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### **ALSO IN THIS ISSUE:**

- Contractor Spotlight: Service 1st Pros
- Business Performance: Why In-House Training is Essential
- The Power of High Performance is in the Proof
- Design Helps Attain Historic Efficiency

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# HIGH-PERFORMANCE HVAC TODAY™



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# Are Career Paths the Answer to the Technician Shortage?



**Mike Weil** is editor-in-chief and director of communications and publications at National Comfort Institute, Inc. Contact him at [ncilink.com/ContactMe](mailto:ncilink.com/ContactMe).

**T**oday's word is **career**. Many HVAC contractors I speak to talk about the importance of creating career paths in their companies as a strategic initiative to not only enhance employee satisfaction, but to help retain them.

Here are 10 practical tips I've learned from various HVAC Industry professionals to help establish effective career paths for their employees:

## 1. Assess Current Workforce and Roles

— **Evaluate Skills and Competencies:** [John Boylan of Lakeside Service](#) says he conducts a thorough assessment of the current skills and competencies of his workforce to understand the strengths and areas for improvement among employees.

— **Identify Key Roles:** Boylan identifies all key roles within the company, from entry-level positions to senior management. That includes understanding the responsibilities and skills required for each role.

## 2. Define Clear Career Progression Paths

— **Outline Career Ladders:** In a [recent column](#), NCI's Dominick Guarino discussed the need to develop clear and detailed career ladders that show the progression from entry-level positions to higher roles. This should include both technical and managerial paths to cater to different career aspirations.

— **Set Milestones:** Guarino says you should define specific milestones and criteria for advancement. This could include years of experience, completion of training programs, attainment of certifications, or demonstrated competencies.

3. Provide Training and Development Opportunities — **Offer Ongoing Training:** [Implement continuous training programs](#) to help employees acquire new

skills and stay updated with industry advancements. This could include in-house training, online courses, workshops, and seminars.

— **Support Certification:** Encourage and support employees in [obtaining relevant certifications](#), such as NCI (National Comfort Institute) certification or NATE (North American Technician Excellence) certification. Covering the costs of certification can be a great incentive.


## 4. Implement Mentorship and Coaching Programs — Pair Employees with Mentors

Establish [mentorship programs](#) as Alana Ward of Baggett Services does. This is where experienced employees can guide and support newer or less experienced staff. This helps in knowledge transfer and provides career guidance.

— **Regular Coaching Sessions:** Schedule regular [coaching sessions](#) to provide personalized feedback and career advice. This helps employees understand their progress and areas for improvement.

## 5. Create Individual Development Plans

— **Personalized Career Planning:** Work with each employee to create an [individual development plan](#) (IDP) that outlines their career goals and the steps they need to take to achieve them. Regularly review and update these plans to reflect progress and changes in career aspirations.

— **Set SMART Goals:** We talked about [SMART goals](#) (which are Specific, Measurable, Achievable, Relevant, and Time-bound) during the HVAC Summit some years ago. 

If you'd like to find out what the final five tips are, read the rest of my column on the **High-Performance HVAC Today** website at [ncilink.com/CareerPaths](https://ncilink.com/CareerPaths).



## Daikin to Showcase Condensing Units

At this year's NCI Summit, **Daikin Comfort Technologies North America, Inc.** (Daikin) is turning HVAC on its side by showcasing the **Daikin FIT** side discharge condensing units for ducted applications. Daikin *FIT* is available as a heat pump as well as its unique offering with gas heat and dual fuel furnace connectivity.

The Daikin *FIT* whole house inverter systems meld the best features and performance of ductless style side discharge systems with the ability to connect to traditional ducted systems.

This brings your homeowner customers the advantages of Daikin technology, including high-performing inverter compressors with cabinet designs that are smaller, lighter, and quieter than traditional unitary outdoor units.

The performance of Daikin's inverter compressor — compared to traditional unitary compressors — requires less condenser coil surface area. That, in turn, allows for much smaller cabinet sizes with a side discharge fan design — eliminating the need for typical large, wrap-around style condenser coils.



In a market saturated with expensive high-tiered inverters, the system provides

a premium mid-efficiency inverter at an affordable rate.

A compact, space-saving solution for homes with limited installation options, the new inverter-driven, variable-speed, communicating Daikin *FIT* is up to 53% lighter and 40% smaller than a traditional cube-style unit — requiring just 4 inches of clearance.

Also, High-Performance HVAC™ Contractors will love the connectivity offered by the **Daikin ONE smart thermostats** that continually monitor and control all components of the Daikin *FIT* system to operate at peak performance.

See the Daikin *FIT* inverter compressor and Daikin *ONE* smart thermostat at National Comfort Institute's **High-Performance HVAC™ Summit** in Asheville, NC this September 10-13. **NCI**

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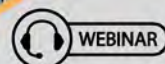
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# Service 1st Pros: *High Performance from the Start*

**A**uburn, GA, was first settled between 1775 and 1781. It incorporated in 1892 and sits around 42 miles north-east of Atlanta and 27 miles west of Athens. It became an important railroad town after the Civil War, and today, it is an active community of around 53,000 people with around 18,000 total homes.

This city is a perfect environment for HVAC contractors. In 2018, a young man named Josh Meacham was building his skills working for one of those contracting firms, starting when he was 19 and working his way up from technician to service manager in the 11 years he was there.

Before that, he worked at a different company while attending a technical school.

But in 2018, Meacham decided it was time to be on his own, so he left that company and started **Service 1st Pros**.

