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JULY 2019 VOLUME 3 NUMBER 7

HIGH-PERFORMANCE HVAC TODAY™

SERVICE:

Callbacks Are Expensive: Now for the Rest of the Story . . .

The cost of callbacks impact your entire business. So what should you do about them? Dennis Mondul shares his thoughts.

TECHNICAL:

Improve System Performance Using the Two-Foot Rule

NCI Trainer John Puryear explains airflow and turbulence and its impact on overall system performance.

COVER STORY:

High-Performance HVAC Industry Influencers

It takes a village to change an industry. When it comes to Performance-Based Contracting™, who are some of the key "villagers" and why are they so influential? Read this to learn more.

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By Mike Weil

The Gray Tsunami Is Upon Us

It's no secret: Baby Boomers are facing that point in their lives where retirement is just around the corner. Yes, we are getting old and some of us are not going down without a fight. But the fact is, an entire generation is beginning to leave the marketplace and that exodus will become a gray tsunami unlike anything witnessed before.

Plenty has been written over the years on the impact that this will have on businesses and industries around the globe. Many have broached the subject of the impending technician shortage in the HVAC industry and plenty of people (me included) have stood on soap boxes crying out for the need to correct the situation.

But how?

Recently I spoke with Don Langston, president of Aire Rite Air Conditioning and Refrigeration about a related topic – lack of quality training for field service and installation technicians, especially when it comes to doing system performance testing. He talked about how America's decades-long push for young people to attend college has resulted in the dismantling of most high school shop programs.

"So many young people missed the opportunity to get into the skilled trades where they could make more money and not be burdened by huge college debts," he told me.

It's one of the reasons why Don got so involved in workforce development – at his company, in industry associations like the Air Conditioning Contractors of America, plus his work in California with the Western HVAC Performance Alliance, as well as with national organizations.

He even started an educational foundation called "Human Works" to provide training for people interested in the trades.

This is an amazing amount of effort by just one contractor to better the industry.

But is it enough?

Europeans may have a leg up on us in this regard. There is a movement that began in 2017 by politicians and commentators to shift government funding and attention away from higher education and back toward vocational training.

In an article published in June 2017 on the *Inside Higher Ed* website (**ncilink.com/EU-Vo-Tech**), the author cites a study done with over 9,000 citizens in eight European countries. It showed that "when forced to prioritize one area of education, only 17 percent chose higher education, compared with 30 percent who want more vocational education and training."

This swing, according to the article, may be the result of what author David Matthews called "the enormous expansion of universities."

Well here in the U.S., we have that issue too. But more importantly, it's the cost of that university education that is crippling young people today and burdening them with an enormous debt that they may never be able to repay.

Isn't it time that we look at swinging the pendulum back toward the middle? Isn't it time that our educational system equally promotes both the trades and college as viable options for our young?

As Dominick Guarino wrote in his *Last Word* column for ***Contracting Business*** in June 2019 (**ncilink.com/LastWord0619**), "It's estimated we will soon have a 30% shortage of technicians in the HVAC industry. Unless something drastic happens to change this course, one in three will be gone within the next few years!"

The gray tsunami is upon us. Unless we fix our approach to education and make vocational training equally important as college, its waves will overwhelm and damage not only our industry, but also the future of our children.

So what are you doing about it? I'd love to hear your thoughts. NCI

Mike Weil is editor-in-chief and director of communications and publications at National Comfort Institute, Inc. He can be reached at **MikeW@ncihvac.com**

Written By HVAC Professionals for HVAC Professionals

DWYER 490A HYDRONIC DIFFERENTIAL PRESSURE MANOMETER

The original Dwyer 490 hydronic manometer has been around for more than a decade. Back then, it wouldn't read in feet, and the resolution wasn't where it needed to be. But its size and weight were perfect for when balancing dozens to hundreds of chilled and hot water coils above the ceiling on large commercial projects.

The 490A today has fantastic resolution, accuracy (±5% FS accuracy), and a handy back-lit screen which is a bonus when you are up in a ceiling. It comes in several packages with or without the manifold, in ranges from 0-15 PSI, up to 0-500 PSI.

Not only does this device meet the requirements for most TAB certifying organizations, it comes with a NIST traceable calibration certificate (**ncilink.com/NISTCert**), plus many of the parts and fittings you'll need.

Besides being a great tool for longtime hydronics pros, it is also the perfect FIRST hydronic meter for professionals just starting to explore hydronic balancing.

Another bonus for when you need to travel to a job across the country: a travel-friendly soft case version of the 490A. This soft case enables me to fit the entire 490A kit into my computer bag. This specific soft-case kit is ONLY available through National Comfort Institute (NCI) and National Balancing Council (NBC).

Of note is the fact that the 490A is the result of input from hundreds of professionals holding certifications from multiple organizations, union, non-union, TAB, mechanical, residential HVAC, Federal government, and facilities managers.

Learn more about the 490A and the soft case on the NCI website (**ncilink.com/Dwyer490A**).

If you are interested in the manifold version, go to Dwyer's website for more information (**ncilink.com/DwyerHyd**).

By Scott Fielder, Director, NBC

FIELDPIECE SDP2 DUAL IN-DUCT PSYCHROMETER

The Fieldpiece dual wand psychrometer (SDP2) is quite a versatile instrument when it comes to multiple temperature measurements.

Because it has two wands that attach to one hand-held unit, equipment temperature testing has never been any easier! Just place one wand in the return plenum, the other in the supply plenum, and the instrument displays both readings simultaneously.

When you need dry bulb or wet bulb measurements, relative humidity, or dew point readings, the SDP2 can do it. It even has a built-in psychrometric chart which will convert wet bulb readings to enthalpy, so us airheads don't have to look at enthalpy conversion tables anymore.

Put the calculators away – the SDP2's programming will calculate the temperature differentials in any temperature parameters. It even has a function that will sync with the correct set of Fieldpiece gauges for proper refrigerant circuit charging.

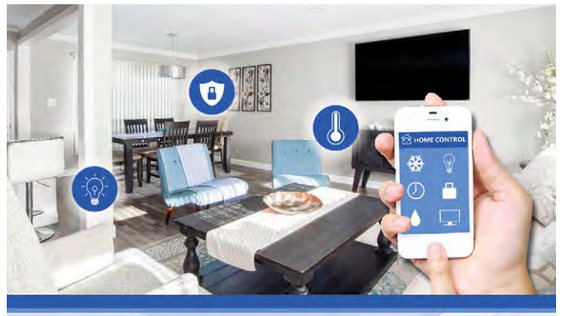
Other pros of the SDP2: it's a very rugged instrument with a protective rubber case around the front, back, and sides. Its keypad is easy to use for changing parameters, and having two wands instead of one is huge!

By the way, the SDP2 has a great display screen with a blue back-light feature.

