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How COVID-19 Changed Training Forever

ALSO IN THIS ISSUE:

The Dangers of Improperly Positioned Ribbon Burners

Walking the PATH to Performance: Part Six

Partner Spotlight on Arzel Zoning Technologies, Inc.

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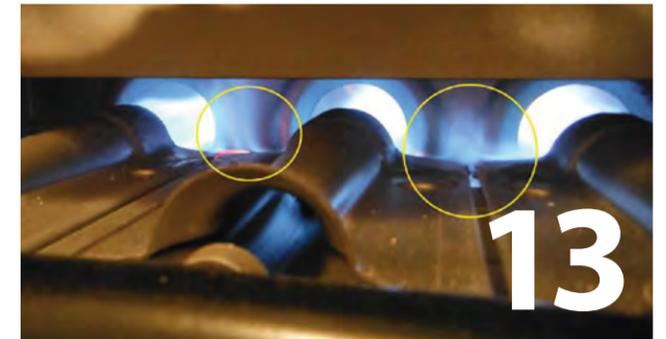
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TRAINING:
How COVID Changed Training for Performance-Based Contractors
 Learn how the pandemic impacted these contractors' abilities to stay current in their training and certifications.

MANAGEMENT:
Walking the PATH to Performance
 In wrapping up his six-part series on airside performance, NCI's David Richardson summarizes the PATH and shares his rationale for you to plan on finishing your performance journey.

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TECHNICAL:
The Dangers of Improperly Positioned Ribbon Burners
 Jim Davis shares insights into potential dangers posed by ribbon burners that aren't installed and positioned correctly.



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Silver Linings Brighten the End of a Dark Year



Mike Weil is editor-in-chief and director of communications and publications at National Comfort Institute, Inc. He can be reached at ncilink.com/ContactMe

Welcome to Volume 5 Issue 1 of the year 2021. Yes, we have closed the door on 2020 and can I get a hal-lelujah and amen to that? While a lot of writers typically pause and look forward with predictions for the upcoming year, I feel a lessons-learned look at 2020 is more appropriate. As an industry, we've faced serious challenges and it looks like we fared reasonably well. There is a lot to be thankful for. So here are a few "silver-lining" items I think we should learn from for the new year and beyond, and even be grateful for.

WE PLAN, GOD LAUGHS

Pulitzer-Prize winning author Michael Chabon is credited with having come up with the quote, "Man makes plans ... and God laughs." And wasn't last year living proof of this? The first quarter held so much promise as Performance-Based contractors and the HVAC Industry set goals and began working on their plans to get there.

As the pandemic unfurled, we were all faced with surrendering those plans or rolling with the punches. I like to think that most of the HVAC Industry opted for the latter.

From an NCI perspective, March was insane as our team completely turned our business model on its head to accommodate a world turned upside down. Many contractors that I've talked to over the months also had to change almost everything to secure the safety and well-being of their co-workers and clients.

SLOW IT DOWN AND REFLECT

For many, the shutdowns were disastrous. But for others, it gave them a chance to use that time to slow things down, do some deep thinking about how to learn from these events, and thrive.

For example, **Mike Greany of All Pro Heating and Plumbing** decided to set new goals – to

focus on his own well being and education.

Jason Nikkels of JN Electrical Temperature Control took the time to decide to move to a more open-book style of management.

Ken Dean of Dean Heating began exploring industry podcasts to help figure out how to improve his company's sales process.

It was a time when contractors also began looking to fill needed positions so when things started getting back to normal, they could launch forward and grow.

LIFE LESSONS AND MORE

Here are some of my personal takeaways from 2020:

- **Self-care is a priority, not a privilege.** COVID made it more clear than ever that life spares no one. Our health is the only thing we have to make the most of the life we have
- **Mental health is vital.** Also, always have something to look forward to
- **Time is a limited resource.** Don't waste it on people or things that don't add value to your life
- **Change is inevitable.** This is another old maxim that was proven big time in 2020
- **Pivot when you must.** Setting smart goals is outstanding, but being able to pivot them is even better. Be flexible and responsive
- **Decision making.** When it comes to making decisions, this maxim especially rang loud and clear in 2020: Deciding NOT to decide is still a decision. We all choose to live our lives moment by moment. We should always remember that
- **Knowledge is gold.** Your knowledge is your most valuable asset. Investing in it is the best investment you can make. Why? Because your future depends on it. 

Read the rest of my editorial on the HVACToday.com website: ncilink.com/0121TodaysWord

Written By HVAC Professionals for HVAC Professionals



A LOOK AT NCI'S ONLINE UNIVERSITY

National Comfort Institute's (NCI) Online University is a group of 30-minute or longer video classes provided to supplement the live, in-person classes that NCI taught pre-Covid. We use them as refresher courses for our trained technicians and as a perfect starter kit to help train new employees.

As soon as the university was available, we began weekly 45-minute sessions for our NCI-trained technicians that also included new employees. If you hire

new experienced or non-experienced maintenance techs, this is an easy way to properly bring them up to speed.

Furthermore, if you have technicians who may be shy about asking for help, or you think they need additional training, this is an easy and inexpensive way to get them caught up.

The Online University also offers business and customer service training. The **HVAC for Rookies** class, for example, takes what can be a very complex business and breaks it down to manageable chunks of information. This gives the

office staff an idea of the big picture of what HVAC companies do. These classes can be repeated as often as needed, unlike a live class.

Training is one of the ways we invest in our employees and is also an important part of our company's culture. NCI has allowed us to pivot our training to continue providing technical training to our employees without exposing them to a potentially unsafe environment this year.

For more information or to sign up for any of NCI's Online University classes, go to ncilink.com/OnlineU. You can also call 800-633-7058 and ask to speak to a Customer Care Specialist.

— By Greg Wallace, Progressive Heating, Air and Plumbing

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Arzel Zoning: The Evolution of Comfort Technology and Training

This month's spotlight shines on Arzel Zoning Technology, Inc., a Cleveland, OH-based manufacturer of HVAC zoning systems. Founded in 1983 by Al and Ruth Zelcer, this 37-year-old company has always been driven by a passion for innovative solutions to HVAC comfort and energy saving issues.