“My wife and I started the company with me in the truck and her answering phones,” Meacham says. “When we started Service 1st Pros, our vi-

sion was to create a company based on core values, a code of conduct, and a desire to do what I truly believe the industry can do and still make money doing it.

“That thing is to provide what we call **WOW** service. That means we exceed customers’ expectations using a process much different than most companies do.”

He explains that while learning the trade, he noticed how other HVAC companies focused their energy on

well and providing customers with comfortable, safe, and energy-efficient environments.”

## AND THEN THERE WAS HIGH PERFORMANCE

In the middle of his learning years, around the age of 25 or 26, Meacham met Rob Falke and Jim Davis from [National Comfort Institute](#) (NCI). He attributes this encounter to his first exposure to airflow testing and how that changed everything for him.

“When I met David Richardson of NCI, that’s when I understood that a high-performance approach was the real deal. The result was that I attended NCI classes many times over the years and brought trainers like David to our headquarters.

“When Richardson came to our company, he was phenomenal. He helped us all understand that while we must make money, it’s more vital we are a properly

trained team that can leave customers with something tangible, like a well-equipped system that delivers the efficiency we promised.”

In just a few years, the Service 1st



Josh Meacham and his wife, Hillary (center foreground) with other team members.

bringing in dollars, not caring how they were doing that.

“While earning a profit is certainly important,” Meacham says, “you must also ensure the system is performing



Pros team now specializes in [duct renovation work](#).

“We also do a lot of combustion testing. We believe in airflow. We believe that nothing works unless airflow is correct first.”

### SERVICE 1ST PROS TODAY

Service 1st Pros is a \$5 million company serving the residential service and replacement market. They employ 20 teammates, including six service technicians, seven installers, a quality control manager, three office personnel, a warehouse manager, and a full-time parts runner. Meacham says the quality assurance manager is also a trained installer and does any necessary warranty work.

“We go well beyond installing and servicing boxes: we provide something that will fix problems in customers’ homes, problems they’ve suffered with for too long,” he says.

“Our approach is different. My wife and I always knew that our vision was to be one of the few contractors in our area focusing on customer comfort and efficiency. Our vision was to create a company that was a great place to work. We wanted to create a team by embracing training so we could go to market differently.

“Part of that vision includes how we physically appear. At Service 1st Pros, we pride ourselves on having clean, well-wrapped trucks and clean technicians who undergo regular training. Beyond that, our vision is to help

improve our technicians’ lives.”

### CULTURE IS KING

When asked about his training philosophy, Josh Meacham said, “***Culture Is King. You Get What You Tolerate.***”

What does this mean? He says that you can lay out a regimen and tell your team what culture you want to have, but it depends on how often you bend the rules and tolerate people who decide to interpret the process.



Professional looking, well-trained techs are the order of the day at Service 1st Pros.

In other words, as an owner or manager, you need to lay out the goals, vision, and training regimens, and then you need to hold the team accountable.

“I believe in training our field service and installation teams to do what no competitor can: they can test, measure, and discover invisible issues plaguing customer comfort and energy efficiency that no one else can. They can diagnose the problems and offer choices in solutions.

“They can be true HVAC professionals who not only have the knowledge

and expertise but dress well, are clean, and excited to do what we do best,” he says.

He says he will not tolerate technicians on his team who approach their jobs with a stubborn, arrogant, or cocky attitude.

“I won’t tolerate that because it leads to rebellion. Rebellion is a cancer that can kill your goals, darken your vision, and drive customers away. These rebels do not last long at Service 1st Pros.”

He adds that they hire people who want to do things correctly and grow. He wants people who want to learn, grow, and improve daily.

“Much like doctors,” he says. “If you go to a doctor, you expect them to be sharp, on point, and have the latest and greatest technology to help you.

“Our customers want this as well. Whenever a technician walks into their home, the customer doesn’t know them or their abilities, and often they don’t know our company. They trust them to be an industry expert who will deliver solutions to their issues and help them in their lives.”

### CONTINUOUS TRAINING

Meacham says that the Service 1st Pro culture centers around [continuous training](#). It is required. As an owner, he uses many sources for training but says most of their technical training comes from NCI.

“Without NCI constantly teaching us about measuring and testing, we wouldn’t be able to see the invisible

issues plaguing customers' systems. You don't see what's in front of you because you don't know how to look. I'm thankful that NCI has good people like David Richardson, who constantly look at ways to help improve what HVAC contractors do in the field so that we can deliver the best level of service.

"Honestly, I think what they teach correlates with what I see in the field. We have many "AHA!" moments when solving individual customer system issues. Without training, I think the company will die. Training is our lifeblood. I'm appreciative of the services and what NCI offers."

But training goes beyond technical expertise. It also helps Meacham and his team overcome the competitive hurdles they face in their marketplace. He says that 95% of his competitors do not provide high-performance services.

"We find almost no test ports installed on equipment, ducts, or flue pipes in homes we have not serviced before," Meacham says. "Most customers have no idea what a combustion analyzer is. They had never heard of duct pressure. Nobody's checking this stuff."

He adds that Service 1st Pros is also one of the most expensive HVAC companies in their area. Overcoming the price question is 100% their biggest challenge.

Meacham says he looks at this issue in this way. His team goes on three daily calls, which totals 15 weekly calls. Of those 15 calls, two customers see value in the High-Performance HVAC™ approach and spend dollars to achieve ultimate comfort. Six are nervous about the money and will choose a more middle-of-the-road option, which he says is usually an air upgrade.