There are only two cons to this instrument: One is the wand tips can become damaged pretty easily if you aren't careful. The second is that the protective covers for the wand tips are black. When working in dark areas they can be hard to locate when testing is complete.

If interested in learning more about the Fieldpiece SDP2 Dual In-Duct Psychrometer, go to **ncilink.com/SDP2**.

By Casey Contreras, NCI Field Coach and Instructor



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By Mike Weil

"We Sell Value and Performance"

Chicago's North Shore stretches between the northern edges of the Windy City itself to just south of the Wisconsin border. The area is a collection of affluent communities located in Cook and Lake Counties – a swath of real estate that is home to both Northwestern University's ivy-lined campus and to the only Bahá'í House of Worship in all of North America.

Greg Vickers

The city of Glenview is part of the North Shore area and is home to GV's Heating and Cooling. The 29-year-old residential and commercial HVAC maintenance and service company was founded by Greg Vickers and his wife Pam. GV's cares for clients throughout Chicagoland and offers a full range of services that include air conditioning, heating, hot water systems, snow melt systems, and clean air systems.

His modus operandi is to provide customers with the highest integrity and honest service, based on being well educated in the systems they install, maintain, and repair, as well as the tools and methodologies necessary to do that.

The family business grew – not only from the perspective of sales and profits but also from the addition of family to the ranks – namely son Scott in 2003 and daughter Dawn in 2004. Scott works as a service technician and Dawn is one of two company HVAC comfort specialists.

Vickers says that his journey toward high performance really began in 2008 or 2009 when he learned about National Comfort Institute. He took his first class (taught by Rob Falke) in 2010 for air balancing and air diagnostics. His mission after that was to follow the performance way of life.

"We sell value," he says. "It's really how we do business and that plays nicely with the idea of Performance-Based Contracting™."

Was making it work easy? Not by a longshot. He will tell you that in the beginning, he faced more internal issues than external ones.

The GV's Team from left to right: James Hamelberg, John Mroczek, Dawn Mroczek, Nathaniel Brand, Pam Vickers, Scott Vickers, Greg Vickers

CHANGE IS HARD

"When we first began moving toward a culture of performance, there was pushback from our people. They mostly couldn't wrap their heads around the 'why' of it," he says.

"It's about doing the right thing. It's also about learning. Gaining knowledge. It probably took us a good four to five years to get everyone on board. Today, the entire team is on board."

One thing Vickers does is to regularly remind GV's field personnel that because of the company's culture and all the training, they are the best of the best. More importantly, Vickers says customers are telling the technicians the same thing.

"Really that is the answer to the 'why' of what we do," he says, "and that is how our team finally got it. They get so jacked up, so excited now."

SURPRISING CUSTOMER REACTIONS

When it comes to selling High-Performance HVAC, Greg Vickers says customers have been very receptive to it. "In fact, they are often floored by the data we show them," he says.

"But we don't lead with measurements. We lead with a discussion. We call this *Show-and-Tell*. We ask them questions about their health, comfort, as well as where they see the hot and cold spots in their home."

Then they perform their testing and diagnostics. Vickers says people are generally very receptive to seeing actual numbers. He says on calls where they can answer customer questions with facts, his salesperson (Dawn) can close the sale most of the time.

GV's installation box truck on a jobsite.

He says, "The interesting thing is, once people see the numbers, their reaction is usually something like 'I can't believe we've been living under these conditions for so many years and no one said anything about it!"

TOOLS OF THE TRADE

To provide customers with the results they promise, GV's makes sure their technicians are equipped with the right tools and instruments to get the job done.

Every contractor has their own policies, but Vickers says it makes sense for his company to provide the larger, more expensive tools including flow hoods, vacuum pumps, traverse tools, digital manometers, as well as an infrared camera and particle counter.

"We expect the techs to have their own hand tools and gauges," he says.

Another tool of the trade that Vickers says is key to successfully selling air upgrades and duct renovations is to offer financing packages. He adds that in most cases, when they find the problem and offer customers choices in solutions, the customers WILL choose one.

"Financing is a key component of this because it takes a sometimes-pricey project and breaks it down into affordable monthly payments. Today everything is financed. It's to a point today that between 85 to 90% of our customers take advantage of our financing programs. The costs for duct renovations and equipment are not obstacles."

So pricing is NOT an issue. By doing the show-and-tell approach to measuring and offering financing to help make payments reasonable, GV's closes around 70% of their sales, according to Vickers.

PERFORMANCE BEGINS AND ENDS WITH TRAINING

"We wouldn't be where we are today had we not started training with National Comfort Institute more than 10 years ago," Vickers explains. "It goes beyond that. We took what we learned and used it, implemented, made it part of our daily routines.

Dawn demonstrates using a flow hood during in-house training.

"Have we implemented everything we learned? Absolutely not. What we focused on were nuggets – small bits of information learned in every class we took, every Summit we attended, and we came back to the office and we worked on it.

"NCI has the total package. Other training organizations focus on maybe one thing – whether it's on the business side or the technical side. NCI covers technical training, business training, customer service training – it's like an endless fountain of knowledge. There is always something you can learn.

"Our success with the Performance-Based Contracting approach begins and ends with training," Vickers adds. "It is enhanced by networking. And I know that there is no end to the training because technologies change, approaches improve, and new things are being discovered each day."

Though training is key, he also says the performance method will not work well if you aren't consistent in its implementation and use. He confides that may be the toughest part of the process.

THE RECOGNITION FACTOR

Earlier this year, GV's Heating and Cooling was recognized by National Comfort Institute with the presentation of its **Contractor of the Year Award** (**ncilink.com/2019CofY**).

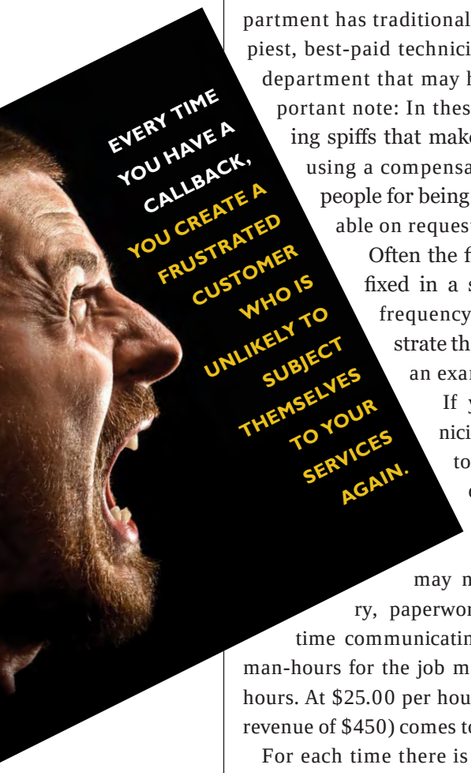
Winning this award is, in Vickers' opinion, a tremendous honor and proof that what they are trying to do is absolutely the right thing.