Their zoning solutions are designed for new construction and retrofit, residential, and light commercial applications. From its very beginning, Zelcer and his team were committed to simplicity as an integral part of their product design.

In fact, because Al understood that his product line would serve a universal need for consumers, his product design, from the very beginning, had built-in flexibility and universal application. In this light, Arzel was the very first to develop retrofit zoning technology in the HVAC marketplace.

A LITTLE HISTORY AND A LOT OF CHUTZPA

Originally an immigrant to the U.S. who worked as a baker, Al Zelcer found his way into working for an electrical contracting firm and realized he had a knack for it. Eventually, he struck out on his own and opened an electrical contracting firm in the Cleveland, OH area.

Sometime in the early 1980s, when he began thinking about retiring from the electrical contracting business, he

had an "Ah Ha!" moment.

You see, he was having comfort issues involving uneven temperatures throughout his home. During that time, very few HVAC contractors knew much about zoning, and the companies he had out to his house couldn't propose an easy solution. They all quoted him multiple system solutions, which were expensive and not cost-effective to operate.

He couldn't understand why something couldn't be retrofitted into the existing ductwork to control airflow. Of course, at that time, there was nothing like that. So, he set out to resolve the issue on his own.

It takes a lot of courage, or as they say in Yiddish, 'Chutzpa' to go from baker to contractor to designer and manufacturer, but that is exactly what Al Zelcer did. In 1983 his design became a reality, and Arzel Zoning was born.

According to Ken Barton, vice president of technical sales at Arzel, that original product was a pneumatic system, unheard of in a world where zoning used electro-mechanical motorized damper systems. The original Arzel design needed to be different and easily retro-



Ken Barton,
vice president,
technical sales.

fittable into existing ductwork.

"Al wanted to eliminate the motor, springs, and gears. By making his system pneumatic, he did just that," Barton says. "His first design was a blow-up bag-style damper. Once it inflated and squeezed against the side of the duct, it stopped airflow. It was a zone damper. Today's version is more conventional-looking."

FROM CONTRACTING TO MANUFACTURING

Al Zelcer isn't the only member of the Arzel team who moved from one side of the industry to another. Ken Barton began his career working for an HVAC contractor in the Greater Cleveland area. He was a technician who fell in love with zoning technology because it helped him solve his customers' comfort issues.

"It just worked," Barton says. For as long as I worked with the Arzel zoning product, I just installed it and never had to come back out to fix it. It just never broke."

Over the years, Barton worked his way up in the contracting business, eventually becoming an operations manager who was responsible for the recruiting and hiring of new techs.

"I knew someone who was working at Arzel at the time, and I called him to see if he could help me find some folks. He told me that Arzel was in the same boat – looking for someone to join their tech team. It sounded ideal



Arzel EzySlide Dampers are lined up and ready for shipping in the company's warehouse.

for me, especially since I was so passionate about their product and had been using it for so long. I asked if I could apply. The next thing I know, I was hired!"

That was 13 years ago.

Today the company is preparing itself for what Barton says is a potential resurgence of demand after the COVID pandemic comes under control and orders begin to climb to pre-pandemic levels and beyond.

He says that Arzel, like every other business in America, felt the impact of people becoming ill and being forced to social distance. Though the company remained strong in 2020, it did see shipments fall off, and some team members became sick with the virus.

Barton adds that the secret to keeping things going was taking the time to prepare for the resurgence of business by upping their game in terms of education – the cornerstone of Arzel's relationship-building with contractors since its founding.

IT IS ALL ABOUT TRAINING

He says, "Arzel has always provided training and support for its products and services – from system design to troubleshooting. We're proud of our training facility. It's home of our on-going **Comfort College** (ncilink.com/ComfortCollege) program."

Since its inauguration, Arzel's Comfort College has offered hands-on lab training sessions where HVAC con-

dampers, run tubing, and so on.

"Also, we conduct airflow dynamics training in those labs," Barton says. "This is where students use airflow hoods and pressure instruments to take readings. It all comes together with our bypass and Airflow Dynamics training. It's during this segment of our program where we often see contractors have that "Ah ha!" moment where they suddenly can see how it all makes sense.

"In other words, they not only come to understand why zoning can be so beneficial, but they also see how it provides them a great tool to resolve cus-



Joel Rosier facilitates one of Arzel's webinar offerings.

Like everywhere else, things had to change in terms of in-person training, and Arzel's Comfort College was no different. Remote learning became so much more important.

Plus, according to Barton, some pre-COVID expansion and renovation of the in-person classroom area now allows for students' social distancing in a comfortable environment.

"We are also in the process of updating our lab area where students get to see first-hand operational HVAC equipment paired with Arzel zoning controls. This part of our training and educational programming allows students to get hands-on with installations where they can physically get in there and install

tomor comfort issues."

Barton emphasizes that training has always been a critical part of the Arzel approach to business. "We have always tried to improve and reinvent ourselves," he explains, "and that's never been more evident than in 2020 with the pandemic."

From the aspect of conducting online and webinar-based training, this isn't anything new to Arzel. Barton says the company has used such tools for training for years.

"However, once the pandemic swept the nation, we needed to up our game and find even more ways to get our contractors what they need and what they want. That process is still underway



Left: Arzel engineers assemble and test zoning equipment in stations like the one pictured here.

Below: Comfort College, since its inception, has offered contractors training on the use, design, and troubleshooting of Arzel Zoning systems. Here they can test airflow, static pressure, and see the impact of dampers on a live furnace.

example, to provide targeted training to a salesperson who wants a better understanding of the product and how to sell or design it. He or she can set up a course at their convenience and even from home.

“We can also focus on a company where the contractor can have their entire crew take a deep technical dive into zoning and airflow.

“There’s no reason we can’t facilitate that from our facility and broadcast to their facility. Live online training is interactive, and the technicians can ask questions and get answers.

“It’s all about putting ourselves out there and making sure that we are available when needed.”

THE NATIONAL COMFORT INSTITUTE CONNECTION

Historically, through their Contractor College, National Comfort Institute (NCI) and Arzel collaborated to understand better the dynamics of airflow on the entire HVAC system. This includes the impact of static pressure. According to Barton, it is also where the two organizations took a deep dive into what happens inside a bypass on a zoned system.