"The rest of them won't do anything," he says. "I don't pretend that spending all this money on training brings in more dollars with every customer. But it brings in two or three high-value projects a week if my guys run the call properly. In that light, we see a difference that usually leads to referrals."

"For me, that is the most significant value in a system approach and being partnered with NCI. Also, on the installation side, we see far fewer warranty claims because our techs are trained to look for proper airflow, and they make sure customer systems are dialed in correctly. That is huge."

"I believe in the NCI training. It is worth the investment."

## HIGH PERFORMANCE FROM THE START

Six years ago, Meacham started Service 1st Pros with his team testing, measuring, and doing High-Performance HVAC work. And it was not easy.

"I've invested heavily with NCI and other organizations that provide technical and customer service/sales training and coaching. I learned that without accountability, the system's performance commitment will waver, and that causes trouble," he explains.

"To do this work requires developing internal processes and procedures and sticking to them. In the beginning, I was too lenient, and I let my techs get away with murder. It created a cancerous culture, and the only fix was to clean house and start over. That was a hard lesson."

"I had to rebuild a few years ago, and that's when I decided no one would dictate or work against what I wanted to do here."



"Today, most of my techs love this approach. They soak up their training and use what they learn daily. Frankly, if I want to continue growing the company, I need people who are of the same mind, who are young and hungry to learn. I need people who embrace doing things my way, the way NCI teaches. And that means backing off hiring technicians from other HVAC contracting companies."


## OTHER LESSONS LEARNED

Josh Meacham will tell you that his most significant takeaways from starting his own company and focusing on the high-performance culture is to first understand your market – from what type of competitors you have to how you price your services.

"Know your pricing and stick to it. That is how to sustain and grow your business," he says.

The other lesson is one of leadership. Meacham reiterates, "**Culture is King, and You Get What You Tolerate.**"

"As a leader, if you don't enforce the rules, things WILL go sideways. You need core values. You need systems and processes. You must continuously ensure that your team follows those systems and processes. People can't improve unless the unsaid is spoken."

For these and many other reasons, the team at **High-Performance HVAC Today** chose **Service 1st Pros** as our *July Contractor Spotlight*. Congratulations to Josh Meacham and his entire team. 



SPONSOR Highlights

## TRUTECH TOOLS: EQUIPPING INDUSTRY PROFESSIONALS

**TruTech Tools** is partnering with National Comfort Institute at this year's **High-Performance HVAC™ Summit**. TruTech is a trusted online supplier specializing in tools and resources for professionals in the HVAC and Building Performance industries.

With a core focus of *"helping technicians create better environments for people"*, they understand the importance of high-performance contractors and offer a comprehensive selection of tools and instruments to help contractors:

● **HVAC:** TruTech's inventory includes an array of tools like digital and wireless gauges for refrigerant-based systems, combustion analyzers to assess flue gas composition, airflow measurement in-

strumentation, maintenance supplies, and more. These tools allow contractors to accurately pinpoint issues and offer real solutions for their clients.




● **Building Performance:** As consumers become aware of delivered comfort and whole house performance, looking outside the boxes making up HVAC systems becomes important. TruTech carries a full line of tools and instruments to help identify sources of comfort issues in building envelopes and duct systems. Tools like thermal imaging cameras that allow technicians to visualize heat loss and pinpoint areas for improvement.

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# The Power of High Performance *is in the Proof*

**T**his article is not about whiskey or rum. But, hey ... isn't it obvious (even when it comes to distilled spirits) that **MORE PROOF = MORE POWER?**

In producing alcohol, "proof" is the Alcohol Content by Volume (ABV) times two.

What is "proof" when it comes to High-Performance HVAC™ contracting? In this case, evidence is sufficient to establish that measurements are accurate which produce belief in its truth.

The "power" of alcohol works in the mind. It alters a person's mood, relaxes them, and perhaps even makes them more receptive. What is "power" when it comes to High-Performance HVAC contracting? The standard definition is that power is the ability, capacity, influence, or authority to cause something to happen.

## KNOWLEDGE IS POWER

Let's relate this to something meaningful in life. What I am talking about is spirituality. Somebody once suggested that I don't have to understand when it comes to questions about where I came from, why I am here, and what lies ahead. I need to believe.

Well, my response to that is, "Uh ... NO! Show me your facts, show me your data, show me the research."

In an article in *Contracting Business* magazine titled, [\*What Is the Current State of the HVAC Industry\*](#), the late Rob Falke of National Comfort Institute (NCI) highlighted that *doing things the right way should be the norm, but it seems to be the exception*.

This can be especially true if your HVAC business is in a highly competitive and price-driven market.

Why is it so? Think about the "ace" technician

who decides to start their own HVAC company. What do they usually do? What would you do? You might interview some of the more prominent owners in your area, look at their operations, and get some ideas about what a successful HVAC company should look like. It might even seem to make sense that starting a business should look like successful competitors. Right?

In the article, Falke wrote something very profound: "*Current conditions position our industry to deliver a custom product...*" What is that custom product? He writes, "... *installed HVAC systems **documented to be far superior to the level the industry now offers.***"

Falke wasn't talking about technological advances in HVAC equipment. He was saying it's time to **GET OUT** of "commodity selling."

What does that mean? A commodity is an essential good used in commerce that is interchangeable with other commodities of the same type." If the product is "interchangeable," why should the price be higher?