"Our employees can really see the importance and value of what we've been pushing. Being recognized by NCI means the world to them."

For these and many more reasons, **High-Performance HVAC Today** selected GV's Heating and Cooling as our *July 2019 Contractor Spotlight*. Congratulations! NCI

By Dennis Mondul

Service Callbacks Are Expensive:
And Now for the Rest of the Story . . .



While doing work for around 1,000 HVAC contractors over the last 20+ years, there has been a remarkable consistency in service labor as a percentage of service revenue. It is common for a company to operate with a labor rate of 27% to 35% of revenue for the department. Meaningful profitability is difficult for a company in this situation.

The standard labor rate for a good service department has traditionally been 22%. And the happiest, best-paid technicians and owners work in a department that may have it at 19% to 20%. Important note: In these companies, it is not selling spiffs that make them the best paid. It is using a compensation method that rewards people for being effective (details are available on request).

Often the first thing that needs to be fixed in a service department is the frequency of callbacks. To demonstrate the financial impact, let's use an example of a failed fan motor.

If you account for the technician's drive time to the customer's home, the time to diagnose and repair the unit, a trip to a supply house to get a motor that may not be in the van inventory, paperwork preparation, as well as time communicating to the customer, typical man-hours for the job may involve as much as four hours. At $25.00 per hour, labor (based on this job's revenue of $450) comes to a little over 22%.

For each time there is a callback, we need to account for a second technician's travel, diagnostic, repair, paperwork, and communication time with the customer. This may add up to two more hours of raw labor invested in the rescue technician.

The financial impact of this call back would look like this:

- $100.00 first tech
- $50.00 second tech
- $150 is now 33% for the labor on $450 of service revenue.

THERE'S MORE . . .

By expending two hours for the rescue technician to complete the fix, you forever lose the additional revenue that a capable tech could have generated on another job. Let's say that two hours could generate at least $300.00.

Now we are looking at hard dollar costs that add up to $150.00 of raw labor, plus the lost revenue of at least $300.00. There is no quicker way to lose money in a service department than to overlook callbacks.

THERE IS EVEN MORE . . .

Every time this happens, you have a customer who may feel cheated and betrayed. Customers who are subjected to this kind of treatment are unlikely to subject themselves to what they see as incompetence again. This is the definition of a lost customer.

Dissatisfied former customers are also likely to vocalize their frustration to a group of people we will call, "never-will-be-customers." If this happens too often, your marketing campaigns may not be able to overcome their negative influence on potential new customers.

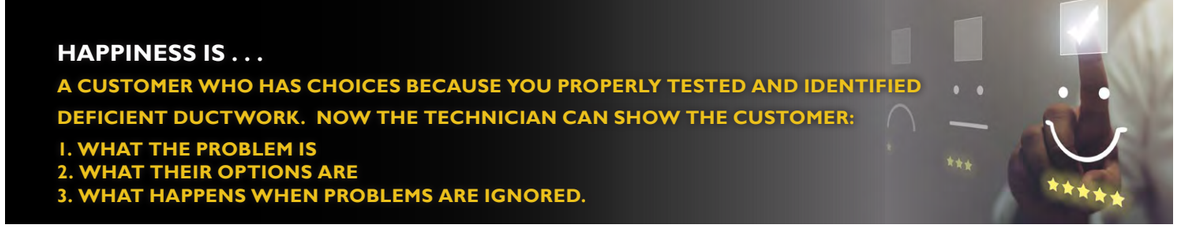
The damage to your local branding is difficult to quantify but could be incredibly expensive.

BUT WAIT! THERE IS WAY MORE . . .

When your technicians fail to perform in a customer's home there is an additional price paid by others on staff. For instance:

The Customer Service Representative – There are customers who express frustration and sometimes anger to innocent co-workers who answer the phone. For someone needing to sound happy and WOW customers on every inbound call, this can be a serious burden.

The Manager – Angry customers tend to somehow reach the boss. Now the boss may need to respond and give time, attention, and sometimes money back to the customer because of the failure. There is too little of all of those items to spend on unnecessary and avoidable call back issues.



HOW DO YOU TURN IT AROUND?

First, don't blame the technicians for the problem, even subtly. This only makes becoming profitable more difficult.

Holding termination over the heads of those who underperform rarely generates better results. Besides that, it may be easier to find a leprechaun than it is to find an available and capable service technician. Here are some ideas that can help.

- **List the technical failures from the service tickets** – After a quick assessment of the failed service ticket, you will likely have a very good picture of your technicians' technical training needs. And they are likely to be categorized as electrical, mechanical, and issues in the refrigerant circuit. Those companies that have a weekly training schedule with "hands-on" time with copper, motors, wires, torches, etc. tend to develop very good and loyal technicians.

However, the fact is that much of the training done in contractors' labs or in schools, fail to require competence in correcting improper airflow. As a result, this training can often generate inaccurate diagnoses or the diagnostic readings may be useless.

- **Early in the training cycle, you want to build mastery in Performance-Based Contracting™** – It could be said that most meaningful diagnostics for furnace and air conditioner operation begin with precise airflow. Absent that, you won't be able to determine the proper refrigerant charge, proper Delta T, capacity, amp draw, dehumidification, or even determine if ductwork leaks are impacting system performance.

Furthermore, on the heating side, flame color does not necessarily indicate efficient fuel burning. The customer may have invested in a high-efficiency furnace, but if you don't know the oxygen/fuel ratio, you may have never actually delivered a safely operating high-efficiency furnace to your customers.

Recognition of this was born out in comments made by Satoru Akama, president of the Goodman/Amana business unit during the High-Performance HVAC Summit in April 2019.

He said, "When a unit leaves our factory, it's only a structured combination of aluminum, copper, and plastic components assembled together. It's just a piece of a system, nothing else. It gets life and becomes a product only when professional contractors like you install it properly. Moreover, you give it long life by maintaining it for customers.

"We design, engineer, and assemble pieces and components, but you give them life. I thank all of you for giving life to our products."

It appears that we have come to a fork in the road as an industry. We may be in a place today where quality contractors in any marketplace will be defined by their technicians being capable of doing whole system performance analyses (starting with airflow). This means:

1. Having technicians capable of making precise measurements
2. Making sure technicians can make the situation understandable by homeowners.

Here is one example of why Performance-Based Contracting may be the dominant training needed in our industry today:

Recently, National Comfort Institute (NCI)-trained technicians tested 856 existing systems nationwide. What they found may strike you as startling. Sixty percent of the systems tested showed deficient airflow. Much of that was due to ductwork deficiencies. These caused customer complaints like poor comfort or high utility bills, and both generated callbacks.

This shows that the general rules of thumb used by much of the HVAC industry regarding ductwork are not working. With proper testing, deficient ductwork can be identified, and with proper training, the technician or Comfort Advisor can be trained to show the customer:

- The problem, based on objective data
- Options for solutions
- Potential consequences of not resolving the issues.