“With NCI’s knowledge and their help working with us in our lab, we developed the bypass sizing chart that we still use today,” he says.

“We explored the actual velocities

and CFMs going through a bypass and often found they were off the charts from what we thought they would be. It was NCI that opened our eyes to all of this.”

Another connecting point is what Barton calls NCI’s laser focus on high-performance contractors and their teams. He says, “We love this group of customers because they strive to be the absolute best they can be. We’ve seen this first-hand at NCI events like Summit, where contractors share knowledge and network together to help each other understand and use performance to better their customers and their companies.”

Barton continues, “It’s obvious they don’t want to be a typical heating and air conditioning company. They want to differentiate themselves. They want to be educated and do things the right way. They are the exact people we want to partner and work with.”

ARZEL TODAY AND TOMORROW

The Arzel Zoning Technologies workforce is divided into several working groups that include their technical/engineering department (product development), the manufacturing team (production and assembly), and their sales/marketing group.

All production and assembly, warehousing, and shipping are done in-house. They bring their products to market through a close-knit wholesale distribution network but work very hard to maintain strong bonds with their contractor customers through training.

Today there are several other zoning product manufacturers on the market. According to Barton, Arzel stands out in how accessible they make them-



The Arzel management team includes, from left to right: Joel Rosier, Matt Hoffman, David Domanick, Beth Wood, Ken Barton, Lenny Roth.

selves to contractor customers.

“Those contractor relationships were key to our prior success as well as our success going forward,” he says. “Our success also stems from all our excellent technical development and support. Everyone in our tech department came from the field, so they understand what the technicians need.

“They can talk intelligently to contractors. They make it easy for contractors because they quickly get them the answers they need.”

Another service is what Barton calls Arzel’s after-hours and weekend tech-

nical services, as well as video “virtual” technical support (using cell phones on the jobsite if necessary).

He says they feel that HVAC technicians in the field are the guys who support Arzel the most. “So it’s essential that we are here to support them when they need it. You can’t put a price on that kind of value, and I think contractors recognize that,” he adds.

KEY ISSUES FACING ARZEL TODAY

One of the critical issues Barton sees today is finding ways to help contractors become more comfortable talking

about zoning in general and the Arzel product in particular.

“If the contractor doesn’t talk to consumers about zoning and its benefits, the customer doesn’t know what they don’t know,” he says. “They can’t ask intelligent questions. If I could change one thing, I would like every homeowner to know what zoning is. For that to happen, I’d like contractors to learn more about it themselves and then talk about it.”

That is the Arzel Zoning Technologies focus. For these and many more reasons, we cast our spotlight this month on Arzel Zoning Technologies. Congratulations to the entire team.



now. We began developing new and more diversified content. We also put together a pre-recorded library of webinars and have them available on our website through our contractor portal.”

Furthermore, Arzel is using this time to dedicate a separate room within their building focused only on webinars.

Barton adds that the next phase is bringing their content into podcasts, live streams, as well as online live guest speakers who can be interviewed and who can interact with their contractor customers.

OTHER TRAINING OPTIONS

Also, any contractor or distributor can sign up for their own personalized, one-on-one Arzel webinar on the date and time of their choice. Barton explains that this enables them, for



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How COVID Changed Training for Performance-Based Contractors

As the global COVID-19 Pandemic continues to limit in-person interaction, remote learning solutions allow companies to continue growing.

Let's face it: COVID-19 isn't the first virus to impact the world. Not by a long shot. Humanity suffered even worse in the past, and yet here we are. What's different this time around? In a word – the Internet.

Without this one tool, the world would have suffered even more because the Internet provided humankind the means to continue learning creatively, training, researching, communicating, and more.

Back in March, when quarantines began, everything was thrown off balance. No one knew what was going on or how long it would last, or what it would mean. Companies quickly switched to a remote work approach to keep employees safe and help the business continue, though in quite a different way.

Most HVAC Industry members – manufacturers, distributors, contractors, trade associations, and more – didn't have the infrastructure designed and in place for this work-from-home environment. Everyone scrambled to find solutions.

They found that webinars by themselves wouldn't cut it. And so, a new gold rush began to become more adept at something called virtual learning solutions.

Virtual learning isn't new technology. It was already making inroads as useful training tools, but it really took off as a result of stay-at-home orders as the Pandemic raged (and continues to do so even today).

TAKING TWO STEPS BACKWARD

From a Performance-Based Contracting™ perspective, the business impact was huge because this HVAC delivery method requires con-

tinuous training and certification to keep current. But, in March, almost all training activity in our Industry lurched to a stop.

Mike Greany, service manager at All Pro Heating and Plumbing in Ontario, CA says, "We saw what happens when we stop doing performance training and practicing as a team. It hurt our productivity."



"We took two steps backward in our mission to improve airflow and temperature measurement and testing. The Pandemic reduced the amount of time we typically spend teaching each other and communicating, and that cost us personnel who got nervous and jumped ship."

He says the shutdowns made several things abundantly clear: his training programs needed to change, and he didn't react fast enough. Plus, he needed to learn to delegate better.

At GV's Heating and Cooling in Glenview, IL, pandemic pressures were also very high. For Dawn Mroczek, it directly impacted sales, which up until March were very strong.



"Now everything is flat. Plus, we were impacted by equipment shortages from the distributors and manufacturers. It's like we've taken one step forward and two steps backward, which affected my family, our co-workers, and our customers."

Still, she says they kept up with performance-based contracting thanks to having access to online learning. Because her installers stayed sharp, they saw an exponential increase in duct renovation work.

COVID-AGE REMOTE LEARNING PLATFORMS

Everyone has been reading about online learning platforms changing how our children attend school and how that impacts working parents' lives.

Existing online learning platforms provide for student-teacher interaction and more. But business needs to go beyond this model.

That is where Distance Learning comes in. Distance Learning is closely linked to formal educational institutions. Typically, an employer pays for traditional higher education that specific employees, like

managers, would undertake.

