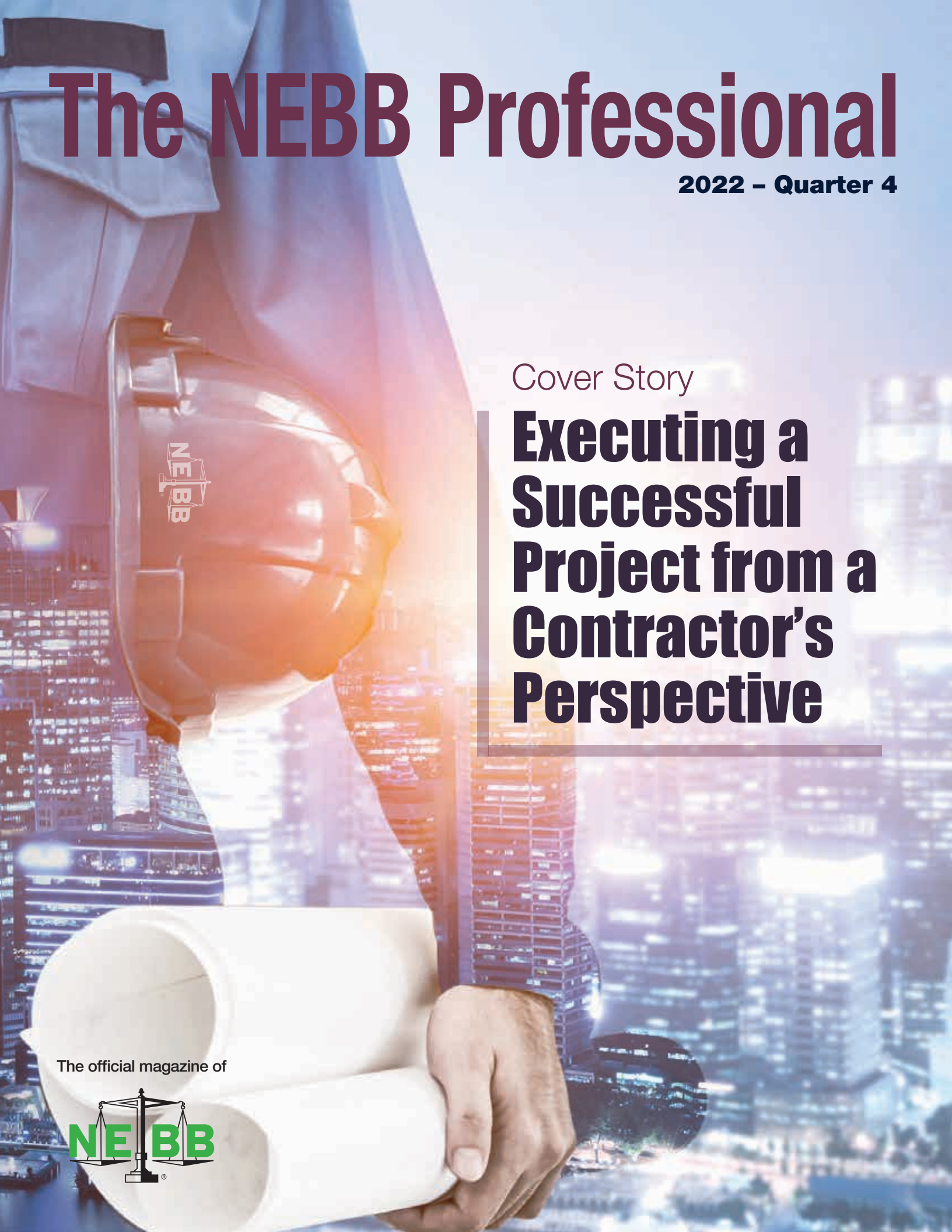
The NEBB Professional

2022 – Quarter 4



Cover Story

Executing a Successful Project from a Contractor's Perspective

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Contents

Quarter 4 – 2022

2 **PRESIDENT'S MESSAGE**

3 **MENSAJE DEL PRESIDENTE**

5 **CONTRIBUTORS**

6 **LETTER FROM THE EDITOR**

Features

8 **Cover Story: Executing a Successful Project from a Contractor's Perspective**
By Todd Larson

14 **The Importance of Indoor Air Quality and HVAC Strategies to Improve it**
By Howard Smith

18 **Life Safety Systems**
By Jonathen Lloyd

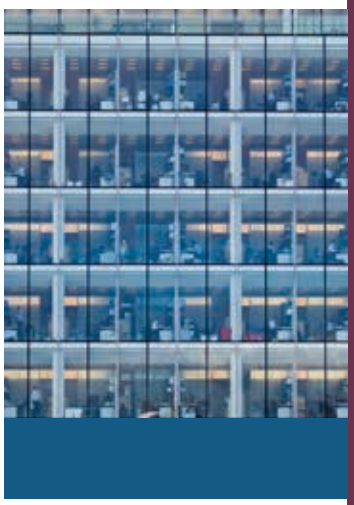
24 **100 Percent or Something Less?**
By Andrew Boyd

27 **The NEBB Toolbox**
By Jeff Schools

28 **War Stories: How to Pass a Building Enclosure Test**
By Mike Peak

32 Our Chapters
Chapter Updates

36 Seminars
NEBB Seminars Calendar



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President's Message

The idea of becoming President of NEBB comes to me with great humility. The mission of this organization is something I truly believe in right down to my core. I cannot stress enough what an honor it is going to be to serve you during the next year as your President. Let me repeat that, to serve you!

I truly believe the success of NEBB is dependent on the training and services it provides to those who choose any one or all of our disciplines as their career–not just their job, but their chosen career. I believe training starts at the corporate level, followed by the Chapter level, and finally at the National level. All three entities must focus on the development of those that choose NEBB as the certification they desire to hold.

I believe Penny and Rodney Hinton of Palmetto Air and Water Balancing have one of the greatest mottos: *We want to invest in those that want to invest in themselves*. The NEBB family should do everything in its power to ensure we do just that, too. We must invest in those that want to invest in us.

My goals for the coming year are to ensure the training being offered throughout NEBB is truly training viewed throughout the industry as premier training, and for those that experience our training to come away with a satisfied, personal belief in the training they have received.

The well-trained candidate will have confidence and pride in getting certified through NEBB. And it all starts with high quality education.

I truly look forward to serving NEBB as your next President. I am humbled and honored to be here. So, go ahead and ask a lot of me and challenge me. That's what I'm here to do as President. But take one thing to heart: I will ask a lot from you and challenge you, too.

I look forward to an incredible year ahead. Let's do this.

Phil Emory
NEBB President

Mensaje del presidente

La idea de convertirme en Presidente de NEBB llega a mí y la recibo con gran humildad. La misión de esta organización es algo en lo que realmente creo en lo más profundo de mi ser. No puedo enfatizar lo suficiente el gran honor que será servirles durante el próximo año como su Presidente. Permítanme repetirlo, ¡servirles a ustedes!

Creo firmemente que el éxito de NEBB es dependiente de los entrenamientos y servicios que provee a aquellos que escogen cualquiera de nuestras disciplinas como su carrera–no solo su trabajo, pero como su carrera elegida. Creo que el entrenamiento empieza al nivel corporativo, seguido a nivel de cada Capítulo, y finalmente a nivel nacional. Las tres entidades deben enfocarse en el desarrollo de aquellos que escogen NEBB como la certificación que ellos desean poseer.

Creo que Penny y Rodney Hinton de Palmetto Air and Water Balancing tienen uno de los más grandiosos lemas o frases célebres: "*Queremos invertir en aquellos que quieren invertir en ellos mismos*". La familia de NEBB debería hacer todo lo que este a su alcance para asegurar que nosotros hacemos eso mismo, también. Debemos invertir en aquellos que quieren invertir en nosotros.

Mis metas para el próximo año son asegurar que el entrenamiento ofrecido a través de NEBB sea visto realmente como una capacitación premium en toda la industria y que aquellos que experimenten nuestro entrenamiento salgan satisfechos y convencidos en el entrenamiento que han recibido.

El candidato bien entrenado estará confiado y orgulloso de obtener su certificación a través de NEBB. Y todo empieza con una educación de calidad.

Realmente espero servir a NEBB como su próximo Presidente. Me siento humilde y honrado de estar aquí. Así que, ¡adelante!, demanden mucho de mí y rétenme. Eso es lo que estoy aquí para hacer como Presidente. Pero tomen algo muy en serio: también voy a demandar mucho de ustedes y los voy a retar igual.

Veo un año increíble delante de nosotros. Vamos... ¡hagámos esto juntos!

Phil Emory
Presidente de NEBB

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Todd Larson has been a writer on a variety of subjects for more than 30 years, specializing in topics related to the building trade: architecture, engineering, construction, real estate, and, of course, testing and balancing..

Howard Smith serves as Product Manager, Air Solutions at Belimo, and is responsible for products with integrated differential pressure sensors used in flow control, duct pressurization, and room pressurization applications.

Jonathen Lloyd is a NEBB Certified Professional (TAB) serving as a voting member of the NEBB Young Professionals Network, NEBB TAB Committee and NEBB 2022 Board of Directors.