If you are dedicated to High-Performance HVAC Contracting, as NCI says, "*If you're not measuring, you're just guessing™*" and "*The power is in the proof.*"

The suggested solution is not revolutionary, but a fundamental principle that solid faith (trust) is based on accurate knowledge.

## IN A CLASS BY OURSELVES

At Crossway Mechanical, we believe in the High-Performance HVAC approach. The principles that Rob "Doc" Falke and NCI prescribe kept us healthy before, during, and after the COVID-19 pandemic. Those same principles put us in a unique, highly desirable position – **with no real competition**. High-performance

contractors in our market are in a class by ourselves.

Does this sound like bragging?

"It ain't braggin' if you can do it."

The path to high performance is an investment in your future. Learning to test, measure, and diagnose system (including ductwork) issues will set you apart, enabling you to provide services your customers need, want, and deserve.

With that in mind, check out the [ComfortMaxx™ Verify](#) program. Position yourselves to confidently say to your customers, "We not only stand behind our promise to deliver a comfortable, efficient, safe, and healthy indoor environment; we can prove it!"

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ComfortMaxx Verify is the ultimate in total HVAC system performance measurement. By performing a test-in before you begin renovation work and a test-out after the job is complete



and the system is balanced, you can provide your customer with a side-by-side comparison report showing that you delivered what was promised.

### THE RESULTS SPEAK FOR THEMSELVES

The power is in the proof, and the evidence is seen in the types of online reviews that Crossway Mechanical receives. Just look at what some customers have said about the results of our High-Performance HVAC Contracting yields:


*"We've worked with Crossway several times, and they always exceed our expectations. They do exactly what they say they will, and their team is trustworthy and honest. Brian has put together a great team and is always available when we have an AC question. Luis and his crew did our install, and we were so pleased with our new unit. They cut NO corners and offered solutions that other AC companies hadn't even mentioned."*

*"Professionalism, honesty, manners, and friendliness: there are not enough adjectives for this company and its employees. They know what they are doing. They understand the needs of your home. The employees are knowledgeable and professional. By looking at them (dress code and overall manners), you can tell they are the real deal and the right company to care for your AC/Heating*

*needs. Extremely happy and satisfied customer here. Thank you, Crossway, for taking care of our home and our family's comfort needs. God bless you and your employees.*

*P.S. - David was just at our house. His professionalism and manners were off the chart. I would use Crossway again and recommend it to friends, family, and neighbors. Excellent work, Crossway!!!"*

*"We recently completed our new construction project to create a mold-free home. Brian's expertise and input were invaluable throughout the process. I don't know how I would have made it through the process without Brian's consulting. I highly recommend him to anyone wanting a High-Performance HVAC system."*

These results prove our power to provide our customers with the best services. If you are not currently involved in the high-performance approach to contracting, maybe it's time to consider a change. 



**David Small** is Quality Assurance and Technical Excellence manager at Houston-based [Crossway Mechanical LLC](#). He is also a NATE senior analyst. Small's background includes careers at both Carrier

Enterprise and Trane. He can be reached at [ncilink.com/ContactMe](mailto:ncilink.com/ContactMe).

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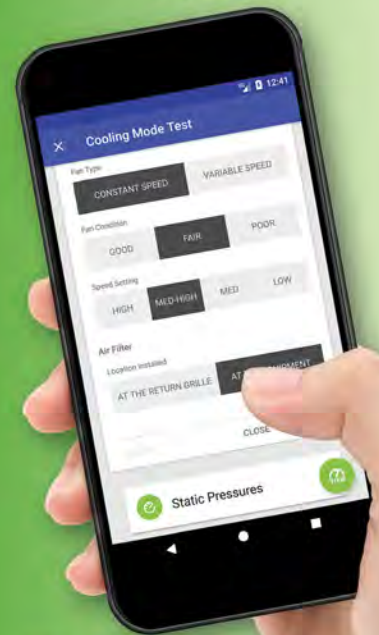
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# Why We Consider In-House Training to be Essential

**A**t [Lakeside Service](#), we have been doing structured and consistent in-house training for the past three years. However, it took us years to create the structure of our program and a lot of effort to keep things as simple as possible.

Don't get me wrong, we have always been strong proponents of training our team – but until three years ago, our training was not organized or necessarily focused on creating career paths to help employees better themselves, earn more money, and have targeted goals to help them do those things.

Why make the career path change? Frankly, it was not only to create a technician corps that was unsurpassed in our marketplace, but it was also a way to help us keep techs happy and loyal to Lakeside Service.

In-house training became the centerpiece of our approach. I have found that doing as much

training here and bringing in third party training organizations to help has many more benefits and is ultimately more cost-effective than sending my techs out to external training (though we do some of that as well).

## BUILDING A TRAINING CENTER

Though this is not a requirement, it's been something I have always wanted to do. We expanded our facility several years ago after a tenant moved out. We used that space to build a working training room with live-fire equipment for hands-on testing.

In 2014, one of my goals was to have all my techs certified in air balancing and CO. Today, I can say that we've accomplished that and more.

Training and certification are just some of the ingredients that make the cake. The outcome is using training and certification to build up our techs and create careers at Lakeside.

## OUR OVERALL TRAINING PROGRAM TODAY

Our in-house training program typically addresses four areas:

- NATE certification
- Factory/manufacturer updates and products
- Installation and service best practices
- Specific topics that directly affect our recall percentages.

Our program starts with setting consistent dates and times. For example, we hold classes on installation techniques and practices on Monday mornings. Those classes might include how to correctly pull a vacuum and charge a system, how to commission equipment and set up air-flow, brazing, or duct fabrication.