Like eLearning and online learning, distance education relies heavily on the Internet, online classrooms, and training professionals.

For example, the National Comfort Institute (NCI) Distance Learning Program includes self-directed and live online classes. These classes range from their **HVAC System Performance class, Airflow Testing and Diagnostics, and Performance-Based Selling**, to recertification classes for several NCI certifications.

Learn more about these High-Performance HVAC classes here: ncilink.com/DistLearn.

"For me," says Jason Nikkel, "the closures and social distancing protocol posed logistic issues with how we con-

ducted service calls and installations. We use not only the online university classes that NCI offers, but their Trailblazer Coaching as well."



The Trailblazer Coaching that Nikkel is talking about is a monthly online live discussion hosted by NCI trainers to help contractors improve processes, better manage implementation strategies for Performance-Based Contracting, and more to help keep contractors on track.

Nikkel owns JN Electrical Temperature Control of Bowerstown, GA, and is a strong proponent of the performance-based approach to HVAC contracting. He says COVID created difficulties in closing more sales, but

thanks to his peers' encouragement and a stick-to-it mindset, they saw a 20% increase in their 2020 revenue.

"Distance Learning through the NCI Online University and other sources has helped us as Canada went into shutdown mode in March," says **Will Horner, sales manager of Canco ClimateCare, Newmarket, Ontario**. Horner was exposed to the virus and talked about how his quarantine gave him time to focus on self-growth using distance learning programs.



"Canco was closed for four months," adds owner **Nancy McKeraghan**. "That set us so far behind in our goals. Our staff stepped up,



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filled in the gaps, and helped us make up for those lost months and go beyond them.

“The lesson for us,” she continues, “is that we have to be more flexible and more constant with how we approach customers in this new world.”

“Thanks to things like distance learning programs, we understand more than ever the importance of continuous training – whether in person or online – as well as recruiting new people,” she says.

GOALS FOR 2021 AND BEYOND

Based on what they went through this year, the Performance-Based Contractors we spoke to have all set plans and goals that now include adding more distance learning to their train-

ing repertoire. Says Dawn Mroczek, “My goal is to focus more on leadership development in 2021. That will consist of taking online courses, participating in online learning, and reading more about it.”

Ken Dean, of Dean Heating and Cooling in Athens, OH,

says he is looking to improve his sales processes, especially when it comes to educating customers on duct renovations, air upgrades, and more. “I’m looking into more online classes and podcasts to help with that,” he says.

He got a taste for what distance learning can do after hiring a new tech in the middle of the Pandemic and got him up-to-speed quickly using online educational tools.



Mike Greany adds that he is looking forward to carving more time to use distance learning for his personal growth in 2021.

As the global COVID-19 Pandemic continues to limit in-person interaction, remote learning solutions allow companies to continue growing.

High-Performance HVAC contractors can rely on courses like those offered through NCI’s Distance Learning and Online University programs, or hire professionals to teach their crews with courses specific to their needs remotely.

Regardless of what the world will look like at the end of the Pandemic, one thing is clear: Coronavirus has changed employee training at its core. The question is, have you taken advantage of what’s out there? NCI

By Jim Davis



A Lesson on the Dangers of Improperly Positioned Ribbon Burners

In the early days of my career in the HVAC Industry, I intended to just sell combustion analyzers, mostly to commercial and industrial accounts. However, somehow rumors began spreading that you might be able to solve furnace problems using these instruments. Of course I was the one spreading those rumors!

So, in the early 1980s, my employer asked me to go into the field with a contractor to look at a furnace that was proving to be a major headache. I learned that the factory representative for the furnace manufacturer would be there as well. I wasn’t sure if I was being set up or that the idea was two heads were better than one.

TESTING AND DISCOVERY

The furnace was in a closet with a louvered door. There was no way to watch or test the furnace with the door closed. Because it was a louvered door, it shouldn’t have made a difference whether it was open or not. Okay, that was what I thought at the time, but that was to be another learning process later.

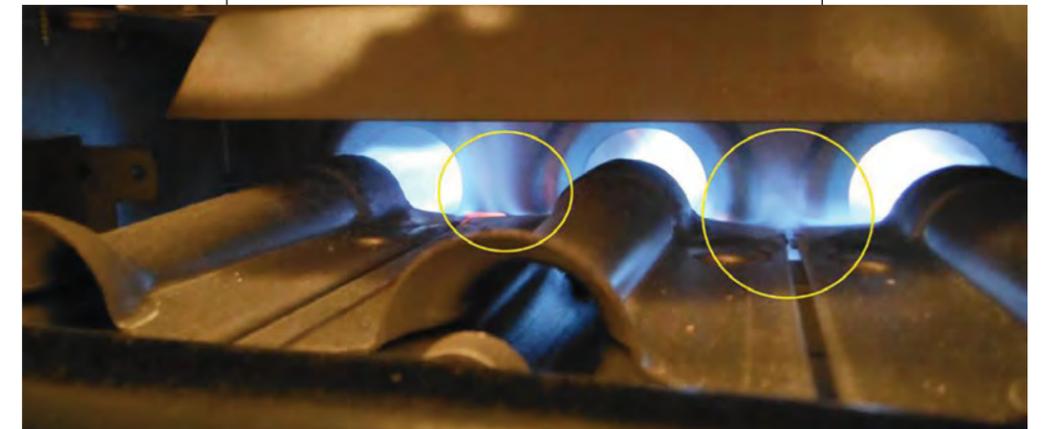
Using my analyzer to test the furnace, we found the combustion numbers to be stable, but the carbon monoxide (CO) was over 500 ppm. The insulation on the wires leading to the gas valve, fan, and limit switch was melted — a bad sign that flames are rolling out of the front.

THE CUSTOMER

The customer was a local bank. A draft hood furnace in this bank kept tripping its blocked flue switch three or four times a week, but the flue wasn’t blocked. The contractor changed the switch several times, but it kept tripping.

I was always anxious to use my combustion analyzer on new things, especially when there were problems. The more I tested, the more I could learn, and the more I could explain the value of the combustion analyzer, even though at the time it cost over \$2000.