They can then let the customer decide on how to proceed.

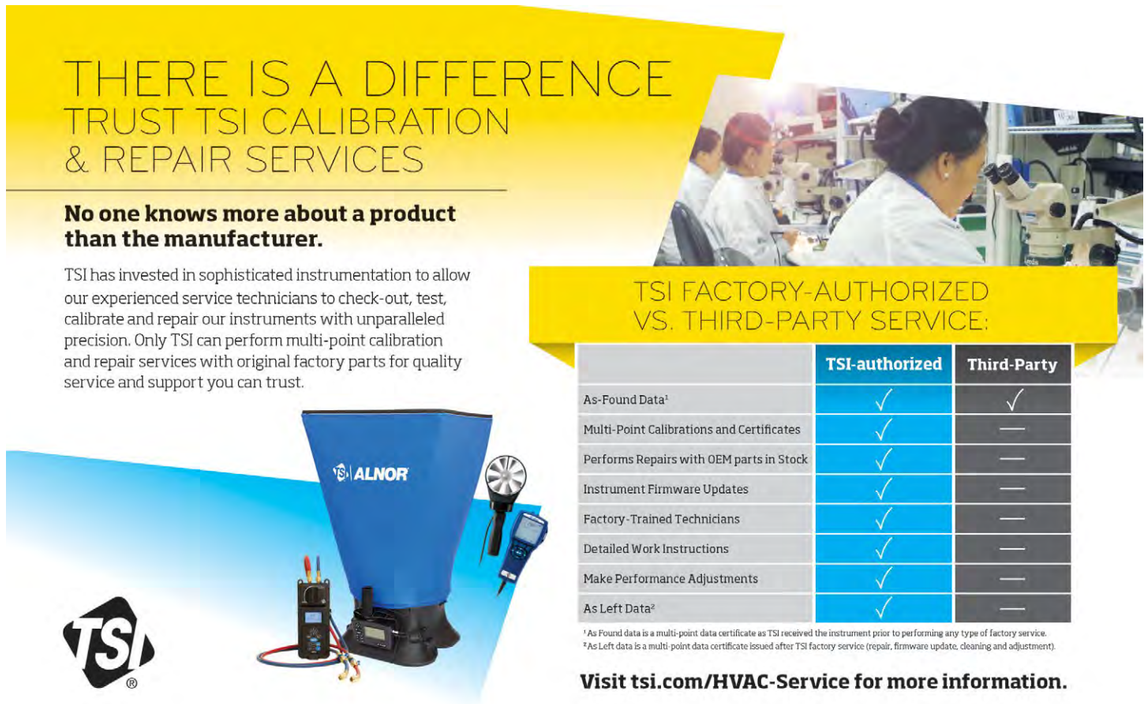
This can be done in a manner that is unlikely to generate any pressure or risk the sale of equipment. In fact, many contractors who have adopted this style of serving their customers claim that it has increased their likelihood of making the sale.

If your company is one that needs to increase equipment sales ratios and cut service callbacks down dramatically, here are some easy steps to begin "upping your game:"

- Become a student of Performance-Based Contracting
- Track and interpret technician performance so you can see how your training investments pay you back
- Expect to celebrate with your team.

If these issues seem too complex, time-consuming, or too expensive, please contact me with your questions. Sometimes what appears to be a huge mountain is really just climbing an easy slope. Many contractors have kept this kind of project simple and affordable. You can too. NCI

Dennis Mondul from HVAC Contractor Solutions (HCS), has been doing consulting and training for HVAC contractors in North America since 1992. The HCS mission is to show contractors how other contractors increase the quality of life for their families, employees' families, and delivered a better-quality service to their customers. He can be reached at **dennism@hvaccsllc.com**.



By Mike Weil

High-Performance HVAC Industry Influencers

Every industry has people who have had a great impact on it — whether it is from the invention of technology or processes, or from sales and/or marketing techniques. These are people who, because of their experience, knowledge, position in that industry, and relationship to others impact its development. They make a difference in the industry's direction, and ultimately it's future. The Performance-Based segment of the HVAC Industry is no different.

These influential people are not only members of the Performance-Based Contracting™ community, but they work to help others be more successful. In fact, by their actions, they contribute to the High-Performance HVAC Industry's growth and acceptance throughout the greater HVAC industry and among consumers as well.

How did they make our list? Over the years, members of the NCI team have traveled the country, visiting and working with many contracting firms, manufacturers, distributors, and utilities, as well as the various trade associations. They worked together on ways to evolve away from just selling equipment, to one that takes the time to understand that a system is much more than a set of boxes.

They met people who believe in the tenets of testing duct systems, equipment, even the overall building itself. They measure airflow, temperature, and more, then calculate their impact on delivered comfort and energy efficiency.

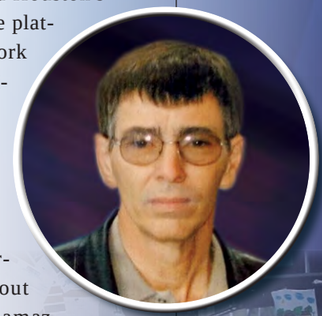
The following four top "influencers" of this industry are just the beginning. We plan on featuring influencers twice each year.

Time or era in which they served was not considered — we looked at what they have done or are doing and the impact of those efforts on the industry.

If there is someone you think should be added, let us know who they are and why they are influencers. Send me your "nomination" via email at **mikew@ncihvac.com**.

So, without further ado, here are the first four influencers who have had a direct impact on the High-Performance HVAC Industry.

DAVID DEBIEN, CENTRAL CITY AIR CONDITIONING, HOUSTON, TX



Born in Port Clinton, OH, Debien's entire life was that of a "tinkerer." He founded Central City Air Conditioning in 1986 and quickly made a name for himself as a problem solver, eventually landing a radio show where he was dubbed Houston's "air conditioning guru." This is the platform on which he began his life's work of trying to solve indoor humidity problems throughout greater Houston.

As a tinkerer, Debien loved to measure everything. He was a strong proponent of accuracy and of not guessing. At every opportunity, he discussed his ideas about customized installations and the amazing results achieved from his proprietary designed evaporator coil with an adjustable expansion valve.

Over the years he manufactured his own coils, used stainless steel drain pans custom-built for his systems, and continued looking for and adding many unique features to his designs and installations. He was a true visionary in the air conditioning industry.

David took his knowledge and passion to homeowners, building inspectors, and industry peers by teaching classes at local colleges and other venues.

He presented at conventions and seminars nationwide. He authored articles on humidity control in several industry trade publications and even taught in local community colleges.

He championed humidity control using the entire HVAC system instead of just a humidifier/dehumidifier product and was always looking for better ways to accomplish that.

David Debien lost his lifelong battle with diabetes in 2006.

