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Special Ops: Cleaning Uncommon and Specialized Duct Systems

or:

What the Hell is that Thing?

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Presenter

David Monson
Then

David Monson
Now

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Disclaimer

This presentation is not intended to be a comprehensive program covering all aspects of this topic. All technicians are encouraged to read and follow all applicable standards, codes and regulations related to this topic.

- ✓ It is the responsibility of each individual contractor to follow local building codes and licensing requirements and to work safely in accordance with OSHA guidelines.
- ✓ It is the contractor's responsibility to take proper precautions on each project to prevent cross contamination. Always take the health and safety of the building occupants into consideration before you conduct any cleaning procedures.
- ✓ All of the following tips are only general tips. They do not cover every situation and it is your responsibility to adapt these tips to the individual system you are working on.
- ✓ The Instructor is not responsible in any way for the work you perform after viewing this slide show. You are responsible for your own work.
- ✓ The views and opinions following are the instructors opinions and not necessarily the official position of the National Air Duct Cleaners Association.

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What We'll Learn

- Adapt known duct cleaning techniques and methods to 5 unique situations.
- Use those 5 situations as a paradigm to take what we know and apply it to those situations we have never encountered before.

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Special Ops

The Motto I learned to work under when I wore that sailor suit…

- **The Snipe's Creed:**
- **We the unwilling, led by the unknowing, have done the impossible for the ungrateful for so long… we are now qualified to do everything with nothing!**

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Special Ops

High Velocity Duct Systems

- They have a unique configuration.
- They have a unique design.
- They present unique problems to Air Duct Cleaning.
- They move HVAC air by compressing it and squeezing it through small tubes (2").

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Special Ops

High Velocity Duct Systems

- They perform HVAC functions and save space.
- It is a stationary adaptation of forced air systems on planes.

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Special Ops

High Velocity Duct Systems

- This is what they look like before the plaster goes up.
- Because they move air with higher pressure, it is faster air flowing through the ducts.
- Normally dust doesn't settle on the supply side and all of those 2" ducts don't need to be cleaned.

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Special Ops

High Velocity Duct Systems

- The 2" flex ducts absorb sound and have to be a minimum of 12' long.
- If the run is short, they fold up on themselves.
- Enter the cleaning problems.

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Special Ops

High Velocity Duct Systems

- No one makes tools specifically for cleaning 2” diameter ducts.
- Spinner balls for dryer vent cleaning are made to navigate 4” ducts and 90° turns.
- You can successfully move a spinner ball in a 2” high velocity duct branch. You can even navigate it around a 180° bend…
- But you will never get it back out.

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Special Ops

High Velocity Duct Systems: Case Study

- A house with 2 high velocity systems is having a fireplace chimney repair made.
- The terracotta clay flue tiles have failed and need to be replaced with an insulated stainless-steel liner.
- To make space for the new liner, the tiles have to be removed from the inside.
- You set up a HEPA vacuum at the bottom sucking on the fireplace opening that is tented over and you run a “tile whacker” down from the top.

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Special Ops

High Velocity Duct Systems: Case Study

- Everything goes smoothly with the rotary demolition tool turning the clay tiles into fine pink dust until…
- The HEPA filter ruptures, and no one is inside to see it.
- That vacuum propels the fine pink dust into the indoor air.

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Special Ops

High Velocity Duct Systems: Case Study

- The second-floor duct system jammed into the eaves space. The basement system was just as convoluted and jammed into tight spaces.

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Special Ops

High Velocity Duct Systems: Case Study

- These ducts needed to be cleaned whether or not there were tools to do the job.
- The only way to do it was to disconnect every 2" branch, straighten it out, and run the air tools through.
- It took a lot longer to do than a conventional duct system, but it was the only way.

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Special Ops

High Velocity Duct Systems: A Fly in the Ointment

- As I was in the kitchen admiring how clever we had been to pull off this duct cleaning job I found myself staring at this Viking built-in refrigerator.
- I was sitting on the island stool resting my elbow on the shiny black granite countertop.
- UH OOOOOH!

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Special Ops

High Velocity Duct Systems: A Fly in the Ointment

- Time to look up a service manual on Viking built in refrigerators to learn how the air passageways are configured!

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Special Ops

Duct Socks (Sox)

- What the hell is a duct sock?
- Is that some sort of special clothing you have to wear when you are duct cleaning?
- Is it some sort of secret phrase you use to describe duct cleaning?
- What the hell is that thing?

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Special Ops

Duct Sock

- This is a Duct Sock.
- And, man, is it dirty!
- Inside and out.
- How the hell do you clean one of these?

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Special Ops

Duct Sock

- This is what one looks like when a system is running, and the duct is inflated.

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Special Ops

Duct Sock

- So how do you clean these in a cost-effective manner?
- Do you turn the system on to inflate the duct, then stick your compressed air snakes in through the holes to clean them?
- Do you try and attach the hose from a duct vacuum to them?
- You could try to wash them in a washing machine, but only if they are made from cloth fabric. You better have a large drum washing machine without an agitator cone, though.
- The first slide in view is made from woven polyethylene. That would come apart in a washing machine.

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Special Ops

Duct Sock

- They usually have some sort of cable and clip arrangement for attaching them to the overhead.
- Unclip the clips and lower them to the ground.

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Special Ops

Duct Sock

- Then take them outside and hook them to the discharge side of your non-brand specific engine driven duct vacuum and fire it up.

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Special Ops

Duct Sock

- Once inflated insert your compressed air tools and whip the heck out of the inside.
- Then spray detergent on the outside with a pump sprayer.
- Then hose it down with a garden hose and nozzle.
- It will dry in about 15 minutes with the air blowing through it.

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Special Ops

Duct Sock

- Then hang it back up, clean as can be.