I was already somewhat familiar with different venting problems on larger draft hood equipment, but this was the first time on a furnace. During the mission to determine the cause of the blocked flue switch tripping, we also found other important issues. These had to do with a ribbon burner position and air shutter or damper adjustments.



However, stable numbers indicate the furnace is venting. After a few minutes, the blocked flue switch opened, and the furnace shut down, but it wasn’t spilling!

It was a mild day, the outdoor temperature was in the 40s, so draft in the flue was low but adequate. Very little dilution air was being drawn into the draft hood, so the flue gases were taking up most of the space. This caused the flue gases to radiate heat down to the blocked flue switch and make it trip.

Here we see a Ribbon Burner fired up in an old furnace. A similar ribbon in our case study kept tripping its blocked flue switch.

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I knew what needed to be done to solve the one problem, but the manufacturer's rep wasn't too agreeable. He recommended (off the record), that the blocked flue switch be replaced with an automatic reset switch, so the furnace could recycle. I knew that wouldn't solve the high CO reading or keep the wires from melting.

I was told there was another furnace in another closet in another part of the bank, but it wasn't tripping its blocked flue switch. For comparison's sake, I suggested we look at it.

THE MYSTERY OF BURNER GUARDS AND AIR SHUTTERS

Approaching the other closet, I sensed a problem. There was a familiar stench. Opening the louvered closet door, I recommended the furnace be turned off immediately and the area ventilated because I was measuring CO in the ambient.

This furnace also had a blocked flue switch, but it wasn't tripping, and this furnace was spilling CO into the space. I could see flames coming out from under the rear burner guard.

I was not sure at this time why some burners had rear burner guards and others didn't?

Was this a guard or a support?

I asked the factory rep and he said this furnace model had a tendency for the flames to roll-out when it lit. I asked for the guard to be removed for a visual inspection. I noticed the burners had a downhill slope from front to back.

After the area was ventilated, the furnace was turned back on so I could do a combustion test. Yes, indeed the flames rolled out the front excessively. This was definitely a furnace you did not want to squat down and eyeball

the flames when it lit. That is if you wanted to avoid hair loss.

The CO was more than 1,000 ppm in each heat exchanger after five minutes of run time and still rising. This is the most dangerous furnace situation, and yet it was not shutting off.

ANALYZER ACCURACY?

The manufacturer's rep was confused and wasn't sure about my combustion testing results. Digital combustion analyzers were new technology, and I might have been the first to use one on a residential-style furnace in the field.

I noticed the burner flames angled sideways and were hitting the side of the heat exchanger. I was pretty sure this was not a good thing. Then I saw this little shutter inside the burner, and I wondered what was it for? The rep said it was an air shutter to adjust the primary air on the burner. It was different from other air shutters I had seen.

In this situation, the shutter was fully closed, so I asked if the tech could open it on one burner. When the shutter was opened the flame moved in an upward position and no longer hit the heat exchanger. CO dropped by more than half but was still on the high side. We then adjusted the other burner shutters. Even the rep was surprised how much effect the shutter had on the flame and combustion.

A few years later I saw that replacement burners had the shutter screwed down. My takeaway from this was that air shutters could be a good thing or a bad thing, but it took a few more field experiences to figure that out.

THE MANUFACTURER'S REP WASN'T SURE ABOUT MY TESTING RESULTS.

FRONT-ROLLING FLAMES

I also noticed there was more flame towards the front of the burner than in the rear. You could feel the heat radiating to the front.

The manufacturer's rep explained that having downhill burners made it easier to convert the furnace to LP (propane) in the field without changing the burners.

So I asked why couldn't the burner just be changed by the installing contractor? He said they were afraid the contractor would forget or not read the instructions.

The result of keeping the burners in an uphill configuration after converting the furnace to LP would be a small explosion!

My next question was why couldn't we raise the burner for natural gas? The rep said he didn't know. I had the contractor raise the burners, so they were uphill instead of downhill. The CO reading dropped below 25 ppm. When the burner lit, flames rolled to the back instead of the front. The factory rep was quite impressed and said officially he could not recommend what was done. But he thought it was a good idea.

Something else that was quite noticeable with these burners: their ends were corroded badly, as was the back of the heat exchanger. I later discovered this happened because there was less flame in the back of the heat exchanger which is where most of the airflow passes. So, the flue gases cooled more and partially condensed out, causing the corrosion.

This type of furnace and burner is no longer made, but there is a chance

there are some still in use and operating. Furthermore, some ribbon burners still used on certain boilers and water heaters today are in the wrong position in the field.

SIDE STORY

Right after I started sharing this information with my students, one asked if I could meet him at his parents' house. This contractor told his parents to turn off their furnace until then. Fortunately, it wasn't that cold.

He told me that when they installed his parents' furnace and air conditioner, his team mounted the A-coil with the drain in the back. Then tilted the furnace slightly backward so the coil would drain better. This was, of course, the furnace with the previous-

ly mentioned downhill burners.

So, we went to his parents' house and tested their furnace. The CO levels were over 2000 ppm. The furnace was venting and showed little signs of spillage which gave him a sigh of relief. The burners were corrected and made safe. As a result, this contractor knew he had to visit a few other customers and make the same corrections.

LESSONS LEARNED

As National Comfort Institute trainers, we pay special attention in class to the position of ribbon burners. They must be slightly uphill on natural gas (lighter than air) and slightly downhill on LP (heavier than air).

I even raised the burners on my father-in-law's furnace when I found out

he had these burners. Unfortunately, because something else on his furnace was different, I almost caught his pants on fire. Whoops!! That's another lesson to be discussed at a later date.

P.S. I believe using those rear burner guards or supports were flame roll-out band-aids. 



Jim Davis is the senior instructor for National Comfort Institute (NCI). He has a long and storied career in the HVAC Industry. That career began back in 1971. Today he is considered one of the HVAC Industry's foremost authorities on combustion and carbon monoxide safety. Jim is credited with developing the first combustion testing protocols and field diagnostic methodologies using digital combustion analyzers. To contact him, go to ncilink.com/ContactMe.