To honor his dedication to performance and his memory, National Comfort Institute created the David Debien Technical Excellence Award. It is given every year to an individual who demonstrates having strong technical skills, especially in airside and combustion testing.

Like Debien himself, this person regularly performs diagnostic testing on service/installation projects. The recipient is a constant learner – always seeking to improve their knowledge – and participates in sharing that knowledge by teaching others in his company.

TOM TURNER, AUSTIN ENERGY, AUSTIN, TX

In the High-Performance HVAC universe, getting the word out about the importance of measuring and proving system performance is something that requires traction from more than just HVAC contractors. Manufacturers, distributors, and utility companies also have roles to play.

One such entity, municipal utility Austin Energy of Austin, TX literally took the Performance-Based Contracting™ methods to heart, embracing them in their efforts to train the HVAC contractors in their service area, to test, measure, and diagnose both mechanical equipment and duct systems.

As the Environmental Program Coordinator for Field Services for Austin Energy, Tom Turner was key to helping the utility to understand the importance of this approach so it could achieve the energy efficiency goals it was tasked with. He was part of a leadership team that brought about the creation of a "Duct Diagnostics" program which taught contractors blower door and duct blower testing.

In a profile story interview with this magazine (**ncilink.com/0318AustinEnergy**), Turner said, "More than diagnosing leaky ducts and homes, the program established the fact that old homes needed duct improvements to address comfort, performance, and to prolong HVAC equipment life."

This was unheard of for most other utilities at the time.

From teaching and requiring their contractor participants to "test in and test out" on every job, the utility can truly validate energy savings – a huge benefit for consumers as well as the utility itself.

Turner's contributions helped to set a gold standard for utilities and contractors alike when it comes to testing, measuring, diagnosing, resolving comfort issues, and delivering results that consumers want and need.

He says, "whether they are in the Austin market or elsewhere, "HVAC contractors need to keep up with advances in technology and best practices. It's more important than ever to embrace innovation and methodology."

ROB FALKE, NATIONAL COMFORT INSTITUTE, SHEFFIELD LAKE, OH

Rob Falke is one of the two founders of the National Comfort Institute in the early 1990s. Rob leads the technical training and curriculum development teams of the company, which is driven by his and CEO Dominick Guarino's vision that HVAC system performance can and should be measured, tested, and diagnosed under live operating conditions in the field.

He has always found himself looking at the world through technical lenses and sees the vital importance of service and installation technicians – when properly trained – to consumer safety, comfort, and efficient energy use.

In fact, he helped to not only found NCI, but also a division of NCI now known as the National Balancing Council (NBC).

NBC established and maintains stringent standards that must be met by those seeking to qualify for certification in testing, adjusting, and balancing commercial air and hydronic HVAC systems on projects of all sizes and scopes.

Rob always felt that the duct system was the key to overall comfort and energy savings and over the years he gathered enough data – proof if you will – that he was right.

His passion is to use that knowledge to help contractors actually deliver what they promise to their customers. That is why he is most noted for his understanding of the importance of proper airflow distribution for delivering comfort in any building.

In his early days, he was often called

the "Air Doctor" by his friends. Today many just know him as "Doc" Falke. His contributions to Performance-Based Contracting™ are many, including the focus on air delivery, air balancing, and diagnostic testing.

To date, the curriculum and classes he oversees and teaches have reached more than 25,000 HVAC professionals over the years. This small army renovates, balances, and improves live performance of hundreds of thousands of HVAC systems a year and is revolutionizing the way HVAC systems are tested and rated for performance.

He has published hundreds of articles, technical procedures, and reports during his career serving the air conditioning and heating industry. Furthermore, Rob has been instrumental in the development of ASHRAE Standard 221P, a "Test Method to Field-Measure and Score the Cooling and Heating Performance of an Installed Unitary HVAC System."

In essence, this standard will raise the bar for the entire HVAC Industry by holding it accountable at the field level. This is a first, and Rob "Doc" Falke is at the heart of it.

DON LANGSTON, AIRE RITE AIR CONDITIONING

When it comes to customer satisfaction, Don Langston says that performance matters more than promises. Langston, President and CEO of Aire Rite Air Conditioning & Refrigeration, Huntington Beach, CA, explains that "through total system diagnostics, customers see their system in a new light and understand the value of the services provided."

Aire Rite is a $23 million commercial HVAC firm that focuses on the HVAC, restaurant, and food service industries.

Langston says, "A performance-based approach teaches customers about their HVAC systems in simple terms, identifies real performance issues, and differentiates contractors from competitors. This approach proves to be a great lead generator and profit center for our HVAC business."

But that was never enough. He takes his successes and works to translate them to the rest of the HVAC Industry through his trade association and industry activities. Don is widely known within the trades and has been very involved in shaping policy and government regulations in California.

From a Performance-Based Contracting™ industry standpoint, Don has put his money where his mouth is. Besides keeping his team trained and certified in the high-performance method, he founded a non-profit educational foundation called, "Human Works," to help train others in his area as well as helping the California Public Utility Commission develop their own performance-based training programs.

He is a speaker and has spent a lot of time educating his commercial customers through their trade associations on the importance of knowing the numbers when it comes to HVAC system and building performance. He shows them how this approach will save them energy dollars and improve productivity and comfort at the same time.

He says, "energy costs are more controllable today than ever before."

Among the customer group conferences he speaks at are the Building Owners and Managers Association, the Restaurant Facilities Managers Association and more.

In addition, Don Langston has been heavily involved working on emerging technology projects with funding from DOE, the State of California, and state utilities. It is on such projects that he became more acquainted with Dominick and Rob and the NCI team.

This enabled him to see tremendous sums of money being squandered, especially on the energy efficiency side. In California, he found himself working against the concept of "deemed" energy savings because it is based on calculations where, as he says, "the math just didn't add up."

"The biggest opportunity for improving energy efficiency in any existing building is fixing the ductwork. Most return ducts are undersized. Most supply ducts are jacked up – especially in older buildings that have been remodeled."

Which is why he has been very involved in the development of ASHRAE Standard 221, and why he supports training that teaches contractors how to do this kind of work.

For these reasons and more, ***High-Performance HVAC Today*** magazine recognizes Don Langston as a key contractor influencer in the Performance-Based Contracting Industry. NCI

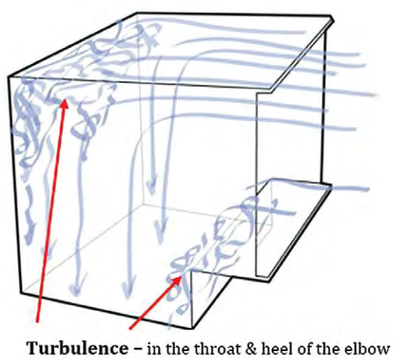
By John Puryear

Improve System Performance
Using the Two-Foot Rule

Sometimes our industry spends more time focused on equipment than on how to deliver comfort into living spaces efficiently. This article details a common rule-of-thumb based on the physics of air movement in a duct system that has all but been forgotten.

