
Dylan Lee Bandy	USA	YES							
Chad Bolin	USA		YES						
Toby James Kongsle	USA	YES							
Luke Michael Hendrickson	USA	YES							
Preston E. Clark	USA	YES							
Troy N. Byers	USA				YES				
Christopher J. Taylor	USA	YES							
Brenden Finn	USA	YES							
Paul D. Martin	USA							YES	
Jose Luis Casillas Vazquez	USA					YES			
Joseph D. Molloy, III	USA							YES	
Adam M. Weis	USA					YES			
Ronald A. Choina, II	USA					YES			
Robert D. Landall	USA					YES			
Jon R. Sissel	USA					YES			
Dean O. Davis	USA					YES			

TECHNICIANS Certified January 2016 through July 2016

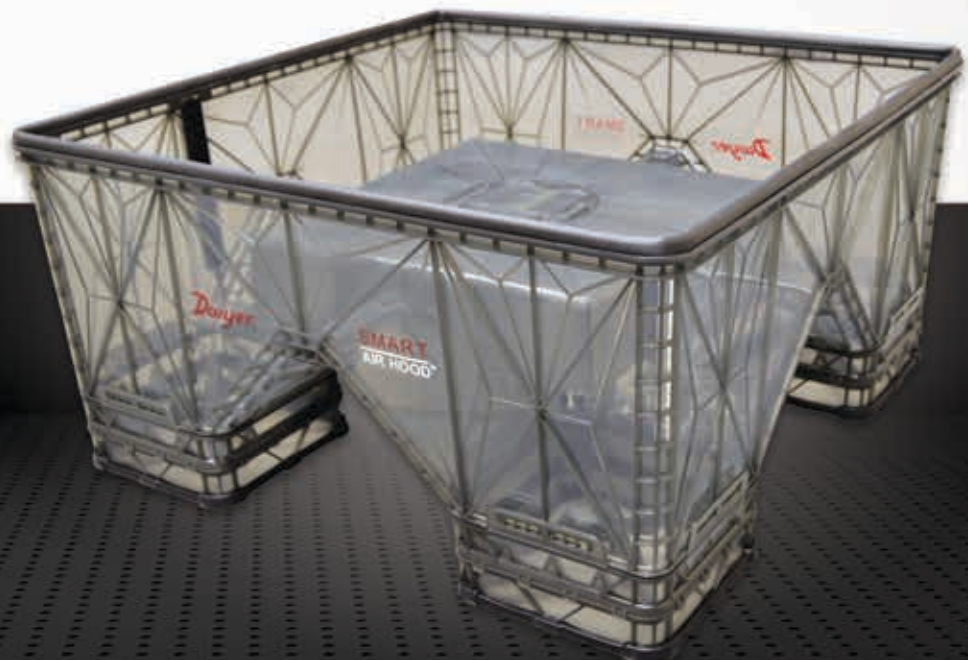
NAME	COUNTRY	TAB	BSC CxCT	S/V	CPT
Mohamed Saber Mohamed	Egypt	YES			
Nasser Saad Al Qahtani	Qatar	YES			
Ramy Fekry Al Maasrawy	Qatar	YES			
Corey Robert Culp	USA	YES			
Ahmed Younis AbdelBaky	Egypt	YES			
Adam Davis	Canada	YES			
Roosevelt Calligos	USA	YES			
Austin Curtis Fitzpatrick	USA	YES			
Benjamin J. deWitt	USA	YES			

NAME	COUNTRY	TAB	BSC CxCT	S/V	CPT
Tho Kim Huynh	Vietnam				YES
Joshua Lee Thomas	USA	YES			
Robert Joseph Pifer, III	USA	YES			
Marino Colette	Canada	YES			
Gregorio Nathaniel Cortez	USA	YES			
Mark E. Wasmund	USA	YES			
Christopher Shayne Michalicka	USA	YES			
Daniel Rodriguez Alvarado	USA	YES			
Marvin Pipit Sanchez	Singapore	YES			YES
Scott Sheldon Clendening	USA	YES			
Oliver Reginaldo Orosco	UAE				YES
Matthew James Amos	USA	YES			
Jerry Robert Whitmire	USA	YES			
George Maultsby	USA	YES			
Jaime Juarez	USA	YES			
James Cole	USA	YES			
Terry Haynes	USA	YES			
Roger O'Connor	USA	YES			
James D. Hamill	USA	YES			
Alejandro Daniel Lemus	USA	YES			
Brian Michael Leval	USA	YES			
Siang Lin Chee	Singapore				YES
Mahmoud Mohamed Mohamady	Egypt	YES			
Oren Keith Cameron	USA	YES			
Colby Sloan Kistenfeger	USA	YES			
Roy Alan Eberly	USA	YES			
Dustin Wade Haffelder	USA	YES			
Jonathan Micheal Smith	USA	YES			
Paul Bruce DeValk	USA	YES			
Carlos Enrique Peralta	USA	YES			
Jeffrey David Wagner	USA	YES			
Andrew Christopher Bruns	USA	YES			
Brennan P. Blowers	USA	YES			
Robert Allen May	USA	YES			
Wayne Edward Ayers	USA	YES			
Joseph Lynn Sutterfield	USA	YES			
David Christopher Kitts	USA	YES			
Issac William Clarke	USA	YES			
Christopher Lee Williams	USA	YES			
Jon L. Sanford	USA	YES			
Max Andrew Pascarelli-Rusnock	USA	YES			
Brian Augustus Jackson	USA	YES			
Martin Bryan Knellar	Singapore				YES
Gan Seow Wee	Singapore				YES
Vincent Leong Hoe Kiat	Singapore				YES
Greg Lombardi	USA	YES			
Joseph Edward Estrada	USA				YES
Pierre Audet	Canada				YES
Jeramie Joe Nieman	USA				YES
Christopher Ryan Kolanek	USA	YES			
Rawdon Wells Mainville	Canada				YES
David Rodger Phillips	Canada				YES
Paul Floyd Griffin, III	USA	YES			
Khia Seng Ng	Singapore				YES



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