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Walking the PATH to Performance

THIS IS THE LAST ARTICLE IN A SERIES BY DAVID RICHARDSON DISCUSSING THE PATH TO PERFORMANCE: PRESSURE, AIRFLOW, TEMPERATURE, AND HEAT.

As you look down the Performance Path, it's easy to get overwhelmed with the performance tests and diagnostics you can perform. Don't make the mistake of trying to do everything at once. You will end up frustrated and anxious.

Wherever you are on the path, focus on small steps and consistent habits to give you the best chance of success.

Remember, this is a walk, not a 100-yard dash. Let's look at the wisdom shared by other Performance-Based contractors who walk the PATH to Performance.

START WITH THE END IN MIND

In Stephen Covey's book, *The Seven Habits of Highly Effective People* (ncilink.com/7Habits), he refers to a habit called "Begin

with the End in Mind." The first exercise Covey has his readers perform is to imagine themselves going to their funeral, three years from now. It instructs the reader to visualize the legacy they will leave behind and what impact they had on others.

This powerful exercise has the reader consider where they want to be in three years so they can work their way back to achieve those goals today.

I want you to do the same thing with the Performance PATH. Start with what you want to accomplish one year from now using HVAC system performance testing, diagnostics, and repairs. Then, work your way back to the present-day and recognize what steps it will take to get there.

When my family-owned company started down the PATH back in 2000, we knew what we wanted to accomplish. We wanted to prove our installations worked better than our competitors and prove it through airside measurements like static pressure and delivered airflow.

However, once we began measuring, what we discovered took us on a minor detour. But the "end in mind" didn't change. Don't let it surprise you when detours appear along your path.

WISDOM OF THE CROWD

If you have trouble defining what your "end in mind" goal is, ask for feedback from your colleagues. Get their ideas and opinions. They may see opportunities you didn't consider and help you find alternative ways to use system performance testing and diagnostics. Your chances of success are much higher when your team takes ownership of the idea.

This step is also a good time to figure out and decide who will walk the PATH first and lead the way. Choose wisely – the most technical person you have might not be your best choice. Look for some-

one who sees the big picture and understands why the performance path is important.

It may surprise you who volunteers to lead the way if they see your vision and choose to take ownership of it. Most times you are the first key player. You must learn the skills and then teach those skills to other key players.

After that, they become the teachers and multiply the lessons you taught them.

Establish specific tests for each team member. Then determine how each "role" will communicate or hand off results to others. See how comfortable each team member is performing different tests and assure they know what they should do. A good rule to follow is that all testing skills must be scalable and repeatable by anyone who performs a specific job. Your goal is to assure you don't create a position only a select few can perform.

AVOID PERFECTIONISM

Sometimes you won't know where you want to go or what you want to do with these tests. You may even feel like your head is spinning when you consider the potential options and opportunities. It's normal to feel unsure of what to do first and okay if you don't have the perfect plan.

If you don't know what your "end in mind" is, then start with the first letter of PATH (Pressure) and begin testing. Start as small as you can think of and then gain momentum. If you don't see the big picture, then focus on the small

picture of learning a new skill and how to master that principle.

Often, the act of starting will prompt further ideas and additional considerations you wouldn't have thought of until you started.

Take one step, then another, then another. If you have children, remember how you taught them to move from crawling to walking. Each child progresses differently, just as everyone will progress with testing at their own pace.

Some will grasp the principles on the first attempt – others may need more encouragement and coaching. Recognize the different speeds and adjust expectations accordingly.

FOCUS ON PROGRESSION

When you focus on a single step at a time, you tune out all the noise around you and stay focused on what you need to accomplish. Don't work on more than two testing principles at a time. For best results, the tests should complement each other, such as total external static pressure (TESP) and plotting fan airflow.

As you continue to test, you get a feel for what works and what doesn't. The testing process will vary slightly for each company, but the principles remain the same.

Refer to the static pressure article (ncilink.com/PATH2Boylan) of this series and the Lakeside Service example. You can see how John Boylan and his team use a process that handles static pressure. They have the

steps down for how to test, diagnose, explain, hand-off, and sell with this single principle.

The goal is to achieve consistent progress forward, not going in circles. Mile markers help you determine your progress as you travel down a road.

If you continue to see the same mile marker repeatedly, you aren't making any progress. Consider how you will measure and track your progress. What types of information can you easily track to assure you're moving in the right direction?

PARKINSON'S LAW AND QUARTER POUNDERS

It's often said the day before vacation is the most productive day of the year. You have a massive number of tasks to complete but you somehow accomplish them in record time.

How is that possible? The answer: setting deadlines that appear slightly out of reach.

Deadlines drive results and they're an important part of **Parkinson's Law** (ncilink.com/ParkinsonsLaw). It states a task will grow in importance and difficulty in relation to the time allotted for its completion.

In other words, you can take a minor task, such as learning to install test ports, and turn it into a year-long project, if you want to. Deadlines force you to focus on what is essential.

Your goals and deadlines should pinpoint what needs to get done and push you a little. However, they should not be so overwhelming that

The PATH to Performance: A Six-Part Series

This marks the final installment of our series that discusses the PATH (Pressure, Airflow, Temperature, and Heat) to Performance.

- Read Part 1 here: ncilink.com/PATH1 (Overview)
- Read Part 2 here: ncilink.com/PATH2 (Step 1: Pressure)
- Read Part 3 here: ncilink.com/PATH3 (Step 2: Airflow)
- Read Part 4 here: ncilink.com/PATH4 (Step 3: Temperature)
- Read Part 5 here: ncilink.com/PATH5 (STEP 4: Heat).

Remember, practice makes perfect. So, as Richardson explains, become proficient in each step before proceeding to the next. In the end, you will be able to deliver the greatest value in service and performance that your customers have ever seen.

And that will help you deliver the most well-deserved profits to your bottom line.

they are out of reach. To challenge you and your team, I recommend you stuff a pound of testing into each quarter of the upcoming year.

Make it a challenge for them to see if they will step up and accept it. I believe it will surprise you how many people rally around this challenge. Good teams like to beat the odds and prove they can win.

Consider the following quarters and five skills in each. Set them as goals with a deadline to learn. They can serve as potential steps forward your team will use to move along the PATH to Performance.