"WE HAVE ALWAYS DONE IT THIS WAY"

Most HVAC contractors, depending on their geographical location, have a standard duct system-type they use when installing equipment -- usually during the initial new construction phase. Currently, local jurisdictions may require a Manual J, Building Heat Loss/Heat Gain calculation, and sometimes a Manual D, Duct System Design drawing. This development was not common 20 years ago.



Turbulence – in the throat & heel of the elbow

Many contractors assume the duct system is sized and installed correctly according to the local code. They also assume that the HVAC equipment is producing and delivering the "correct amount of air" to the duct system. This assumption can lead to ductwork going untouched for decades. Then, when a contractor is confronted with an airflow issue by the customer, he takes out his trusty Handometer, holds it over the register in question and agrees with the customer.

Then he says something like, "All we have to do is add another outlet in this room or maybe a return. If that doesn't do it, we'll increase the fan speed if possible."

Don't laugh, a lot of us are guilty of having done this - even me.

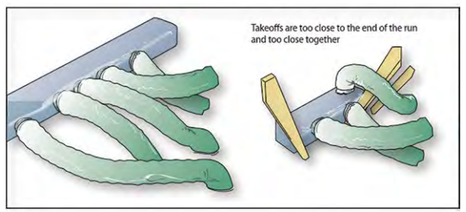
WHAT MOST CUSTOMERS BELIEVE

Typically, customers believe comfort/air issues are an equipment problem. The customer calls a contractor and tells the customer service representative, "I'm thinking about replacing my HVAC system, when can you come over?" A comfort advisor shows up promptly and the homeowner says," I was talking to my neighbor and they had a bigger unit installed. I think I need a bigger unit!"

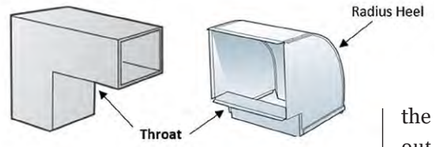
The truth is, until the system is examined and tested, no one has any idea what the problem might be. Performance-Based Contractors™ are trained to verify equipment is sized correctly for the home and conduct static pressure tests to show customers that oftentimes the equipment isn't the culprit. In fact, it is often the duct system attached to the equipment that is causing the problem.

POOR AIRFLOW IS COMMON

Unfortunately, we as contractors have trained customers over the years to accept poor airflow. Rooms over garages and bonus rooms are usually the worst, but the upstairs in a two-story house is typically five to 10˚F higher than the first floor. Installing contractors usually lack knowledge about airflow, don't have a room-by-room Manual J and/or D, or they use too many rules-of-thumb in duct design. They also most likely never used any airflow testing protocols like NCI's AirMaxx app, Air Upgrade Worksheet, or ComfortMaxx Verify™ software. This leads to what happens next.



Two common ductwork installations



These two elbows shown above have the same restrictive throat even though one has a radius heel.

WHAT CAUSES THE AIRFLOW ISSUE?

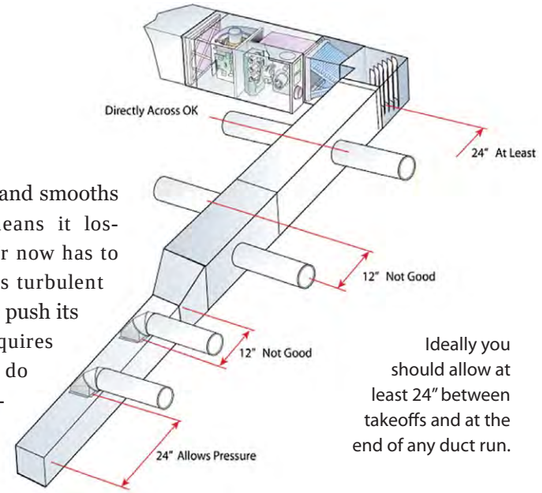
A common airflow problem comes from high static pressure in the ductwork which causes "turbulence." Turbulence is the physics of airflow that shows how air rolls and tumbles through the duct, almost like a "corkscrew."

The combination of air rubbing against the wall of the duct (resistance) and turbulence in the air stream itself creates friction loss. This friction loss shows up in poorly designed duct fittings because transitions are too short or because of square-throated elbows.

HOW DO WE FIX THIS? THE TWO-FOOT RULE

The air from the supply side converts from velocity pressure to static pressure so it can disperse into the branch runs. This turbulent flow pushes against the sides of the duct and creates static pressure. Whenever there is a directional change in airflow, from either an elbow, transition, take-off, etc., it takes 18 to 24 inches from that airflow change to "re-pressurize" the duct and resume the turbulent air movement.

This pressurized air then comes upon a take-off for a branch runout. The air escapes down the branch and the turbulent flow stops and smooths out. Technically this means it loses some pressure. The air now has to re-pressurize to regain its turbulent flow so it can continue to push its way down the duct. It requires about 24" or two feet to do this. This is the "Two-Foot Rule".



Ideally you should allow at least 24" between takeoffs and at the end of any duct run.

When asked, "which is better, to put take-offs directly across from each other or to stagger them," most students say to stagger them. This is correct if the stagger is 18 to 24" on center from each other. Look at the diagram.

If you place take-offs too close together, less than 24" on center, or too close to an air change (elbow or transition), the air doesn't have time to re-pressurize and create the appropriate turbulent flow.

WHERE DO YOU PUT THE LAST TAKE-OFF IN THE TRUNK DUCT?

It is safe to say that most installers know to never put an outlet in the end cap of a duct system. So where do you put it? Two feet from the end. There are two ways to address this issue in duct renovation. You can move the take-off upstream by 24" which is labor intensive. The second way is to remove the end cap and add 2 feet of duct and re-attach the endcap. This is usually simpler. You have to decide which is more cost effective.

MAKING IT HAPPEN

The type of installation common to your area may not accommodate this rule. If you have a system with remote plenums, or an extended plenum that is 6 foot or less with multiple branch runs, this rule may not work. NCI suggests that the installer use NCI's Duct Design Tables, NCI's Guide to Enhanced Duct Installation Practices, and your company's duct installation procedure to fix the problem.

The goal of this article is to raise your awareness of turbulence in the ductwork and how it affects air delivery through restrictive duct fittings. It's also to show how spacing takeoffs for branch runs using the Two-Foot Rule will relieve unnecessary pressure on the fan.

Customers want to be comfortable and do not understand our technical terminology and testing processes. Our job is to give them options based on testing and reviewing the system. Using the "Two-foot rule" on your next project will lead to greater customer satisfaction and a sense of pride of a job well done. NCI

John Puryear has a background in duct design, sheet metal fabrication and installation in both commercial and residential HVAC. He currently serves the industry as an instructor for the National Comfort Institute (NCI). If you're a contractor or technician wanting to learn more about duct airflow, design, or renovation, contact John at johnp@ncihvac.com or call 800-633-7058.