Andrew Boyd is a licensed architect who works for NAVFAC and is an Industry Stakeholder on NEBB's Certification Board. His views do not necessarily reflect the views of his organization.

Jeff Schools is the Past President of NEBB and has taken the new role of the NEBB Technical Director.

Mike Peak has been a NEBB Certified Professional since 2002 for TAB and 2013 for BET. He is the current chair of the BET Committee and also sits on the Exam Development Committee. Mike has been employed with TestComm of Spokane, WA since 1997 where he is the TAB/BET Supervisor.

Letter from the Editor

You may have seen my name floating around previous issues, but I'd like to formally introduce myself as the new editor of NEBB's official magazine. Although I've been a past article contributor, my partnership with NEBB began well before that in a strategic marketing capacity. As a small business owner (like many of you), I have provided support that's covered a wide range of NEBB marketing and communications endeavors. I am grateful for this opportunity to keep serving NEBB's goals, while getting the word out on all the exciting things happening here.

As we turn a new leaf, moving into a new presidential term at NEBB, I want to thank 2022 NEBB President Jon Sheppard for his assistance on many completed projects and I look forward to working with 2023 NEBB President Phil Emory. Since the beginning of my partnership with NEBB, Phil has served on the NEBB Board of Directors and I have had the opportunity to work with–and learn from–Phil in the past. As we both begin new ventures with NEBB this year, I look forward to amazing things to come.

One thing I have learned working with NEBB over the years is that its biggest supporters continually invest time and talent advocating not only for NEBB itself, but ways to better the industry overall. It's not uncommon to see a familiar name involved in committees, the annual conference and even the Board. Or if you're like NEBB Technical Director Jeff Schools, you might rise up through the board, serve a presidential term, and still come back asking to do more.

As Phil mentioned in his first President's Message on page 2 (página 3 en español), he's going to ask a lot of you this year. And frankly, seeing that "Adapting NEBB for the Next Generation" was the theme of the 2022 NEBB Annual Conference which just wrapped, I'd say his timing is perfect. Jump in now. Ensure your voice is heard. Who better to do the adapting than all those in the next generation itself?

But here's the catch...if you want a voice, you have to participate. Consistently, passionately participate. Join a committee. Author an article. (*hint, hint: contact me at editor@nebb.org!*)

Speak up and share your ideas, your experiences. Many times, it's the knowledge closest to us that we tend to overlook the quickest. Another thing I've learned about NEBB since I began this collaboration is the sheer amount of modesty everyone seems to have. I can recall attempting to interview a handful of experts several years ago for a project regarding NEBB's expertise, and each interview began with a healthy denial or heavy discomfort that my interviewee felt with the term "expert." These were NEBB Certified Professionals with decades of experience, undoubtedly experts in their fields. Many of them were the names I later got familiar with as members of committees and even the Board, too.

I am sharing this to help you see that your expertise can add immense value to NEBB–whether you've gotten to the point of believing it yet or not.

Next generation of NEBB, I am talking to you!

Kerri Souilliard, Editor

HVACR on an epic level

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Executing a Successful Project from a Contractor's Perspective

By Todd Larson

Executing a successful project begins long before a field technician steps foot onsite. From the early stages of proposal creation and contract acceptance to preconstruction review, physical balancing, and closeout, communication is key.

Proposal and Contract Acceptance

TAB proposal creation demands just as much communication as after the project is awarded—especially pertaining to job specs. "We want to make sure we're as specific as possible regarding quantities of equipment and other special services we're providing," explains Vice President of Aero Building Solutions Nick Muscolino. "It's good to provide breakout prices for other tasks, too (such as sound and vibration testing) that are not necessarily included with balancing, but are complementary to it. By breaking out prices, you're communicating to the customer we're bidding to that we're including the scope of the project in the proposal. It lets them see the different pieces that go into the price."

Technology is key to the bidding process. "The old way of bidding a job was printing a large drawing out, going through it with colored pencils, and physically counting all the diffusers in the building and all pieces of equipment with handwritten work," states Muscolino. "Now you can look at a drawing on a computer and check different pieces of equipment off electronically, and it does the counting for you automatically and saves that

TAB proposal creation demands just as much communication as after the project is awarded—especially pertaining to job specs.

data. It lets you trace out piping, ductwork, and so on. It's more seamless to do, and it saves time and money."

Once a bid is accepted, the next step in the process begins with a review of the project contract. It is important to note the upstream contracts that precede the balancer's contract with the mechanical contractor – that is, the project owner's contract with the general contractor, followed by the general contractor's contract with the mechanical contractor – so all involved contracts can be fairly represented in the final testing, adjusting, and balancing (TAB) contract.

Typically, the TAB contractor is last in the assembly line of a project's construction teams. So, the TAB contractor must take care "that the contract we're signing has references to the upstream contracts and that anything in those contracts is part of our contract," mentions Muscolino. "Otherwise, anything upstream of our contract, we could be liable for."

To mitigate or eliminate liability, the balancer must beware of the word 'alleged' in the contracts. "For instance, if something malfunctions or breaks on the jobsite and we didn't do it but were in its vicinity, they may say we must have done it, so therefore we're liable," says Muscolino. "That word is dangerous and creates subjectivity for damages to come back to us. So, we try to work with our customer [the mechanical contractor] and modify the contract, striking 'alleged' or clarifying 'liquidated damages' to make sure it's satisfactory to us, our customer, and the owner."

Mentions of 'liquidated damages' in a contract also need clarification "because we don't want to get stuck holding the bag at the end," states Muscolino. "If there's a set date in the contracts that says this building needs to be turned over by, say, August 1st, and it's not turned over to the owner satisfactorily by then, liquidated damages go into effect. The owner charges contractors for every day it goes over schedule, and they can charge anywhere from $100 per day to thousands of dollars per day. We would want to clarify that we're the last ones on the job, thus other contractors not doing their job can affect ours. If a controls contractor isn't done getting controls set up to the mechanical equipment, we can't start our job until that contractor is done. So, we need to clarify our duration for the project and set schedules up accordingly."

The TAB contract must be consistent with all upstream contracts on the duration of times for change order requests, lien rights on the property, and retainage terms to avoid further balancer liabilities. Equally consistent must be all parties' drawings, as a key step in job preparation "to be as efficient as possible on the jobsite, so we can identify potential problems before we send people," Muscolino remarks.

TAB Preparation

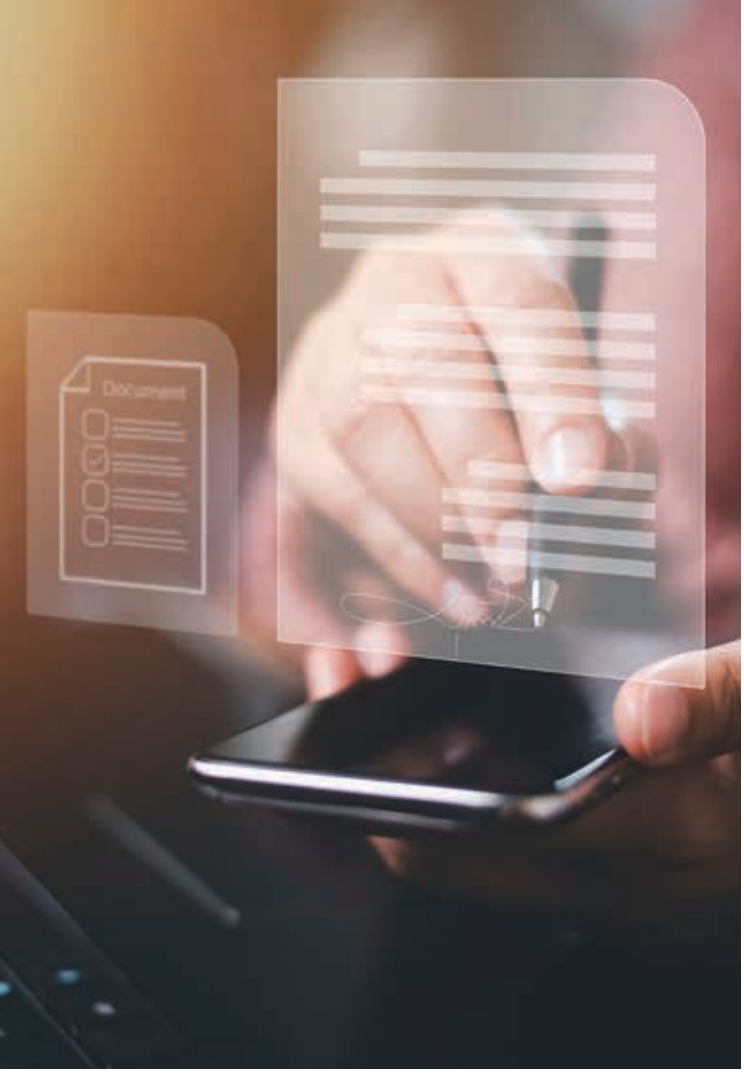
Once the contract is signed, the balancer continues to vet the project. It is important that during job prepara-

tion, the TAB contractor's project manager compares the engineer's and architect's drawings to the shop drawings the general contractor and mechanical contractor made to build off and vet for discrepancies. The drawings must then be compared to the submittals that list the infrastructural equipment being bought for the project for consistency between the equipment components listed in the submittals and those documented in the drawings.