FIRST QUARTER: PRESSURE

1. Understand why static pressure is important
2. Measure and diagnose Total External Static Pressure (TESP)
3. Learn to discuss TESP and compare it to blood pressure
4. Add component pressure drops and duct pressures once you master TESP
5. Use static pressure measurements to diagnose problems and generate leads.

SECOND QUARTER: AIRFLOW

1. Understand why airflow is important
2. Know how to calculate required fan airflow
3. Plot fan airflow and compare to required airflow. Add balancing hood readings once you master fan airflow
4. Use balancing hood readings to verify duct system installation quality and make needed changes before you solve your competitor's duct issues.



Measuring airflow is the second step on the PATH to Performance.

THIRD QUARTER: TEMPERATURE

1. Understand why system temperatures are important
2. Know how to measure system temperatures
3. Understand how to use the duct loss formula to show duct system defects and the need for repairs beyond the equipment
4. Learn to discuss duct system temperature losses in a simple way
5. Use system temperatures in combination with static pressure to generate leads.

FOURTH QUARTER: HEAT

1. Understand why equipment and system Btus are important
2. Know how to determine rated equipment Btu capacity from manufacturer specifications
3. Learn to measure sensible Btus at the equipment in heating mode
4. Move from equipment sensible Btus to system sensible Btus on your next installation
5. Score installed heating system performance on the installation from step four. Identify what is right and what needs work. Once you master sensible Btu mea-

surement in heating mode, you can apply the same fundamentals to cooling operation. While I abbreviated the steps in these four quarters, they provide a starting point and clear deadlines for completion. They are often all your team needs. If the steps don't work for where you are, adjust them.

KEEP MOVING

You're the only one who can determine how far you progress along the PATH. The hard part is getting started. Once you start, keep moving forward because each step gives you momentum. It might not feel like it, but the progress is there. One day you'll turn around and recognize how far along you are.

Avoid stopping. It is dangerous because with each stop it is harder to get going again. So, consistency is important. If you measure static pressure only in slow times and drop it during the first week of hot weather, you lose all momentum.

Remember this statement: If walking the PATH were easy, everyone would do it. The farther down the PATH you go, the less congested it gets. Now it's time for you to decide if you want to be one of the elites who commit to finishing their journey on the PATH to Performance. **NCI**



David Richardson serves the HVAC industry as a curriculum developer and trainer for National Comfort Institute, Inc. (NCI).

If you're an HVAC contractor or technician interested in learning more about airside performance, contact David at ncilink.com/ContactMe or call him at 800-633-7058. NCI's website www.nationalcomfortinstitute.com is full of free technical articles and downloads to help you improve your professionalism and strengthen your company.

PHOTO OF THE YEAR



2020 HVAC Today Photo-of-the-Year

National Comfort Institute and *High-Performance HVAC Today* magazine are pleased to announce the **2020 HVAC Photo of the Year!**

The grand prize winner is chosen from the 11 monthly winners in 2020 as voted on by the readers of this magazine and visitors to HVACToday.com.

Besides being featured in both the digital and print edition of the magazine, on the website, and via our social media outlets, the Photo of the Year winner receives the **GRAND PRIZE — a FREE registration to NCI's High-Performance HVAC Summit*** (up to a \$795 value) in Branson, MO in August, 2021.



THE WINNER IS ...

Nathan Miller of Campbell & Son, Yakima, WA!

Nathan's original entry won in the December 2020 issue and was titled, "Tremendous Prioritized Airflow."

Congratulations to Nathan and we look forward to seeing him at Summit this coming Summer.

* Airfare and hotel ARE NOT included. The prize is for FULL Summit registration only.



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If It's January, It's PowerPack Time

Welcome to 2021 and the first PowerPack of the new year. Hopefully, you and your team made good use of the December PowerPack and are now ready to start this year right.

These tools include access to some of National Comfort Institute's (NCI) recorded webinars, online training, and downloads. Be sure to share them with your team during the month of January.

Please Note: Some of the tools included in the PowerPack each month



may not be normally accessible with your membership subscription package. However, you will be able to access these tools through this PowerPack portal during the current month.

So without further ado, here is what the January 2021 PowerPack includes:

- **Achieve Your Goals Through Delegation (Webinar)**
- **Six Steps to Achieving Your Goals (Online Training)**
- **The HVAC Industry Needs a Return to Craftsmanship (Article)**
- **Strategic Planning and SWOT Analysis Worksheet (Download)**
- **Estimating R-Value Chart (Download).**

Don't waste a minute! Access these tools and remember to share them with your entire team. The January PowerPack can be found at ncilink.com/PwrPak.

If you have any questions, or if you have any difficulty accessing these tools, be sure to contact your **Customer Care team** at 800-633-7058.

“THE NCI WEBSITE IS ONE OF THE MOST AMAZING TOOLS NEW AND EXISTING MEMBERS HAVE ACCESS TO. SEE IT AT NATIONALCOMFORTINSTITUTE.COM.”

Did You Know ...

The NCI website is one of the most amazing tools members have? No matter if you are a new member or an existing one, when is the last time you went to nationalcomfortinstitute.com, logged in, and explored?

The “NCI Dashboard” is your table of contents to everything your membership provides:

- The latest information on NCI's annual conference (NCI Summit)
- The Member Rewards Training Incentive Partner Program (TIPP)
- NCI Training and Event schedules
- NCI Online University
- NCI Webinar Archive
- PowerPack
- I-NCI
- Article Library
- NCI Online Store ... and so much more.

Each of these categories on your dashboard leads you to pages that explain what they are and how you can take advantage of their features and benefits.

New to the NCI training arsenal is the **Distance Learning Program** — an out-

growth of live, in-person training customized for use over the Internet. It includes both self-directed and live online classes that range from NCI's foundational HVAC System Performance class, “Airflow Testing and Diagnostics,” and “Performance-Based Selling,” to recertification for a number of other NCI certifications.

This is perfect during the pandemic to keep your teams up-to-date on their training and certifications when in-classroom training is not available in your area.

Schedules of these classes go out to members each week.