On Thursday mornings, we have service classes. Those include how to diagnose low voltage

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CERTIFIED,  
CAREER-DRIVEN,  
BEST-IN-CLASS,  
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# CAAR

issues and verify compressor failures or heat exchanger failures. We also cover department issues that are causing recalls. If we notice a trend in recalls, the leadership team discusses what we think are the causes, and design a class to teach processes that reduce unbillable calls.

We recently did this for installation because we experienced more than normal refrigerant leaks on our winter air conditioning installations this spring. We discovered that the team was pulling a vacuum using their gauges and hoses, which were not rated to pull a vacuum.

We realized the readings weren't always accurate. In response, we created a tool package for pulling a vacuum with the proper hoses, a valve-pulling tool, and a Bluetooth micron gauge to record the readings and take screenshots. All that data gets uploaded to [Service Titan](#).

By implementing this simple process, we no longer have those recalls.

Other training happens on Saturdays. That's when we offer NATE-specific training to prepare techs and installers for NATE certification.

At Lakeside, all field personnel have 90 days to become NATE certified. This requirement is essential to new technicians if they want to evolve into someone who can work independently in their own truck. We found that the only way to get this done was to create classes to help them.

## CAREER DEVELOPMENT

This is structured to create levels

that provide incremental opportunities for our technicians — installers and service techs — to advance. That meant developing “Lakeside” standards based on High-Performance HVAC™ standards.

That led to creating a career path self-assessment, which illustrates each type of service, guiding each apprentice to becoming a craftsman. Every career path opportunity has specific benchmarks to help our team achieve their desired pay or skill levels. We offer the specific training associated with each skill and pay level.

As I said earlier, NATE certification is an entry-level requirement. All our technicians must earn that certification. We also require and provide training from National Comfort Institute (NCI) in airflow and combustion and carbon monoxide (CO) safety training and certification. These are required to be on our install or service teams.

Our written self-assessment allows techs to rate themselves. We use a 1-to-5 rating process where one means zero experience, and five means expert enough to teach somebody else. Each tech rates themselves and their peers.

The managers also use this system to assess the techs. Then, they sit down together, review their strengths and weaknesses, and develop training protocols to help them improve and grow.

Each career level has required milestones necessary for the technician to advance. We use the assessments to create goals for each technician based on what they need to “level up,” and this also creates a template for our

performance review process.

The key is that we never “complete” training for our team. There is always a next step. However, once a tech meets a specific pre-determined goal with measurably proven proficiency, the team member receives a pay adjustment connected to that goal.

## PROGRAM DEVELOPMENT

Our in-house training depends on clear communication. Team leaders communicate during our weekly manager meetings, and we pick training content based on the needs identified in those meetings.

Usually, training content focuses on skills needed to get technicians to the next level in their career path, which includes maintaining CEUs for Lakeside's required certifications. Content is also in response to customer service standards or company objectives like reducing callbacks.

Training content requires constant monitoring and communication about what is happening in the field to best use training budgets and time.

Our service and installation managers are responsible for developing and updating training materials. Sometimes, there's a crossover event, such as when NCI comes in. All our departments participate in that.

Our distributors and manufacturers provide a lot of product and equipment training. We update guys on new Wi-Fi smart technology, new equipment that communicates via an app, etc.

We are mindful of how we approach coaching callbacks. Suppose a callback



occurs around a specific tech or team, – that requires one-on-one training with the tech involved.

### “PODS” KEEP THINGS SIMPLE

At Lakeside, we also enable lead technicians (two in the service department, one in the installation department) to help a small group of less-experienced techs. We call this a pod. It works like this:

Our service manager has two great senior technicians. One is good at selling agreements, add-ons, other accessories, and customer service. The other is amazing at technical things like testing and diagnosing invisible problems. Each of these two senior techs has four technicians who they mentor.

The sales-focused senior tech may teach his pod how to offer accessories. The senior technical tech can focus on teaching his pod how to take measurements, how to interpret them, where to take them, etc.

We measure how well the training works using our KPIs (key performance indicators). We look for improvements on specific things every week.

Then, there are meetings between the service manager and those senior team leaders. The service manager discusses how the pods are doing, asks to see training demos the senior tech used with their pod, and asks how he can help them be better trainers.

This program works the same way on the installation side. In both cases, we have measurable improvements.

It really helps guys who are fresh out of school – specifically those starting

as maintenance technicians. This training helps them progress faster into the more advanced roles, gets them into demand service when maintenance is not busy, and eventually, the call rotation. This approach is a less intimidating progression for them.

Any person who trains technicians must have certifications and experience in the topic they will teach. The team leader chooses them based on demonstrated competency. Internal trainers must keep their certifications current and must attend factory training along with all in-house training. We post all the available classes and hold them accountable for attending them.



Mentoring is a requirement. Our pods are really a “Leadership School.” Again, we assign four techs to a senior tech (the field mentor). The mentors report to the department (service or installation) manager and work with that manager to help the techs in their pod.

### THE THIRD-PARTY ONSITE COMPONENT

Finally, hosting professional training

a few times a year is vital. Typically, it is National Comfort Institute on the technical side. Why? We focus on the High-Performance HVAC™ approach, and I find that when I bring in multiple source technical trainers, my technicians start to get mixed messages.

Our philosophy and focus are on system performance, as taught by NCI. That is the message we want our team to receive. So, we typically don’t bring in other outside technical training organizations.