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Special Ops

Getting Inside Aluminum Double Wall Duct: With 2 Inches of Insulation Between the Walls.

- The assignment is to clean an Air-to-Air Heat Exchange Ventilator system on the roof of a high-rise senior citizen's housing building.
- Cleaning is normal except…
- How do you make access on double wall aluminum duct?

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Special Ops

Getting Inside Aluminum Double Wall Duct: With 2 Inches of Insulation Between the Walls.

- Recipe:
  - Pre-curved aluminum cover plates from the sheet metal shop.
  - Aluminum cutting wheels on right angle grinders.
  - A bunch of tubs of duct butter to coat the exposed insulation.
  - 2 layers of ¾" Armaflex and 1 layer of ½" Armaflex on the inside of the cover panel to make up the insulation.

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Special Ops

Getting Inside Aluminum Double Wall Duct: With 2 Inches of Insulation Between the Walls.

- There had to be one of these on top of every riser that went down through the 11-story building.
- They had to be removable so that future service could be performed.
- They had to seal airtight (with caulking) because they were energy management systems.
- We, as the cleaning vendor, did the work that the architect failed to do to make the system serviceable.

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Special Ops

A Piece of History

- This is Old South Meeting House in Boston.
- This is real history, not fake online influencer pseudo-history.
- This is the realest of deals.

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Special Ops

A Piece of History

- In this pulpit Sam Adams stood and roused the rabble the night of the Boston Tea Party.
- I had our crews start this job with a moment of respect for the founding of our nation.
- I went and stood in the pulpit, too.

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Special Ops

A Piece of History

- They had a problem, though…
- The next-door neighbor (literally 6' away) was doing a sloppy gut and renovation in a 9-story building.
- They were cutting up concrete floor with diamond saws and shoveling the rubble down trash chutes.
- The trash chutes ended about 15' above the ground.
- They were "catching" the debris (sort of) in 2-yard dumpsters on the ground.
- Oh, buy the way, that is the outside air intake for the main HVAC systems for Old South Church.

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Special Ops

A Piece of History

- The fine concrete dust that entered the HVAC systems was very well distributed through the building and set off the fire alarms.
- Our first piece of business was to install filter media over supply registers as a stop gap until we could get the project rolling.
- This is what a double layer of polyester filter media looked like after a day.

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Special Ops

A Piece of History

- This was a very complicated all-hands duct cleaning project.
- There were 2 multi-zone, hot deck/cold deck systems serving the building. This was cutting edge tech in the 1980s, obsolete these days.
- Our initial cleaning was not good enough. Smoke detectors went off again and we had to re-filter media the whole job.
- Something missed was biting us in the butt.
- It was something not shown on the blueprints.

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Special Ops

A Piece of History

- The mechanical rooms for this building were in the “sub-basement”. This is 2 stories below street level.
- This may be a common thing in many cities, but in Boston, this distance below the surface of the ground has a particularly ominous meaning.
- This section of Boston used to be salt marsh swamp. The colonials drove pilings in the mush and filled with gravel to build up new ground to build buildings on.
- Who knows what nasty chemicals were percolating in the ground just outside the sub-basement foundation walls…

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Special Ops

A Piece of History

- The outside air intake ducts from that grill in the back alley where the dust entered the building were not shown on any of the blueprints anywhere.
- We searched and found a couple of trap doors on the floors of some storage closets in the sub-basement.
- The outside air intake duct was below the concrete floor of the sub-basement, more than 2 stories below the street!

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Special Ops

A Piece of History

- This outside air intake duct was 5' wide by 4' high, was L shaped, and was about 105' long, and it was loaded with fine concrete dust.
- We had to learn about specialized permit-required confined space entry in a hurry.

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Special Ops

A Piece of History

- We hired a professional emergency response team company to teach us how to do a permit-required confined space entry in the location.
- They were the onsite emergency response team that could perform non-entry rescues.
- If things went really bad, they had SCBA and could do entry rescues.

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Special Ops

A Curve Ball from One of the Committee Members…

- Right near the last stages of planning he says, “include a segment on phenolic duct.”
- “WTF is phenolic duct?” was my response.
- But this is exactly the point of this presentation, how to attack the things we don’t know.

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Special Ops

A Curve Ball from One of the Committee Members…

- Phenolic duct is a new product being introduced to the marketplace.
- It is similar to duct board except it is some sort of foam board and has a smooth impermeable inner lining.
- That makes it better than duct board any day.

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Special Ops

A Curve Ball from One of the Committee Members…

- It can be formed into many complex shapes.
- It can be made airtight.
- It has a high insulation value.
- And its chief benefit is…

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Special Ops

A Curve Ball from One of the Committee Members…

- It is very light weight!
- Wow!
- I haven't seen this stuff yet.
- The way my marketplace works, I probably won't see it in my working career…
- But many of you will likely see it in your lifetimes.

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Special Ops

A Curve Ball from One of the Committee Members…

- This begs the question, "how do I work with this new material that I have never encountered before.
- I'm pretty sure it is going to get dirty the same way more conventional ducts get dirty.
- SMACNA to the rescue!

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Special Ops

A Curve Ball from One of the Committee Members…

- Ante up and buy the instruction book.
- Study it until you are able to put a competent work plan together cleaning ducts made from this new material.
- Put prices to the activities of the work plan.
- Quote jobs with assurance that you know how to perform this service in a profitable manner.
- Oh, and charge the cost of the manual to the first job you do to make them pay for your education…

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Special Ops

Conclusion

- No matter how many years we work in this business, there will always be something we have never seen before.
- We don't have to freeze. We don't have to pass. We don't have to lose out.
- Take what you confidently know and project it into this new scenario you have never seen before.
- Research, study, do your due diligence, and come up with a plan.

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Special Ops

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