Brand New Member Benefit: The PowerPack

This special member benefit was created to help you become more familiar with all your National Comfort Institute membership has to offer. Each month you will receive access to a new PowerPack with tools you can use right away in your High-Performance Contracting™ business.

The July PowerPack focuses on integrating testing and diagnostics into your company culture. It includes:

- Top 10 HVAC Performance-Based Sales Obstacles – an article
- An Air Side Diagnostics Lesson – an article
- CO Levels and Risks Chart
- HVAC For Rookies – Online Training Modules – Online University
- Mastering HVAC Pressure Diagnostics with NCI Static Pressure Budgets – Webinar.

You also can still access the first recorded session of the Trailblazer Coaching program which is an introduction to what the Trailblazer Coaching program has to offer. It's still not too late to get signed up for the coaching if you decide you want to take advantage of this great benefit.

Sessions take place once a month, for the next 10 months. Click here – **ncilink.com/TrailBlazeCoaching** – for more information about Trailblazer Coaching or to enroll!

Grab the July PowerPack by logging in at **ncilink.com/PwrPak** and get started today!

By the way, any user you add to the National Comfort Institute (**ncilink.com/NCIHome**) website under your company will be able to access all the great tools from the NCI PowerPack.

If you have any questions, or if you are unable to access any of the tools in the PowerPack, please contact us at 800-633-7058.

Save Big Bucks with NCI Online Training

NCI's virtual university has become more affordable than ever before. NCI has reduced pricing across the board for its online training offerings – and members like you save even more.

Did you know that as a member, you have access to a fantastic online training program that is available 24/7/365? Online training is optimal because you can use it to continue educating your team without the costs associated with travel and housing.

Team members can train during lunch, in evenings, on the weekends – all at their own pace. You can keep track of how well they are doing and what they've completed.

You can incentivize this training and make it part of your Performance-Based Contracting™ culture.

To encourage more use of this amazing member benefit, NCI has greatly lowered pricing enabling you to save hundreds of dollars!

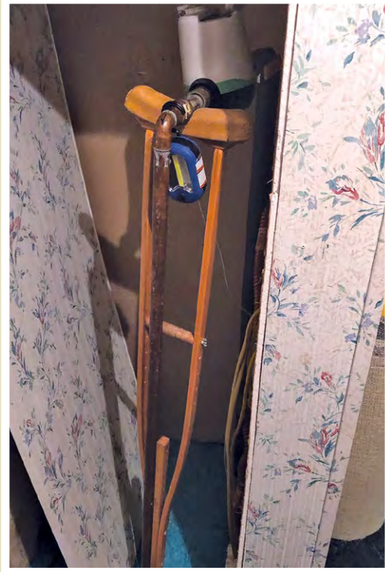
You still earn NCI Bucks when you buy these online sessions, and you can even pay for them with Bucks you already earned and have saved in your account.

Furthermore, if you've added the Learning Excellence Premium, Live, or Online subscription, and/or are a High-Performance HVAC Alliance member, the online training is included in your membership.

So exactly what training is available? Go to **ncilink.com/OnlineU** to our virtual Performance-Based training facility and scan through all the advanced technical, business management, and customer service modules available to you.

Our Customer Care representatives are available online and by phone to help you. Call 800-633-7058, ask for a representative, and ask them about NCI's low-cost, high-impact online training.

Take full advantage of your membership and save hundreds of dollars on your online training today.



"Talk About Support!"

— Kurt Walborn, Gary & Sons, Inc., Falls Creek, PA

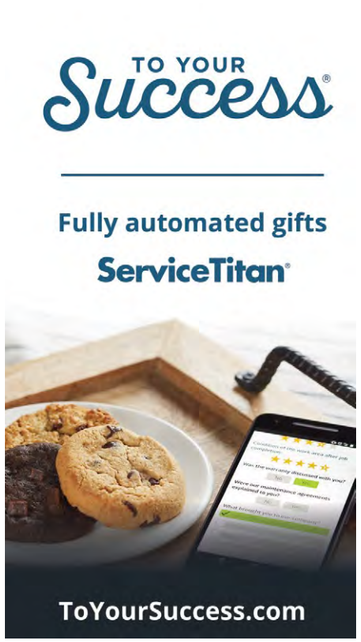
Kurt Walborn discovered this beauty on a recent job. Apparently, the previous technician used a crutch to hold up the water line. Walborn said, "I guess this works if the customer only needs one crutch!"

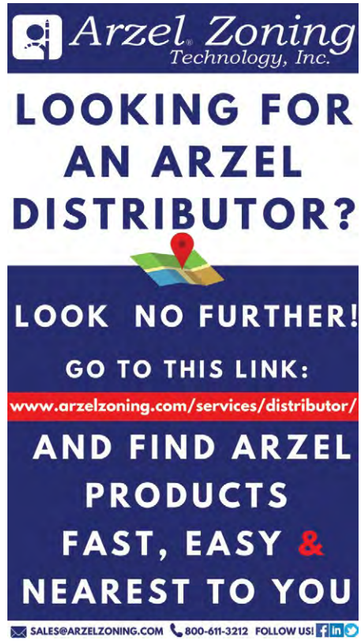
Kurt Walborn of Gary and Sons, Inc., Falls Creek, PA is the July 2019 winner of our Photo-of-the-Month contest, in the ***What the Heck!*** category. Winners are voted for by both the subscribers to High-Performance HVAC Today magazine and visitors to the website. Kurt will receive a $50 gift card.

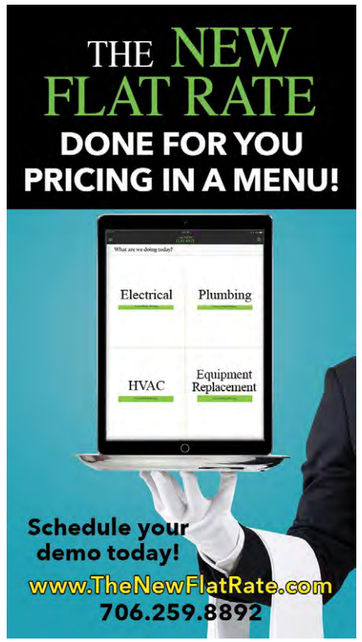
You can win too – submissions are always welcome. If you'd like to submit a photo for consideration in our Photo-of-the-Month contest, go to **ncilink.com/POMSubmit** and fill out the information as requested.

THE AUGUST CONTEST OPENS ON JULY 12, 2019.

That gives you plenty of time to submit something in any of our three categories: **The Good, The Bad, and WTH (What the heck).**







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Email us at contactus@hvactoday.com with your comments and questions.