Utilizing these documents, the communication with the construction team continues by submitting procedures and highlighting prerequisites to balancing. "Before we go on a jobsite, we need to submit our procedures to our customer for approval from the engineer of record," Muscolino explains. "To do so, we make detailed procedures, referencing NEBB procedures in how we'll go out and do the job. For us to do our balancing, there must be prerequisites completed before we set foot on the job—for instance, all ductwork installed, all controls complete, all dampers open. With that, we take those prerequisites and make a checklist for contractors to verify that each is completed. That checklist can be used to make sure the systems are ready for us to balance."

The checklist must include critical paths, or the most complicated mechanical systems that will take the longest to complete, hence take priority. This is part of a balancer's commitment to create durations, or estimated times in which the balancer will finish a task based on a particular system or zone's characteristics. "It may take, for instance, ten calendar days to finish a chilled water system and five calendar days to finish the air balancing on the fifth floor," says Muscolino.

Accountability is especially key regarding requested deviations from NEBB standards.



"We provide durations in different areas of a building so they can be worked into the construction schedule. And based on the durations for each one of these systems or areas, we can figure out the total duration for the project. This is given to our customer when we give them our procedures."

It is also helpful to the process of duration estimations to "work the schedule backwards to let them know when you need to start to execute the job successfully by the approved procedures," Muscolino mentions. Once the balancer knows the work completion date and the durations necessary to complete it properly, working the schedule backwards will help communication with the other construction teams, as well as hold everyone accountable.

Accountability is especially key regarding requested deviations from NEBB standards. "We get the other contractors to accept what our standards are: to properly balance per NEBB standards," states Muscolino. "If anyone wants to deviate from the procedures, we try not to let them. If they 100 percent need us to get started [earlier] because of schedules, we need them to sign off on deviations because by then the procedure is already approved. We need everybody to accept those deviations in the contract so accountability shifts to the person who's requesting the deviations. We work together to make sure all have bought into the deviations to make sure they're comfortable with any deviations on that project. And we need to document those deviations in our test reports."

Similarly, all parties must be involved in the overall commissioning process from beginning to end. "A good commissioning process involves communicating ahead of time with the commissioning agent, contractors, and design engineer. We start to advise what this project will look like well in advance–before we get onto the jobsite," states Muscolino. "It's a constant commissioning process that lets the whole team onsite so they can understand the balancing process because the controls contractor needs to understand what he needs to get done before we go do our work. The design engineer needs to be part of it, so he has in mind how the building needs to be operating. Having that active communication back and forth about our procedures and process is very important."

Having that active communication back and forth about our procedures and process is very important.

Special Circumstances – Existing Buildings

Active communication is equally important with parties outside a job's parameters, particularly when it is a renovation in part of an existing building. In this case, the balancer must "be wary of areas surrounding the area in the contract during bidding and call them out and break out pricing to force conversation," explains Muscolino. "When the general contractor and mechanical contractor look at a job like that, they look at boundaries of the area we're working in. When

we're balancing a system, all that ductwork and piping comes from the bigger system around it, so adjusting airflows and waterflows in our small area of work will affect areas outside our walls. We need to talk to them about it and give pricing to readjust outside of our area. If we don't address that, that other area will have existing problems."

This is where pre-reads, or base readings and measurements, of a building system's efficiency levels (before TAB begins) come into play, as changing the balance of a system's contractually affected areas will affect the adjacent areas they're connected to. "After everything's changed, we need to know what the surrounding areas still need to be so we can reset them back to how they were before," says Muscolino.

Onsite Balancing and Closeout

"A building project's success entails daily communication with all parties so everyone knows what's expected and can resolve onsite issues as they arise," insists Nick Muscolino. "This communication begins with a balancer's onsite meeting with all parties to review submittal prerequisites and create and review checklists based on those items before arriving at the jobsite," he adds.

The constant use of portable technology makes that communication more comprehensive, as well as immediate. It allows all parties to electronically review contracts, report job progress, share documents and drawings, and send time-stamped photos of onsite problem areas for swift, accurate troubleshooting. Technologies that Aero uses for these purposes include MS Teams, which integrates multiple Microsoft applications including Office, SharePoint, OneNote and Planner; and Building Start, a cloud-based mobile software that streamlines field data collection and sharing for balancers, mechanical contractors, and commissioning providers.

A building project's success entails daily communication with all parties so everyone knows what's expected and can resolve onsite issues as they arise.

"You can share files from a central database, drawings, submittals, or anything you need to see," says Muscolino. "You can create different task lists and to-do lists and share them with everybody. And you can access them on your phone or computer anywhere. You can chat on it too, and send little notes back and forth. It makes it a lot easier to communicate on a project in a central location. You can do quick calls, and even video calls. If a technician is onsite and needs to show us something, he can call and show the team what he's looking at. It's all about moving the schedule forward."

Given the length of their review processes and the buy-in they need from multiple parties, test reports must be submitted cyclically (rather than singly) at the end of the job to further help communication. "When we need to submit them, they go through a mechanical general commissioning agent for review," says Muscolino. "Sometimes it can take them a few weeks or a few months for them to review and submit comments for our response. If we submit reports often, people can access and comment on them and we have all questions resolved by the end of the job. That way, we eliminate that whole end-of-project issue."

"The whole thing is about communication," sums up Muscolino. "Getting in there early, forcing the conversation, and trying to take control of a project because we know, as the balancer, what it takes to close out a job." ●

The Importance of Indoor Air Quality and HVAC Strategies to Improve it

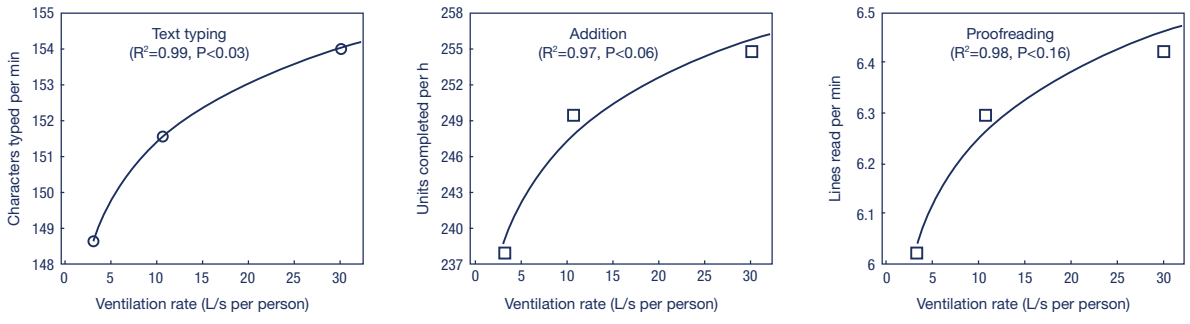
By Howard Smith

The Covid-19 pandemic has increased the awareness of the importance of indoor air quality (IAQ)--mostly in relation to how IAQ affects our health. While this is undoubtedly an important impact of proper indoor air quality, many consider the HVAC upgrades needed to improve indoor air quality a cost of the pandemic, rather than an investment. Studies have shown that not only is proper indoor air quality good for your health, but it also results in improved employee productivity, and ultimately, a better bottom line for your company.

For example, a study by Pavel Wargocki in 1999 examined three different operational tasks often found in an office: typing, addition, and proofreading. Those in the studies completed these tasks at three different ventilation levels, and it was found that each time ventilation doubled over 6 CFM, productivity increased 1.7 percent (Wargocki, 2000). In other words, if the ventilation rate was raised from 6 CFM to 12 CFM, productivity would increase 1.7 percent. If increased to 24 CFM, productivity would increase another 1.7 percent (Figure 1).

One might think that, given these productivity increases, companies would consider increasing ventilation a no-brainer. However, there is a general perception that increasing ventilation is cost prohibitive. In fact, in 2020 Belimo conducted a survey in which 64 percent of respondents indicated that the increased cost to

FIGURE 1.



condition additional outside air was the biggest challenge to improving indoor air quality. So, how expensive is it?

A study conducted in 2014 by Donghyun Rim investigated the energy costs associated with increasing ventilation in Singapore, a tropical climate with high temperature and humidity–and a worst-case scenario for HVAC costs. In this study, even at the lowest temperature setpoint of 22°C (~72°F), when increasing ventilation from 10 L/S (21 cfm) to 25 L/s (53 cfm), the utility costs increased 129 percent (Rim, 2015). Extrapolating this data, if you were to double the ventilation to 20 L/s, the increased ventilation cost would be 86 percent.

Some things to note here: First, is that given the extreme environment, it is unlikely the building would see this level of increase. Secondly, the ventilation rates are very high in this example. Finally, raising the setpoint even slightly would have a significant impact on reducing the utility costs.