We budget to bring in NCI twice a year. In spring, they teach airflow; in the fall, before the start of the heating season, they teach combustion.

On the sales and business side of our training approach, we use [BDR](#). Unlike NCI, we meet their coaches virtually twice per month.

We also work with the [John Maxwell group on leadership training](#) once a year. Again, these programs are virtual, helping us to develop the next generation of leaders.

When we hire, we look for young people with leadership potential. Leadership potential means they have a good attitude, are helpful, coachable, and have some charisma. We look for people who also care and have integrity.

We go through assessments not only on technical and sales abilities but also on leadership. We even look at apprentices in this way. How enthusiastic are they? Do they work smart and hard? I ask my leadership team to think about these things and allow these young people to go into the field, which will make them better field people.

I aim to get those guys the right books to read to help them create the right mindset for leadership early on. The bottom line is that anyone can become a pod leader, given their talent, drive, and willingness to serve.

For these reasons, we focus on three third-party in-house training programs: people, sales, and leadership.

### CONTINUOUS IMPROVEMENT

As I have said, training never ends. Putting together career paths and training that coincide with those is hard. It required a lot of work to get it going. But as the training programs gain momentum, they take on a life of their own. They become a tradition and are vital to our culture.

It's a lot of work to get it moving in

the right direction, focus, and organize. But now that we've gotten into a rhythm — training happens consistently at consistent points in time in a technician's career — my life has gotten so much easier.

It gives me more time to work on the business, not just in it. It gives me time to focus on what lies ahead regarding changes in the industry, technology, and regulations. And it allows me to see where we need improvement. Our in-house training and career program require continuous improvement.

Plus, my technicians love it. We frequently get feedback, and thanks for the training. It's our culture, and it builds morale. It's made everyone's life better. I have technicians now who teach other technicians because

they're proud of what they are doing. It's very gratifying.

I never dreamed that training would be so much a part of what I do each day. It's become one of the most rewarding parts of my business because it's one of the things that always returns on its investment. **NCI**



**John Boylan** is the general manager of **Lakeside Service Company** in Brighton, MI. The company specializes in designing, engineering, and installing complete comfort systems in new and existing homes. He strongly believes in the high-performance approach to HVAC contracting and is a champion for using KPIs as a management tool. To contact John, go to [ncilink.com/ContactMe](https://ncilink.com/ContactMe).



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# High-Performance HVAC™ Design Helps Attain Historic Efficiency

Sometime at the end of 2018, I bid on a job at the historic “[Harry Goodrich House](#),” one of the first architectural treasures built in Oak Park, Illinois, by legendary architect [Frank Lloyd Wright](#).

My first memory of the property was walking towards the front porch, overwhelmed by the home’s magnificent exterior detail. A gray-haired gentleman with a charismatic smile greeted me.

He reached out to shake my hand and said, “Hi, my name is Mark Donovan. I will be the best and worst customer you have ever had.”

Little did I know that he wasn’t joking. We stood at the front door for a few minutes exchanging formalities and then headed down to the basement for my first glimpse of the engineering masterpiece.

## MECHANICAL PERFECTION

We walked into a small mechanical room, and I was immediately in awe and, at the same time, overwhelmed by the sheer mechanical perfection that filled every square inch of the room.



Keeping the house historically relevant while modernizing the comfort system required careful design and planning. On the right side of the photo is a “punch list” that A-Team followed to ensure the project was done right.

I quickly realized that the home had geothermal heating and air conditioning. The system uses hot water heat.

I was trying to make mental notes as Donovan introduced me to the dozens of low and high-temperature zone valves meticulously mounted to a rack on the wall. A [Water Furnace](#) water-to-water heat pump provides heat to an [Ergomax](#) reverse indirect buffer tank. The home’s domestic hot water is preheated through a heat exchanger in the Ergomax tank.

The water returns to full temperature by running through a brazed plate heat exchanger fed by a condensing wall-hung boiler. Two more water-to-water split heat pumps are mounted to a custom rack.

One of the heat pumps connects to a [Unico](#) high-velocity system, which serves the basement and first floor. The second split has a similar set-up, which serves the second and third floors. Zoning for both forced air systems uses an [Arzel](#) pneumatic zone system.

The home’s IAQ is on point, with two [RenewAire](#) ERVs providing ventilation and efficient bathroom exhaust. Both high-velocity air handlers have media filters and a bypass HEPA installed for advanced filtration. The home also has two [Nortec \(now Condaire\)](#) steam humidifiers installed to help maintain the proper humidity in the dry winter months.

Another wall-hung boiler is across from the mechanical room, which provides heat for the snow melt system. Around the corner is a tiny closet with thermostats mounted to a hinged panel.

This control room was later hidden behind a secret hinged bookshelf like the ones you would expect to see in a James Bond movie.

The thermostats in the control room are



adjusted wirelessly by either a phone or tablet via an app by [Tekmar](#).

## OUR EARLY CONTRIBUTIONS

When we became the new HVAC contractor, the general contractor, [Bosi Construction](#), started to finish the basement. They were building custom benches around the game room, and Mark Donovan wanted to ensure that people sitting on the benches didn't feel the cool temperature of the stone foundation.

We added copper fin tubes inside of the benches. Each bench was custom-made with an air slot along the floor and another along the back. When this zone is on, it trickles heat along the back wall as the guests enjoy a comfortable game of pool.

Around the same time, we were contracted to cool a wine cellar that Donovan wanted to build. We installed a small refrigeration condenser in one of the laundry room cabinets.