By Dominick Guarino

Summer Testing Can Lead To A Bountiful Fall

Dominick Guarino is publisher of HVAC Today magazine and CEO of National Comfort Institute, Inc. He can be reached at domg@ncihvac.com

As a High-Performance contractor, at some point or another you will struggle with whether you should suspend having your service technicians test and diagnose airflow problems during the summer season.

The argument is logical at face value. After all, summer is the busiest time of the year for most HVAC companies, both in terms of service and installation.

You may not have enough resources to take care of all your customer's emergency service and replacement work if your people have to *slow down* to do more labor-intensive duct renovation and performance improvement projects.

There is some truth to this. It's hard to scale up your labor even further during peak demand times. And what do you do with those employees when things slow down?

It's expensive and time-consuming to find, hire, lay off, and rehire technical personnel, not to mention the resulting morale issues. And frankly, it's no way to treat people anyway.

The obvious solution is one that allows you to level your work load across all seasons so it's more predictable and easier to manage. When you do this, many things fall into place including productivity, profitability, and morale. Plus it makes it easier to manage your resources.

SO WHAT'S THE SOLUTION?

A great way to accomplish all of the above is to have your service technicians do baseline performance testing – mainly key static pressure and temperature measurements (which they may already be doing), on every service and maintenance visit. Then you need a process to help you generate work in your slower season.

One problem with putting off following up on typical leads is the proverbial "trail" tends to run cold. With the right process you can harvest the leads when you need them most.

Tall order? Maybe. The key is to have a system that works as cleanly and automatically as possible, and keeps your leads from falling through the cracks during the busy season.

NCI has such a process. There's not enough room to go over it in full detail here, so we'll start with a 30,000-foot view.

If you're interested in receiving a free copy of NCI's approach that includes customizable materials and access to free software, go to **ncilink.com/FallLeads**!

So let's take a look at the basic steps:

Step 1. Your service technician takes four static pressure readings and two temperature readings and records them so they can be added to the service ticket or your CRM. He or she also performs and records a visual inspection of the equipment and the duct system where it is easily accessible.

Step 2. A designated person in the office evaluates the information and scores the severity and priority of the issues, based on a grading system.

Step 3. Based on the initial findings, a letter and/or email is sent to the customer at the right time explaining what was tested and observed, and what the scores mean in laymen's terms.

The letter should further outline possible next steps, including setting up a time to explore the issues together. You could hold off sending the letter right away until things slow down a little, and you have the time to follow up. The key is to cue these mailings so they are not forgotten.

Step 4. Follow up the letter with a visit from your Comfort Advisor. He or she would perform some additional testing and provide customer education based on the initial findings.

By the way, this process works well during your less-busy season too. The only difference is you would not delay contacting the customer.

This approach will help open your customers up to seeing you as a problem solver who cares about them and the Safety, Health, Comfort, and Energy Efficiency of their home.

The typical resulting sales include air distribution improvements, equipment replacement, and add-on accessories that truly address your customers' needs and desires. NCI

Cutting-edge Training
from the Industry leader in Performance-Based Contracting™

Think you know airflow? Think you know carbon monoxide safety? Think you know how to solve your customer's comfort issues? Be sure. Don't guess. Find the training and expertise you need from the National Comfort Institute (NCI). Only at NCI will you find certification courses like Duct System Optimization and Combustion & Carbon Monoxide Safety, taught by leaders and innovators in the HVAC industry. Find out why NCI says ***"If You Don't Measure, You're Just Guessing!™"*** *Visit the link below or call* ***800-633-7058*** *to find classes near you.*

Upcoming 2019 NCI Training Schedule

Airflow Testing & Diagnostics and Refrigerant-Side Performance
July 23-25: Los Alamitos, CA

Airflow Testing & Diagnostics
July 23: Los Alamitos, CA*

Refrigerant-Side Performance Certification Program
July 24-25: Los Alamitos, CA*

Combustion Performance & Carbon Monoxide Safety Certification Program
Aug 20-22: Centennial, CO
Sept 4-6: Los Alamitos, CA*
Sept 10-12: Chantilly, VA
Sept 17-19: Somerville, MA
Sept 17-19: Sheffield Lake, OH
Sept 24-26: Golden Valley, MN
Sept 24-26: Sandy, UT

Residential HVAC System Performance & Air Balancing Certification Program
Sept 17-19: San Antonio, TX
Sept 17-19: Charlotte, NC
Sept 24-26: Los Alamitos, CA*
Sept 24-26: Halethorpe, MD

Duct System Optimization & Residential Air Balancing Certification Program
Aug 27-29: St. Louis, MO

Commercial HVAC System Performance Certification Program
Sept 4-5: Duquesne, PA
Sept 10-11: Los Alamitos, CA*

Introduction to Hydronic Testing, Adjusting, & Balancing
Aug 27-28: Sheffield Lake, OH

Commercial Air Balancing Certification Program
July 30 - Aug1: Los Alamitos, CA*
Aug 20-22: South Plainfield, NJ
Sept 10-12: Florence, KY

Optimize Economizer Performance with Certification
Sept 12: Los Alamitos, CA*

National Balancing Council Commercial Balancing with Certification
Sept 23-27: Sheffield Lake, OH

** Subsidized NCI training offered by Southern California Edison*

NCI™ National Comfort Institute, Inc.

Visit **NCIlink.com/ClassSchedule** to view the latest schedule of NCI Training events

High-Performance Trailblazer Coaching

Keep the momentum going all year long!

NCI's 2019/2020 High-Performance Trailblazer Coaching Program

NCI is offering a valuable implementation coaching program to keep your company on the path to success. For as little as $35 a month, you can participate in 12 monthly High-Performance Trailblazer Coaching sessions with fellow HVAC contractors from across the country.

This program was designed and tested by contractors who participated in the inaugural program launched at Summit 2018. Each session is a highly interactive 45-minute web meeting, led by NCI coaches. Your first session includes a 40,000 foot overview of the entire coaching plan where you can ask questions and provide input on the areas you might need the most help with.

In each of the next 10 sessions your coaches will lead the group in a discussion on two of the steps on the Trailblazer Roadmap below.

During the final session, just before Summit 2020, you will review where you've been, discuss successes and failures along the way, and map out your game plan for the next 12 months.

Here's what the original Trailblazers say about the program:

Additional Bonuses:

- Pricing Calculators
- Lead Generation Tools
- Technical Reports
- Software Input Forms
- Educational Resource Library
- Coaching Session Recordings
- And much more…

Download your Trailblazer Roadmap

This map illustrates the 20 areas that will be covered in the online coaching sessions. Breaking the process down into these bite-size steps will help insure your success without overwhelming you and your team. **http://ncilink.com/roadmap**

To register for Trailblazer online coaching, go to:
ncilink.com/Trailblazer

NCI National Comfort Institute, Inc.