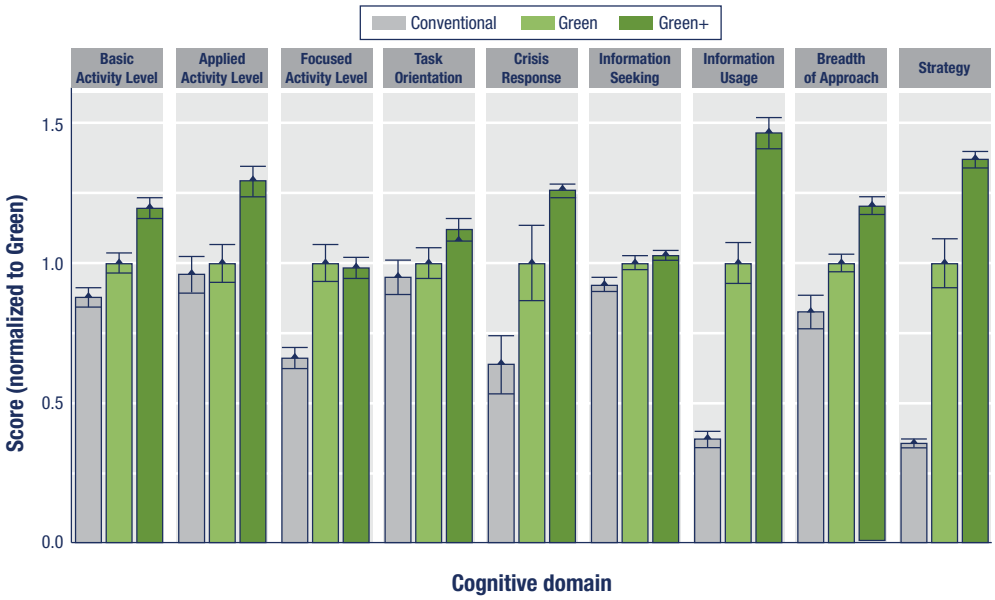
An 86 percent increase in utility costs may seem expensive, but it is important to consider these costs in relation to total costs for a company. To help put it in perspective, there is a useful rule of thumb that states on average, a company will pay $300 per square foot on their employees, $30 per square foot on rent/mortgage for their building, and $3 per square foot on utilities (JLL, 2016). Alternatively, you could say that on average, companies pay ten times as much for building rent as they do for utilities, and ten times more on employees as they do on rent. For example, a company with revenues of $10,000,000, that spends 50 percent of revenue on payroll (an analysis conducted by Deloitte found that on average a Fortune 500 company spends 50-60 percent of revenue on payroll (2017)) would have an annual payroll of $5,000,000, rent of $500,000, and utilities of $50,000.

Referring back to the 1.7 percent increase in productivity, a company with employees producing 1.7 percent more work in the same amount of time would stand to have a 1.7 percent, or $170,000, increase in revenues. Even if utilities increased 86 percent, or $43,000, the net improvement to earnings before interest and taxes would be $127,000. This is a very large improvement, and it pays dividends immediately. No training programs or marketing campaigns required.

These are meaningful impacts to a company's bottom line, but they still may be less important than other, less quantifiable impacts. A study by Dr. Joseph Allen conducted in a simulated work environment reviewed office employees' productivity over three days and various ventilation levels. In particular, the study examined nine different cognitive domains, as illustrated in Figure 2.

In general, results were higher on improved ventilation days across all domains, and the scores were the highest on the days with the highest ventilation rate in all but one domain. This in itself is interesting, but another important observation is that the three domains that showed the highest level of improvement were crisis response, information usage, and strategy. Crisis re-

FIGURE 2.



sponse scores were 131 percent higher on green+ days than conventional days (Allen 2016). One need only look back (or sideways) to the pandemic to know that how an organization responds to a crisis has major implications for whether or not that organization survives, let alone profits. Wouldn't you prefer your employees thinking twice as clearly during these times? It is difficult to quantify just how much money is saved or earned by thinking more clearly during these key moments, but intuitively, one can imagine that the impacts are profound. Utilizing available information and setting your company's strategy can also have profound impacts on its future success or lack thereof.

Armed with the knowledge that increasing ventilation is good for your bottom line, the next question that follows is, "How do I do that?" The first step in this process is to understand how much ventilation your zone needs. ASHRAE guideline 62.1 equation (6-1) makes it easy to calculate how much airflow is required per zone for *acceptable* indoor air quality based upon things such as the type of zone, size of the zone, and number of expected occupants. For example, a large locker room will need more fresh air than a small hotel lobby. Note the values calculated by this guideline are for acceptable indoor air quality, and therefore should be treated as minimum values. It is likely you will need to exceed these values in order to obtain the aforementioned productivity benefits. However, many zones do not even meet this standard, so making sure you do is a great first step.

Once the airflow requirement is known, the next step is to measure the amount of fresh air delivered to occupied zones. The most common method is to use some form of a pickup probe in the supply air duct, which has orifices in the front (for total pressure) and in the back (for static pressure). Pneumatic tubing is then connected to a differential pressure sensor, which can be standalone, but is more often found integrated into either the damper actuator or controller. Flow is calculated from the differential pressure measured. These systems are often calibrated or balanced onsite, to compensate for any irregularities in the system. It is useful to modulate the damper based upon flow, rather than position, because flow does not vary linearly with respect to damper position. Controlling based upon position might not give the expected response.
In addition to the fresh air entering your space, it is also important to understand the pollutants that are in the space. Using CO_2 as a good (albeit not perfect) proxy for the number of occupants, a rise in CO_2 levels in that given space indicates that it is not receiving adequate ventilation. Typically, CO_2 sensors are placed

in the zone itself, but may also be used in return ducts. Outdoor concentrations of CO_2 vary by location, but the current global average is around 420 ppm (Persily 2022). If using demand-controlled ventilation based upon CO_2 levels, you should not set your minimum to be less than 420 ppm, because even with 100 percent outside air, you won't be able to achieve it.

In other areas where pollutants are actively released into the air, such as in kitchens, laboratories, and manufacturing facilities, it's a good idea to also include VOC sensors. This will alert you to any abnormal increases, where you may want to bring in more fresh air. You can also use carbon filters to remove VOCs, but note these filters become saturated, rather than clogged. This means that rather than stopping more particles as they get clogged, they allow the VOCs to pass straight through.

There are a myriad of benefits of proper indoor air quality and this article only scratches the surface. The main takeaway is that you cannot look at indoor air quality as a cost of doing business, or as a temporary measure to get employees more comfortable returning to the office during a pandemic. It should be seen as an investment that can pay immediate dividends with the added bonus of improving the health and well-being of your employees. ●

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Life Safety Systems

Stair Pressurization | Smoke Control Focal points from both TAB & BSC

By Jonathen Lloyd | NEBB YPN

INTRODUCTION

Life safety is the most important part of every building's occupancy certificate. The delicacy of a correctly operating life safety system is paramount to the safe working environment for a building's occupants. The objective of the life safety system, particularly the stair pressure systems and their zone smoke control, are to create and maintain a clear, smoke-free path long enough for a building's occupants to safely evacuate in the event of a fire. There are multiple trades and multiple roles within a life safety bid, testing, and proving to be operating correctly.

Below, we will examine two parts of the life safety system: stair pressurization and zone smoke control.

DESIGN CHALLENGES

During the design phase, the number one challenge a design engineer will encounter is physical space. This determines the physical attributes of the stairwell and its eventual configuration. You may have two separate fire stairwells on opposite sides of the building. Or perhaps a scissor stair scenario with multiple entry points from a tenanted space. From a design perspective, this is the first crucial element of the design process.

Equipment selection is not always an easy task. The system designer will try to account for pressure losses of the air paths as well as the equipment the air must pass over and around. In most cases, the designer will allow for more static on the fans to guarantee adequate supply in the worst-case scenario. But is that enough?

What about the outside wind conditions? Are the adverse weather conditions that are historical to the area detrimental to performance of the system? Has the architect taken into consideration these weather conditions?

From a commissioning (Cx) perspective, the design phase is a busy time. The commissioning authority will need to review each portion of the design process carefully. The physical location can be a major challenge for a life safety system. Pressure control must be taken into consideration. Stair pressurization fans and stair relief fans can and will control perfectly to their respective pressure setpoints as long as the pressure from the space to atmosphere is stable. Structural obstacles such as balconies, inlet louvres, etc. can wreak havoc on the atmosphere reference point.

The structural integrity of each stairwell is another key element of pressure control. If pressure increases in one zone (whether it be stairwell or fire compartment) and there are leakages between these spaces, it will be very difficult to control the HVAC systems. The use of enclosure testing and thermal imaging could be a very useful tool during this phase of commissioning.

The electrical performance of each fan and relay will need to be tested against a fire matrix to ensure that every piece of plant and equipment operates as nominated. Following on from this, the functional performance testing will need to be carried out with the fire interface panel to make sure that both the HVAC systems and the fire protection systems are working together correctly.

The project should now be in a phase of testing actual performance. It is not uncommon for the local jurisdiction to be involved in this process. There are local authorities that utilize specialized smoke systems with applied heat to simulate the buoyancy of hot smoke during a fire scenario. Quite often, in these types of tests, the visual performance is easier to follow than the documented test results.