The team at NCI work continuously to bring you new training classes as well as upgrading existing ones to keep your personnel up-to-speed on the latest advances in High-Performance HVAC testing, diagnostics, and more.

By the way, the NCI website also links you to our National Balancing Council page for those of you in the commercial testing and balancing marketplace, as well as a consumer site that includes a “Find-A-Contractor” locator listing NCI members at the top.

Learn more by visiting the website today. And remember, if you have any questions about the site, your membership, or anything NCI-related, you can call our **Customer Care** line at 800-633-7058.



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Go to ncilink.com/ContactMe with your comments and questions.

What Are Your New Year's Resolutions?



Dominick Guarino is publisher of *High-Performance HVAC Today* magazine and CEO of National Comfort Institute, Inc. He can be reached at ncilink.com/ContactMe

Each year millions of people make resolutions on what they will start or stop doing in the new year. One key to successfully keeping a resolution is making it specific and measurable.

If you are still working on yours, below are 10 ideas for commitments you can make in your professional and personal life – many apply to both!

These are meant as suggestions, so don't feel like you have to tackle every one of them. If any appeal to you, add them to any other resolutions you want to make, and write them all down. Make sure you create measurable objectives.

1. Take Better Care of Yourself. Are you spending enough time taking care of your health? Without good health, none of your other resolutions matter.

Most of us struggle with this area, whether it's weight gain, poor eating, lack of exercise, poor sleep, smoking, alcohol consumption – or other unhealthy behaviors.

If any of these hit home, take a good hard look at which ones are affecting you the most, and make a specific, written commitment to make changes to get yourself on the path to physical wellness.

2. Feed Your Brain. Do you spend enough time learning? When was the last time you read or listened to a good book that brought you new knowledge? Maybe it's time to commit to reading at least one edifying book a month, or perhaps start with one a quarter. What's important is your commitment to a number and follow through.

3. Improve Your Work/Life Balance. Most professionals spend too many hours working and not enough time living their lives outside of work. Sound familiar? One way to break this cycle is to commit specific blocks of time for activities outside of work.

They can be structured, like new hobbies, sports, or other interests, or as simple as cooking a meal from scratch every week, reading a book, or new activities with your spouse or loved ones. Maybe

join a church group or volunteer at a food bank. A good way to stay on track is to write these activities on your schedule every week, the same way you would plan a work meeting or a project. Otherwise you will likely slip out of balance again.

4. Get Better Organized. Oftentimes clutter leads to wasting a lot of time finding things when you need them. It's easier said than done, but commit to starting the new year by cleaning your office – or your garage. Eliminate things you have stored up but haven't looked at or used in several years – you probably never will.

5. Reduce Distractions. If you find yourself getting distracted a lot, and becoming frustrated about not getting things done quickly enough, maybe it's time to try something different.

This might include letting phones go to voice-mail, turning off text and instant messaging, closing your door, and removing as many distractions as possible. Try this for a month. Make it a habit, and you will wonder how you were ever able to get anything done before.

6. See Your Commitments Through. It's very easy to get excited about a new project, focus a bunch of energy on it, then halfway through see another "shiny object," and start on that. Before you know it you have a bunch of unfinished projects. How frustrating is that?

If this sounds familiar, you're not alone. That doesn't mean you can't have multiple projects going on at the same time. Most people don't have the luxury of just doing one thing at a time. Try this: As you complete a step in a project, immediately schedule the next step.

With your project "timelines" all on one page, you can see when a project is slipping, and make a decision to put it on hold, or slow down on the others so you can get it back on track. 

Read four more 2021 resolutions by going to the web-version of this editorial at ncilink.com/Resolutions

Southern California Edison Hosts Online Live Training for HVAC Professionals



Southern California Edison has partnered with NCI to provide High-Performance advanced training & certification to HVAC professionals servicing SCE customers through NCI's online, live classes.

These classes also qualify for NATE (North American Technician Excellence), and BPI (Building Performance Institute) Continuing Education Credits.



January - March 2021 SCE California Training Calendar

	Combustion and Carbon Monoxide Recertification* January 6-7: 8am - 12pm PST • 8-hr training program Regular Price \$395, Student fee - Just \$50 per student	This 8-hour course will renew your NCI Certified Carbon Monoxide and Combustion Analyst certification.
	Airflow Testing & Diagnostics* January 12-13: 4pm - 8pm PST • 8-hr training program Regular Price \$395, Student fee - Just \$50 per student	Measure and interpret Static Pressure; identify fan type & speed; locate fan tables and plot fan airflow; diagnose, sell, and perform air upgrades on HVAC equipment and Duct systems; and much more!
	Performance-Based Selling Jan. 19-20, 26-27: 8am - 12pm PST • 16-hr training program Regular Price \$795, Student fee - Just \$100 per student	This course provides detailed training based on our simplified Performance-Based Selling process. You will also be introduced to simple diagnostic tools and learn how to sell "Air Upgrades" to add profitable work to your replacement sales.
	Duct System Optimization Certification Class** Feb. 2-3, 9-10: 4pm - 8pm PST • 16-hr training program Regular Price \$690, Student fee - Just \$100 per student	Uncover air distribution upgrade opportunities and redesign and renovate the system to deliver the highest quality, comfort, and performance your customers want, and are willing to pay for.
	Commercial System Performance Certification Class** Feb. 11-12, 18-19: 1pm - 5pm PST • 16-hr training program Regular Price \$690, Student fee - Just \$100 per student	This is designed to help HVAC professionals correct the problem of low-rated operation capacity. Learn how to test, diagnose problems, prepare a scope of work and renovate commercial HVAC systems.
	Explore HVAC Field Performance March 1: 5pm - 7pm PST • 2-hr training program Regular Price \$95, Student fee - Just \$15 per student	Learn how to measure and diagnose using Total External Static Pressure (TESP), understand the testing tools and AirMaxx™ app, and teach customers what the test means to them.
	Residential System Performance Certification Class** March 4-5, 11-12: 8am - 12pm PST • 16-hr training program Regular Price \$690, Student fee - Just \$100 per student	Discover the keys to delivering true system performance. This leads to enhanced comfort, safety and energy efficiency for your customers, plus greater revenue and profitability for your company.

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