We also installed a Daikin mini-split high-wall evaporator altered to work with the condenser. The design hid every part of the system with custom cabinetry that would make most

carpenters look like mere apprentices.

Mark had one complaint about his system during the heating season: he always heard circulator pumps running in the basement.

We discovered the sound came from the many small zones in his home, plus several circulators to accomplish different tasks within the system.



The mechanical room pictured here was as much a work of art as the Frank Lloyd Wright design for the house itself (top of page).

I am embarrassed to say how long it took me to understand the idea that there is thermal comfort and overall comfort. Sound plays into people's overall comfort and is almost as important as thermal comfort in some circumstances.

Another related complaint was the

watt draw of the heating system while it was operating. Donovan identified the usage with an [Emporia Vue](#) energy monitor system.

This watt draw wasn't surprising because the system had four [B&G PL-36 circulators](#) installed on the heating side and another Taco circulator on the domestic recirculation loop.

Since the zones were so small, they also had B&G differential bypass valves installed on low- and high-temperature circuits.

One by one, we replaced the original circulators with [Grundfos](#) ECM circulators. By doing so, we could remove the differential bypass valves because the new circulators could ramp down when only one or two zones were calling, matching their speed to the system's demand.

This fix will be a long-term solution for system watt draw and a drastic reduction in overall sound.

## THE FINAL CHAPTER OF THE PROJECT

After completing work in the basement, the second floor was the only thing left to do. At the beginning of



A-Team checked the pressures inside the home using a blower door test.

2023, Mark Donovan and his family moved out of the home, and Bosi Construction started the demo work on the second floor.

At this time, my company drained the heating system and removed the large cast iron radiators. The project scope included installing new heating pipes under the subfloor and routing them to the new cast iron baseboards.

I analyzed the plans and noticed that the specified cast iron baseboards were alarmingly short, mainly because the plan was not to open the exterior walls and insulate them.

To verify that the heat loss and emitter sizing were correct, I ran a [Manual J load calculation](#) and modeled the home with the “As-is” exterior wall assemblies.

I found that the cast iron baseboards were extremely undersized—most by half of the required length.

## SOLUTIONS AND PROBLEMS

In the face of this challenge, we devised an innovative solution. We proposed using closed-cell foam to reduce the heat requirements, a decision that led to the removal of the plaster on the exterior walls for insulation.

However, Donovan thought preserving the original walls in one of the bedrooms was essential to maintaining a crucial part of the home’s history.

With the second floor now insulated, we could reduce the heating requirements, effectively reducing the required length of the cast iron baseboards throughout.

We seamlessly integrated these baseboards into custom cabinetry in each room, a testament to the team’s creativity and problem-solving skills. Heating a home without seeing or hearing the system is truly magical.

The solution also became a big problem. By insulating the exterior wall, we reduced the heat loss of the second floor, but the foam also reduced the heat gain.

This means that the existing heat pump and air handler (used for cooling) were now oversized. The ground source heat pump was a two-stage, three-ton unit. After running a load calculation, we determined that a two-ton, two-stage unit would be the correct sizing for the new load.

We also scrutinized the existing Unico duct design. We could delete a handful of supply ducts from the second floor since we were now installing a smaller-sized heat pump. I replaced the existing 16 x 25 x 4-in. media air cleaner with an [Aprilaire](#) model 1210. The 1210 is Aprilaire’s 20 x 25 x 4-in. model.

Although we didn’t need the larger filter as a means to reduce the pressure drop, I wanted to take advantage of being able to reduce the filter face velocity. By doing so, we increased the filter’s efficiency and effective duty cycle, allowing more time for loading.

Two days before scheduling the dry-

wall installation, Donovan noticed the snow slightly melting in two spots on the roof’s front side of the home. The walls of the third floor are angled because they are part of the roof assembly. The rafter cavities are inaccessible since the third floor is finished and drywalled.

The roof assembly is second to none, very similar to the recommendations made by [Joseph Lstiburek, founder of the Building Science Corporation](#). He is considered one of the godfathers of building science. To prevent thermal bridging, Joe recommends adding a layer of 2-in. foam on top of the plywood roof deck. He then suggests adding wood sleeper strips and then another layer of plywood on top of the sleepers.

This method provides insulation below the rafters with the closed cell foam and above them with the 2-in. foam board. This construction method also provides an air gap, which acts as a mini channel for air to cool the shingles in the summer.

It also slightly increases the roof assembly’s R-value due to the air film on



Dozens of low and high-temperature zone valves are meticulously mounted to a rack on the wall.

the top of the foam board and the underside of the plywood, not to mention the air gap itself.

### A HIGH-PERFORMANCE HOME

Considering the incredible detail put into the roof assembly, anyone can see why the Goodrich house was destined to be a high-performance home. Donovan put the brakes on the dry-wall and said he needed to understand why the snow melted in the two spots.

The day before the scheduled dry-wall installation, I showed up with my [Energy Conservatory](#) blower door, a case of caulk, and another case of spray foam. I made sure to find every leakage point that could have a connection to the roof.


A coworker and I spent nine hours

air-sealing the home's second floor. We ran the blower door at 75 Pascals to make identifying air leaks easier. We worked until we found no more air leaks using a smoke pen and an infrared camera.

The finishing details are going into the second floor. In the 11th hour, we decided to right-size and replace the first-floor heat pump and air handler to match the new load of the structure (since we finished the first floor and basement). The zone systems are being removed from both systems to increase overall runtime and gain a slight efficiency boost.