Assuming that all of the above has been completed, the testing, adjusting, and balancing (TAB) professional will be invited onsite to test the actual performance of the life safety systems and report on the findings. Unfortunately, in most instances, a project is not ready, and the TAB professional will end up testing multiple stages multiple times as the construction process unfolds. With unforeseen delays to the construction process, and perhaps contractual agreements allowing the owner to occupy portions of the project during construction, we quite often see a staged handover of the life safety systems implemented on a project.

The TAB professional will test each system for performance and apply their testing against criteria taken from the specified test parameters listed in the specified contract documents.

TEST CRITERIA

There are countless codes and standards that a commissioning agent and TAB professional must be aware of. It is extremely important that the test criteria for the building, whether it be a new build or an annual recertification test in an existing building, is available to review and discuss. As obvious as this comment may be, it is imperative that the standards you are testing to are both known and understood by all parties involved. Each standard should be read carefully, and any "gray" areas discussed prior to commencement of work. It is always better to read a standard literally rather than twist its words to suit your situation. The systems we are testing are designed to save people's lives. We most certainly DO NOT want to cut corners or risk system failure to save a bit of money.

Each set of contract documents should list the intent of the life safety system performance from the fire engineer on record or the authority in charge of this process. All questions should be forwarded to this same person for action and response.

A common standard followed in Australia is AS 1668. However, in California for example, the California Building Code must be adhered to. Although both standards differ, they both share a common goal and strategy by manipulating ventilation systems to achieve suitable smoke control. Both standards refer to differential pressure requirements, door opening force requirements, and smoke layer requirements, etc.

CONSTRUCTION CHALLENGES

During construction, issues will definitely be encountered. How we mitigate that risk and apply quality control is the difference between a successful outcome or a painful and drawn-out process. Time is key. Not only from the perspective of needing "more time to do the job," but allowing each process the suitable amount of time to see the task completed correctly. General contractors are reliant on mechanical contractors to "get it done" when it comes to the HVAC systems. However, they often don't want that to involve interference with their structural work.

Although general and mechanical contractors must coordinate meticulously throughout the construction process, it is at this point where the harmony of both must be at their absolute. The life safety system can often be the key to occupancy and the final hurdle of the project. Cooperation from the general contractor and understanding from the mechanical contractor is paramount.

TESTING CHALLENGES

As discussed in the sections above, communication and coordination are the keys to a successful life safety test. However, unfortunately, the initial test(s) are more of a quality check exercise for the Cx and TAB agents as they navigate the tasks that were missed or not yet completed due to various reasons. Pressure control is arguably the biggest concern for the TAB company. The TAB professional must ensure that a valid and suitable setpoint is obtained for all relative fans associated with the stair pressurization system. But what is the setpoint and how is one achieved? Just as with TAB work itself, a series of tests are carried out on what experts can predict as our worst case scenario fire door(s). The aim for the TAB professional is to operate the system only as hard as required to achieve

the desired acceptance criteria. This set of equipment data becomes our baseline parameters. From here on out, the test should run quite smoothly, and only minor adjustments to these setpoints are to be expected. However, a further challenge encountered is where one extreme becomes too great for the other extreme. We must run the fans at maximum speed to achieve our door velocity minimum requirements which creates too much pressure on other areas preventing doors from opening. Depending on how a TAB professional carries out the test, a rogue door opening force could cause a major headache and significant retesting time.

Another remarkable yet extremely common challenge encountered by a TAB professional is simply adverse weather conditions. It is not uncommon for a test or annual compliance test to be postponed due to unusually high winds outside. Outside wind blowing into a fire stairwell can wreak havoc on our stairwell sensors. Although there are products available to reduce the impact of this type of scenario, it quite often is not enough, and the test must be re-attempted on a more suitable occasion.

SOLUTIONS?

SETPOINTS | A solid baseline is not an easy task in a lot of buildings. In fact, such as hospitals and other complex design scenarios, the perfect setpoint might be extremely challenging. To be able to find a setpoint that works well for every scenario, it can often pay to think outside the box and create a solution to a problem. During the design phase, it is best practice to include both TAB and Cx professionals in design discussions. The TAB and Cx professionals have encountered many different challenges and configurations and being able to draw from their experience could save a lot of time and money up front.

Building smart is also a great advantage in a successful stair test. Overcoming multiple setpoint challenges by installing a valves system is one of the smartest design ideas I have witnessed. With simple wiring and copper tubing, a 100+ level building can be configured to have every fire affected floor referenced to atmosphere, ensuring that a fire door close to the fan will not have too much fan speed and pressure applied to that particular zone fire trip. The worst case scenario, however, would allow the fans to drive to maximum to accommodate the increased performance requirements. As long as the atmosphere reference is in a suitable location and reliable, this control system will all but guarantee future performance.

DOOR OPENING FORCES | How often have you worked your way through a building only to find an issue with a door that requires a revisit or retest? I have experienced this on too many projects over the past 22 years. A carpenter or door hanging contractor often isn't made aware of the requirements that depend on

the way the door is hung and hardware set. Depending on the door opening force required in a specific region, a "passive" door opening force requirement can be established. For example, a good "passive" setpoint for a fire door in Australia is around 50Nm. This will allow a door to close under minimal pressure but not apply too much pressure, preventing the door from opening in a fire.

Another challenge often faced is a fire door catching on the frame or rubbing on the concrete landing on the other side of the door. These deficiencies are noted and the doors will have to be corrected and subsequently retested. However, a TAB and Cx professional can often verify system performance as a noted interim test. Experience tells me that I can hold the door on the edge of the frame to allow the stair fan to back off to its minimum and then retest the opening force. Although this cannot be the final test, it will give me confidence that the system setpoint is adequate and the system will work once the deficiency is rectified.

PRESSURIZATION | As discussed, system and building pressures present their own respective challenges. We have already mentioned the smart building solutions with a valve and tube solution but what about establishing suitable pressures for multiple fans? Once a fire trip is initiated, each fan will control to its minimal setpoint, waiting for instruction from the cause and effect of a door opening or closing. When all fire doors are closed, we want our stair fans to operate, but only to the minimum allowable speed. This will allow the fire alarm instruction over the evacuation system to be heard, understood, and followed. Once the building's occupants respond to the alarm system, the most common action is to descend the fire stair to safety. This means opening the fire door. We DO NOT want too much pressure! This could prevent an occupant from opening the door and could end in tragedy. We also do not want the fans to be completely off. The time taken for the stair fan(s) to start could be too long, allowing smoke to enter the stairwell. This is why we have the fans turning over to their lowest possible speed. This will ensure the fans are ready to ramp up and also prevent motors from burning out.

If stair relief fans are used, they must also operate to their setpoints, which will be the pressure required to remove the stair pressure fan(s) volume, along with any smoke, safely out of the building. However, these fans hold the potential to move large quantities of air through an opening, which could prevent the damper blades from opening or even push a set of smoke control damper blades out of its frame. Careful consideration is required, and it is common for the use of time delays to allow for the damper to be fully open before operating the fan. The fan will be able to maintain its setpoint easily in a passive state. However, when the fire door is opened, the relief fans will respond to the pressure decrease and ramp up to assist the stair fans with the smoke control.

In a similar situation, to that of the physical door opening force, the stair pressurization and stair relief fans need to be carefully configured to accommodate the worst case scenario, as well as our best scenario, and of course everything in between. The TAB professional must first establish the worst performing door and ensure the system will respond to pressure increase and decrease and respond accordingly to allow the door to open and then provide sufficient air movement to keep smoke out.

CONCLUSION

Life safety is a process that requires attention to detail, careful planning, clear and concise communication between all trades and cooperation by the entire project team. This is a particular task that involves everybody, and the principal contractor and sub trades MUST be managed correctly to ensure this process's success. An owner's representative's best friends are the TAB and Cx professionals. They will have the skill, knowledge, and experience to deliver the successful system operation in a timely manner; however, authority is key. The TAB professional, in this case, should not be needed, as the Cx professional will discuss issues with the project team during the design phase. Addressing any concerns in the kickoff meeting and laying down the expectations from the owner's project requirements brief to the entire team of sub trades life safety on a project is the collective responsibility of every worker on the job. If each phase of the commissioning process is given suitable time, focus, and energy, a successful outcome is a more likely outcome. ●

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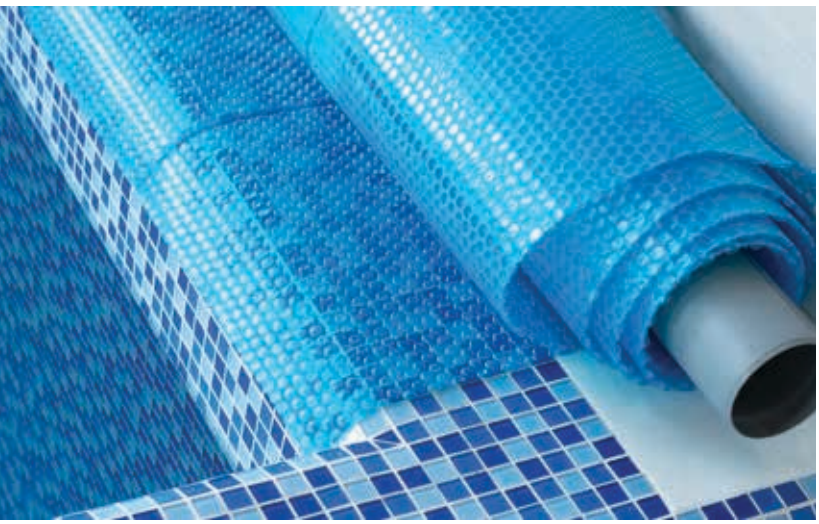
or Something Less?

By Andrew Boyd

I inherited my parent's retirement farmhouse when they died, which includes a small swimming pool. I quickly learned the high amount of work and expenses that a pool demands–all for a limited time of enjoyment. While wrestling the floating solar pool cover in place, I began thinking about building science and how it relates to the pool. Blame it on my inner geek, the hot sun, and a frosty margarita.

The solar cover is basically a large plastic bubble wrap membrane that floats on the surface of the pool to hold the water's heat and help slow evaporation. You trim it to size for your pool.



When new, I guess the cover was 95 percent effective at covering the water and performing its job. Now that the cover is a few years old, there are rips and tears and it is now only about 85 percent efficient. Maybe next year, when it is down to 80 percent efficiency, I will replace it. It still performs well with a linear degradation over time.

Contrast this to the concrete walls and floor of the pool. If they were 95 percent when built – accepting that 5 percent of the water would constantly leak – it would be considered a construction failure. If it degraded around 5 percent per year, it would be even worse.

The pool cover works at 90 percent, 80 percent, or even 50 percent effectiveness to help stop evaporation and hold heat. Perfection is not required, but desirable. With the pool lining however, perfection is expected.

I believe it is important when we design building systems to decide which components need to be 100 percent perfect and which are ok with something less. Let's look at some examples:

1. **Drained foundation versus a boat foundation:** A typical, properly detailed basement foundation system does not need to be designed like a pool. Waterproofing that is 90 percent effective is probably just fine. Rather than designing the basement as a boat, it is best to design the foundation walls with an effective drainage system so hydrostatic pressure never builds up, and groundwater drains to a perimeter drainage system and out to daylight or a robust, redundant sump pump system. Proper damp proofing, a drainage membrane system, and use of free draining aggregate and filter fabric gets the job done. The robust system with backups compensates for minor flaws in execution.

   However, for some specialized basement applications – perhaps under the water table for an archival storage area in a swamp, a true pool type foundation may be required. Perfection is needed, plus dealing with uplift and any minor leaks that may develop over time.

2. **Batt insulation versus continuous insulation:** Fiberglass batt insulation installed between studs as part of a wall assembly is another linear type of building component. In a cold climate like zone 7, you could add a minimum of R-11 between 2x4 studs or R-30 between 2x10 studs. Both buildings could be made comfortable in the winter, but the wall with minimal insulation would require a larger heating system and would use much more energy for the same comfort.

   Continuous insulation requires more care. While batt insulation may have R-30 in the cavity, the metal studs come in at about R-0.5. Every stud would be below the dew point and likely the freezing point in a wall in zone 7 with standard sheathing–not only wasting energy, but likely causing moisture issues. Continuous insulation can remedy both the thermal bridging at the studs and keeps the inside of the cavity above the dew point to prevent condensation and freezing. That is, as long as the insulation is the proper thickness, and is installed carefully to avoid problems.

3. **Vapor barrier (retarder) versus air barrier:** A vapor barrier, more accurately called a vapor retarder, is another fairly forgiving building material component. Typically, a material like 6-mil polyethylene sheeting is used in wall assemblies (interior in cold climates, to the exterior in air conditioning climates, and best left out in mixed climates); used to cover dirt in crawl spaces; and used under concrete slabs. In all cases, the material resists differential vapor pressure to prevent water molecule movement. Without an air pressure difference, this force is relatively weak. Ripped and torn poly under a slab that covers 90 percent of the aggregate is still 90 percent effective in thwarting water molecule movement.

   An air barrier, on the other hand, needs to be as close to 100 percent as possible because it is preventing the movement of moisture rich air from moving across building assemblies under air pressure. Wind, stack effect, HVAC pressurization or depressurization all encourage air to move through the building assembly. If this air contains moisture, and it reaches a surface below the dew point, liquid water will be deposited–often, a bunch of it in the wrong place. Air barriers are like tire innertubes – you don't go on a long bike ride with one which is only 95 percent effective.

4. **Shingled sloped roof versus membrane low-slope roof:** Traditional shingled roofs with sufficient slopes can be very forgiving. In fact, with traditional wood shake roofs with open purlins, such as in a barn, you can easily see daylight streaming through the roof from inside on a sunny day, yet the roof sheds water perfectly during a rainstorm. Gravity, proper flashing, and overlapping surfaces all conspire to make this traditional system very robust. The details must be right, but this system has worked since humans first started building roofs; with a variety of materials ranging from thatch to clay tiles.

   A membrane roof with very little slope is a much more finicky animal. Even a small leak will cause water damage to the building below, and is often devilishly difficult to find. Proper workmanship, detailing, materials, drainage, and flashing is essential.

5. **Vent screened wall versus barrier wall:** Positive or negative pressure exists in a building between the exterior and interior. Basically, Mother Nature wants

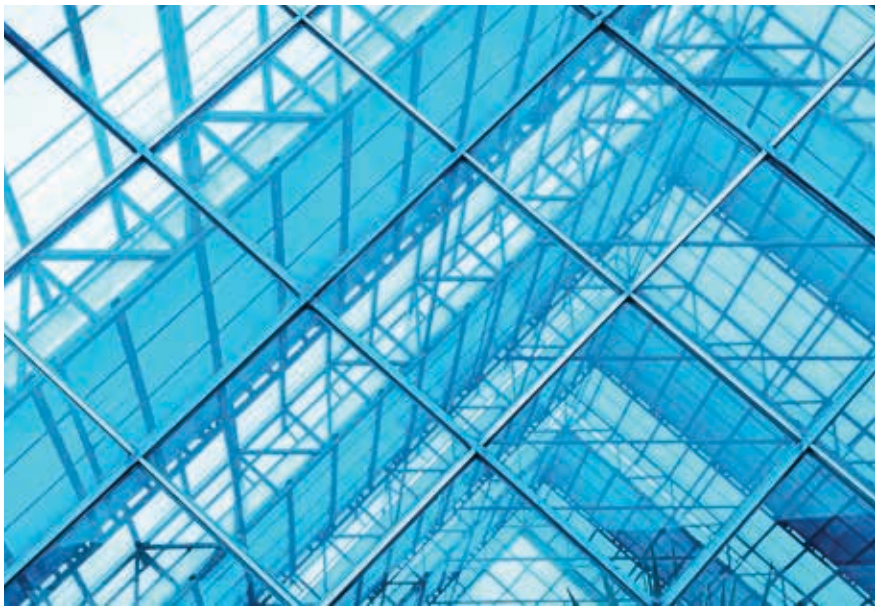
harmony with the interior pressure the same as the exterior. When she is in a bad mood, such as during a hurricane, this desire can be quite formidable. And as we discussed earlier, air movement moves moisture in places it does not belong. In addition to a robust air barrier, a vent screen system that adds a water shedding cladding (like the shingle example), a neutral pressure air space behind the cladding, and a water/air barrier protected by the cladding is an ideal and very forgiving system. Brick veneer, furred siding, draining exterior insulation and finish system (EIFS), and pressure equalized curtain wall systems are all designed to be forgiving. The exterior cladding does not need to be perfect because any water that penetrates merely drips out the bottom of the cavity.

A barrier wall system, on the other hand, relies on a perfect exterior cladding to prevent moisture issues. The early EIFS systems were a casualty of this type of wall system with millions of dollars in legal claims as a result.

Overall, perfection is tough to achieve. Every morning when I look in the mirror, I see how impossible and fleeting it is. We are much more successful as designers when we can design building systems that are forgiving and allow for mistakes in the field. Aim for systems and details that work with natural forces rather than trying to fight them.

Some systems do require an enhanced level of perfection with the goal of 100 percent. Designers need to decide when these requirements are critical, and carefully detail and specify them when needed. ●

Please note all views expressed in this article are those of the author and do not necessarily represent the views of the agency or the United States.