Mark Donovan has made his "mark" on this irreplaceable historic home, taking a house that boasts its original high-performance details, such as

the large shade overhangs, and Frank Lloyd Wright's vision to the next level. Mark and his wife, Mary Ludgin, will go down in history for graciously making this home their life's work.

Future generations can now enjoy their beautiful home. Being part of the 534 N. East Ave. historical renovation was an honor. 



**Adam Mufich** is an instructor for National Comfort Institute (NCI) and an HVAC contractor who recently sold his business, [A-Team Heating and Cooling](#), Ypsilanti, MI. He is a third-generation HVAC contractor who shares his time as a co-host for the [HVAC Overtime](#) and [Cooler Heads](#) podcasts. Adam also works with the social media team at [HVAC School](#). You can contact him at [ncilink.com/ContactMe](mailto:ncilink.com/ContactMe) with any questions.

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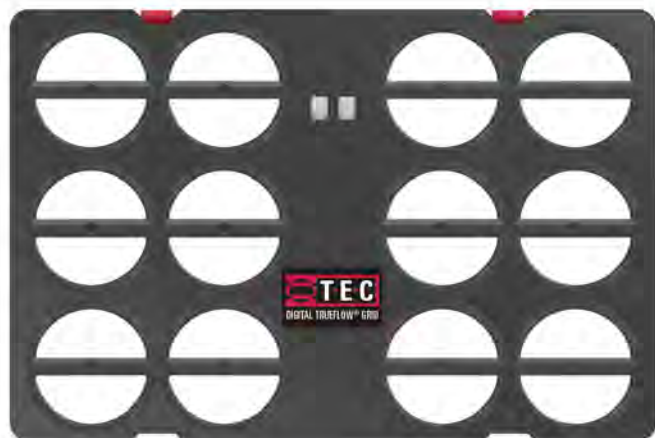
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### Bryan Orr to Keynote NCI's Summit 2024

National Comfort Institute (NCI) is pleased to announce that [HVAC School](#)



Bryan Orr

Podcaster and HVAC Contractor Bryan Orr of [Kalos Services](#) will provide the keynote address for the [High-Performance HVAC Summit](#).

His key note, titled "*How to Attract and Keep Great People on Your Team*," will explain how to recruit people who have the strengths (or "points") your team needs to succeed. Then, he'll dive into the principles needed to keep them engaged in the tasks they do best and make them feel fulfilled enough to stick with your team for the long haul.

Bryan Orr is co-founder and president of Kalos Services, a commercial/residential HVACR company in Central Florida with more than 250 employees.

Bryan has been involved in HVAC training for over 13 years. He started HVAC School to provide free HVACR training across many mediums, *For Techs, By Techs*.

If you want to learn more about **High-Performance HVAC Summit 2024**, which will be held **September 10-13 in Asheville, NC**, be sure to visit the [gotosummit.com](#) website. [Register today](#) and don't forget


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# Make Learning a Lifelong Pursuit



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**R**eflecting recently on my work life revealed a common factor that helped me grow and become successful over the past, almost five decades: **Learning.**

Over the years I've had several careers, including electronic engineering, and technical service and education in the medical equipment industry. I've been an editor and publisher of several magazines. I have sold HVAC and managed installation crews. And for the last three decades I've been immersed in HVAC education.

Looking back, what I find most fascinating is how much the experience and learning from each of these roles helped me in the successive one.

Today, I am honored to lead **National Comfort Institute** (NCI), a great organization with a mission to teach and edify all those we touch in our industry. We get to impact so many lives in a positive way.

And while NCI has grown significantly over the years, we constantly remind ourselves of three important tenets:

- 1. We must always remain in learning mode.** None of us knows as much as all of us. If anyone on our team thinks they don't need to learn anything else, we are in big trouble.
- 2. When we are teaching others we must always be open to new ideas.** The best ideas tend to come from challenging "common knowledge." Rules of thumb, and lack of fact-based, measurable information in our industry have been a major impetus for the original creation and continuous improvement of NCI's training.
- 3. We must remain humble – always.** While our instructors must be confident in their knowledge and ability to convey information in an interesting and engaging way, they must always be careful to not slip into arrogance.

Humility is the most important trait that helps

maintain balance and keep the line between confidence and arrogance from being crossed.

We are truly blessed with one of the most amazing training teams. Their caring, drive, and excitement to help people learn new concepts and become immersed in the high-performance approach is off the charts.

Having said that, our team is ever-vigilant of slipping into complacency, or worse, arrogance when we have the privilege to be in front of a group of students in an NCI class.

We strive to keep each other in check, not just in formal training, but in any interactions, publications, presentations, podcasts, etc.


Of course, none of us are perfect, but our team works hard to maintain humility and an attitude of service. We constantly remind ourselves that we have a significant responsibility to those we serve.

While you may not be involved in the business of education (although, in some ways we all are), think about how learning impacts your team.

Do you provide opportunities for constant learning, both formal and informal? Have you become complacent, perhaps believing that your team and organization is good enough? Do you see your organizations as average or typical?

If you see your company as average, are you happy with "good enough?" If not, maybe it's time to look for ways to make continuous learning and improvement a bigger part of your culture.

On a more personal note, if you haven't already, I encourage you to personally make constant learning part of your daily routine. Look for learning opportunities in your human interactions, and in your daily tasks and projects.

You'll be amazed at the difference it will make, not just in terms of reaching your business goals, but in how it makes you feel about yourself and your personal growth. 



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