The NEBB TOOLBOX

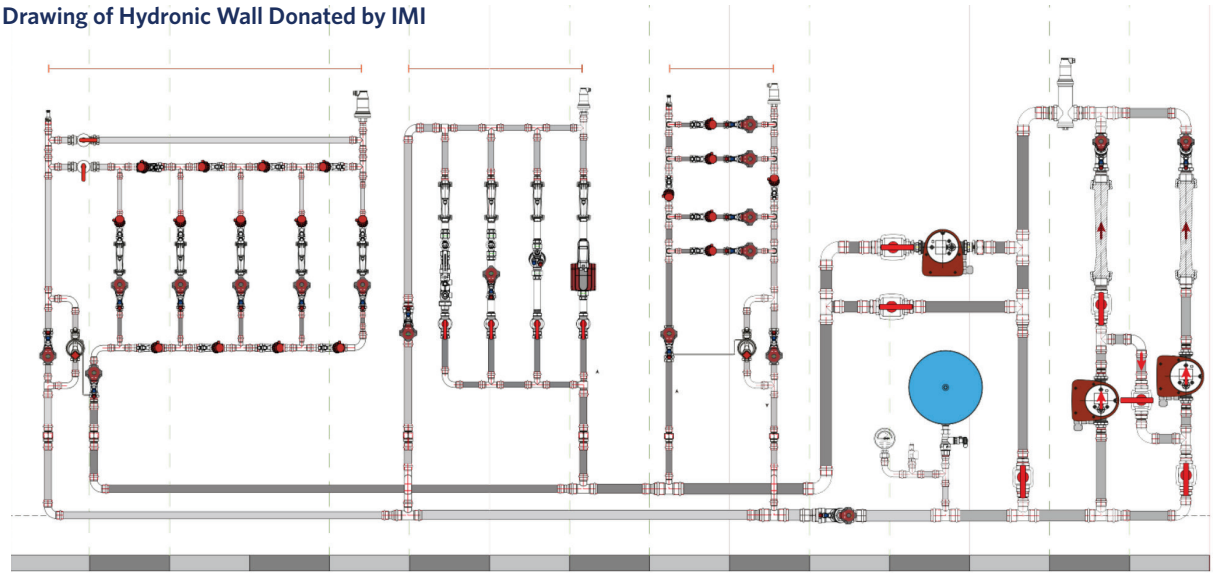
By Jeff Schools | NEBB Technical Director

I cannot believe how fast 10 months have gone by already. It seems like just yesterday was my first day working at NEBB. To say we have been busy would be an understatement.

One of the duties that I enjoy most is working with the Technical Committees on various projects. These volunteers who give up their valuable time for the betterment of NEBB are the backbone of this organization. At this time, all these Committees are currently juggling a lot of balls and getting a lot done. Each of them is working with Cristi Arbuckle on Exam Development. They are all in various stages of the process of creating their JTA's (Job Task Analysis), BoK's (Body of Knowledge), and exam updates. We also had our first meeting of the EST (Environmental Systems Technology) publication and are currently building an outline of what each discipline would like to add or re-write in the next edition. The committees are also working together with Samantha Hawa, NEBB's Online Training Coordinator to create content for the NLC (NEBB Learning Center). Each Committee is building courses and lessons to be uploaded onto the site. The NLC is a very valuable tool for Certified Professionals and Certified Technicians. To set up your account, access to the NLC can be found on the NEBB website under the resources tab.

The Robert Gawne Training Center project is ongoing. We are currently waiting on equipment that is being held up by supply chain issues. But the good news is, that the exhaust fans for the fume hoods were just recently delivered and I have been in discussion with the sheet metal contractor about hanging them and completing the ductwork. Also, IMI Hydronic Engineering has been so gracious in designing and donating a Hydronic Wall System. On July 14, 2022, we received an email from Amanda Salamone from IMI informing us that they would be supplying all the components to build the wall. We are very fortunate to have relations with companies like IMI and thank them for their continued support. ●

Drawing of Hydronic Wall Donated by IMI



WAR STORIES

How to Pass a Building Enclosure Test with Overhead Doors

By Mike Peak

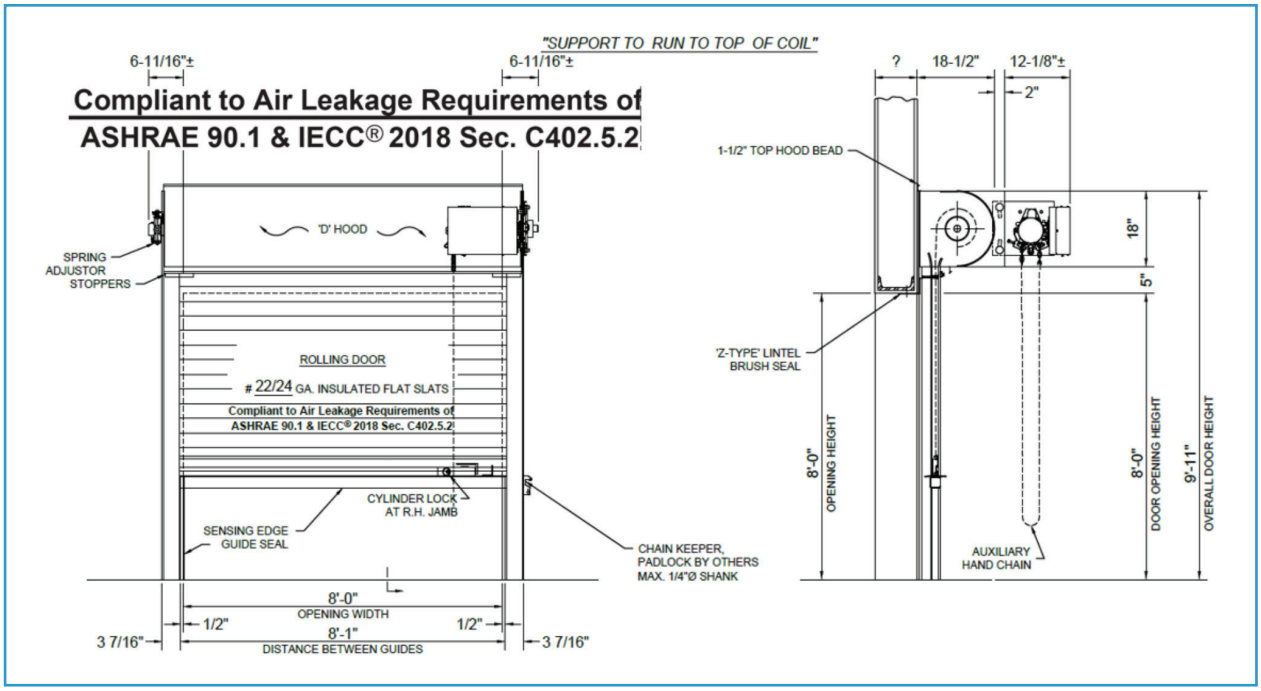
About a month ago, I was presented with an interesting challenge. As a building enclosure testing agency, we do plenty of building enclosure tests on an array of different types of construction. From massive warehouses to schools, all the way down to little coffee shops. You see, in Washington state, a building enclosure test is required for every commercial building as a part of their energy code to get a final certificate of occupancy. So, when we were asked to come out to the Rocky Reach Dam outside of Wenatchee, Washington to conduct a building enclosure test on a large mechanical shop, it was a common request. However, when we found out that they had a twenty-two by thirty-foot coil door, we collectively sighed and loaded every fan we own into a trailer, assuming automatically it would fail. I have tested several warehouses with coil doors, and I am the farthest thing from a door expert, but I do know one thing: nearly every warehouse I have tested with coil doors has failed. The reason these projects do so poorly is because non-insulated coil doors are specified, which have no air leakage rating. Coil doors have a large gap at the top that allows the door to uncoil to the closed position. On non-insulated, non-rated coil doors, that gap is generally unsealed, or sealed with nothing more than a brush which only partially contacts the slats. This amounts to a large opening that easily allows air to pass by under the pressure of a building enclosure test.

As the failing tests mounted on projects with coil doors, we saw a problem coming down the road. The updated energy code in Washington state was going to require all buildings to pass a building enclosure test at a given leakage rate to receive a certificate of occupancy. Two associations were taking this seriously, and that's when we were approached by the Metal

Building Manufacturers Association (MBMA) and the Door and Access Systems Manufacturers Association (DASMA) to provide some additional testing. As mentioned previously, this project had a large twenty-two by thirty-foot coil door, along with another smaller eight by eight-foot coil door, and four fourteen by fourteen-foot sectional panel doors. We were asked to conduct a baseline test to satisfy the Washington state energy code, then perform three additional tests. One with all the coil and sectional doors sealed, one with just the large coil door unsealed and finally one with both coil doors unsealed. This would tell us the net leakage of the sectional doors and the individual leakage of the coil doors.

I thought to myself "What a great idea, now we can quantify the leakage between sectional doors (which do pretty well during the building enclosure test) and coil doors." Why didn't I think of this? So, I set off to Wenatchee with all my fans in tow to meet a couple of engineers out of Ohio– Vincent Sagan of MBMA and Dave Monsour of DASMA. After inspecting the doors with Dave, I set up fans and fired them off fully expecting the building to fail (I even recall prognosticating such in our pretest conversation), but much to my surprise, the building passed easily. I had to start pulling fans out of the door because they were running too slow to get accurate flows! With my brow furrowed, I started entering numbers into my calculator thinking I made some kind of mistake. "These projects never go this well" I said to myself, but the numbers were right. So, I tugged on Dave's coat and asked, "What's going on here? What kind of doors are these?"

On this project, the architect specified insulated flat slat coil doors with a lintel brush seal that pressed firmly up against the door when closed. With a gasket at the base and gaskets up the vertical rails, these doors claimed that they were compliant with the air leakage requirements of ASHRAE 90.1 and IECC 2018 Sec. C402.5.2, and much to my delight they were just that.



This building–a metal building system with rigid insulation panels on the roof and walls–had a surface area of 79,810 square feet with an allowable leakage of 31,924 CFM based on the acceptance criteria of 0.40 cfm/ft2 at a test pressure of 0.30 inches of water gauge (2.0 L/s at 75 Pa). This building was tested using the NEBB version of the ASTM E779 linear regression test, and tested in both directions. The initial baseline test showed an average leakage of 12,055 CFM at a test pressure of 75 Pa. This equated to a leakage rate of 0.15 which is good enough to pass the more stringent leakage rate of 0.25 that went into effect under the 2018 Washington energy code.

With the baseline test completed, we sealed up all the overhead doors and retested the building. With the overhead doors sealed, the building leakage fell to 8,259 CFM at a test pressure of 75 Pa, bringing the leakage rate down to 0.10 cfm/ft^2. This test indicated that the overhead doors contributed 3,796 CFM (31%) to the overall leakage of the building. With roughly 1,508 square feet of overhead doors on this project, this equated to 2.5 cfm/ft^2.

The next step was to unseal the large coil door and retest. With the large coil door unsealed, the building leakage came in at 10,490 CFM at a test pressure of 75 Pa. This indicated that at this test pressure the large coil door contributed 2,231 CFM (18.5%) of the overall leakage during the baseline test, equating to 3.38 cfm/ft^2.

Following this test, we unsealed the smaller coil door and retested the building. With both coil doors unsealed, the building leakage came in at 10,920 CFM at

a test pressure of 75 Pa, indicating that both coil doors contributed 2,661 CFM (22%) to the overall leakage of the building. The smaller coil door contributed 430 CFM (3.5%) to the overall leakage of the building, which equates to 6.7 cfm/ft^2.

With these tests behind us, we determined that the net of leakage for the sectional doors came in at 1,135 CFM, representing 9% of the overall leakage of the building, or 1.45 cfm/ft^2.

The sectional doors came in much better than the coil doors. We knew that would be the case going into this test, as sectional doors have far less gaps than the dozens of slats that make up the coil doors. They can also easily be sealed along all four sides when closed. But these coil doors performed very well.

Bear in mind that this is a field test subject to uncontrollable factors–one being the installation of the individual doors. The larger door performed better in terms of leakage per square foot. However, both doors performed much better than a standard coil door that is not designed with air leakage in mind. Given the leakage differences between both coil doors, one might conclude that most of the leakage occurs around the perimeter of the door. The perimeter of the small coil door is a much greater percentage of its area (32/64 = 50%) compared to the big coil door (104/660 = 16%). Regardless of the reason, unforeseen variables exist in the field and are revealed during testing.

With the Washington state energy code requiring buildings to pass a minimum leakage rate going forward, I had a lot of concerns about using coil doors on any building until testing this project. And I have learned that not all doors are the same. I'm delighted to see that manufacturers are seriously taking to heart energy conservation in the design of the exterior components of our buildings and strive to meet higher energy efficiency standards.

Is your state or local jurisdiction considering adopting a building enclosure testing requirement? If so, carefully considering what type of doors you select in your design can make all the difference in passing or failing. ●

Chapter NEWS

Florida EBB (FEBB) Chapter

Florida EBB's 42nd Recertification Seminar & Annual Chapter Meeting is scheduled for April 27-28, 2023. The meetings will take place at The Brownwood Hotel and Spa located in The Villages, Florida. We have exciting plans for sessions that we are working on and looking forward to welcoming everyone. We will have our annual Corn Hole Fundraiser and we have added a quick round of golf the day before to help a Florida college student in the engineering field.

Please contact the Chapter Coordinator at 727-240-4254 or FEBBchapter@nebb.org for more details and the registration form.

Our next NEBB TAB Practical Exam will be conducted on December 10, 2022 at our Deerfield Beach Testing Site. For additional information, please contact the FEBB Chapter Coordinator at 727-240-4254 or by email at FEBBchapter@nebb.org.

The Brownwood Hotel And Spa

Mid-South EBB (MEBB) Chapter

Registration is open for the 2022 recertification seminar which is being held in conjunction with the NEBB Annual Meeting at The Charleston Place in Charleston, SC from November 3-5. To register, visit the NEBB website (nebb.org) and select the NEBB Annual Conference page listed under News & Events. MEBB will hold its Annual Membership Meeting on Sunday, November 6th at 8:00 a.m. We are inviting vendors to join the membership meeting to give a brief update on their products or services offered.

The Charleston Place

MEBB is organizing chapter sponsored continuing education opportunities for Certified Technicians to earn the annual CECs required to maintain certification. Be on the lookout for more information about this opportunity.

Southern California Chapter

It is with great honor and admiration, that the Southern California EBB (SCEBB) Chapter presented Jim Rosier the 2nd Bill Blackstone Lifetime Achievement Award for his outstanding achievements in our industry on June 10, 2022. Jim's career in the sheet metal industry started when he was 17 years old. A friend of his Dad asked, "Hey kid, what are you going to do with the rest of your life?" The rest is history–an impressive and fulfilling career in an industry he deeply cares for.

In 1969, Jim started working for Renkow Mechanical and stayed for 19 years starting as a green apprentice to eventually work his way up to project management. His introduction to air balance came when a friend of Jim's needed help running his air balance business. At this time, Jim and Shelley were newlyweds. Shelley would come into the office to help him with whatever he needed. Later it was determined that Jim and Shelley could start their own air balance company, so they did just that. In 1989, Equal Air Balance Co., Inc. was formed, and run by Jim for the next 25 years.

Jim dedicated himself to the industry and worked countless hours, nights, and weekends. While doing so, he also served in many capacities in our industry, serving on almost every committee or task force that Orange County SMACNA had during his tenure: Legislative, Events, Budget, Labor Management Cooperative Trust, and Labor Negotiations. Jim also held many positions on the National SMACNA level: Trustee for the SMW Savings Plan, SMW Supplemental Retirement Plan, the Tax Qualified Benefits Trust, ITI Tab Task Force, TABB Council Steering Committee, International Certification Board for TABB and the HVAC Contractors Steering Committee. In 2013, Jim was inducted to the TABB Hall of Fame at the 13th Annual ICB/TABB Convention in Ohio.

After serving SCEBB as Vice President and President, Jim took over the position of Chapter Coordinator from Bill Blackstone in 2014. Following 25 years owning Equal Air Balance, Inc., Jim and Shelley decided it was time to retire. The business was then sold to Erik and Denise Dlugajczyk who have taken excellent care of it since that time.

Even with all of the meetings, phone calls, and a busy schedule, Jim always found time to be the best Dad to his daughter, Katie. He never missed an opportunity to drive or pick her up from school, have acting parts while helping out with the stage crew for student productions, or assist with Girl Scouts, soccer, basketball, or football games. Besides being a dedicated father, Jim was always there to help his employees with anything they needed. He considered his employees his family and treated them as such. While Jim has since slowed down his work schedule, he can be found watching hockey, walking his dog Gunny, and cruising to Alaska when possible.

Last year, we said this award might not ever be awarded to another person due to Bill Blackstone setting such high standards. If anyone deserves this award since, it would be Jim Rosier. We, the members of SCEBB, thank you, Jim, for the legacy you have created in the industry you love.

MAEBA Chapter

MAEBA held its Annual Recertification Seminar at the Hard Rock Hotel & Casino in September. This year's seminar was extra special because MAEBA celebrated its 50th Anniversary!

A special thank you to our speakers: Jeff Schools, NEBB Technical Director; Mike Kelly of Air Filtration Management, Inc. and NEBB Board of Directors; John Connolly, Safety Professional; Ted Salkin, PE, NORESCO (BSC); Eric Sellers, Barton Associates (Domestic Hot Water Systems); Jeff Crozier, P.E., Precis Engineering, Inc. (How COVID is influencing building design); Jared Kapoor, Evergreen Telemetry ("Tips and Discussion for Making Accurate Test and Balance Measurements"); and Derek Hedrick from Ameritech Data Solutions (TABopts with NEBB Default forms), for providing their presentations.

Save the Date! MAEBA will be holding its Semi-Annual Meeting on Friday, April 28, 2023 at the Radisson Hotel in Trevose, PA. ●

The Radisson Hotel in Trevose, PA

2023 NEBB Technical Seminars Schedule

Clean Performance Testing Seminar
March 3-6, 2023, at NEBB TEC in Gaithersburg, MD
August 28-30, 2023 at NEBB TEC in Gaithersburg, MD

Testing Adjusting and Balancing Seminar
February 9-12, 2023, in Rosewell, GA
May 18-21, 2023, at NEBB TEC in Gaithersburg, MD
September 21-24, 2023 in Irving, TX

Building Enclosure Testing
April 24-26, 2023 at NEBB TEC in Gaithersburg, MD

Fume Hood Performance Testing
June 5-6, 2023 at NEBB TEC in Gaithersburg, MD

Visit **https://nebb.org/events/** to learn more

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