Cure the HVAC Equipment Failure Epidemic with Simple Air Upgrades

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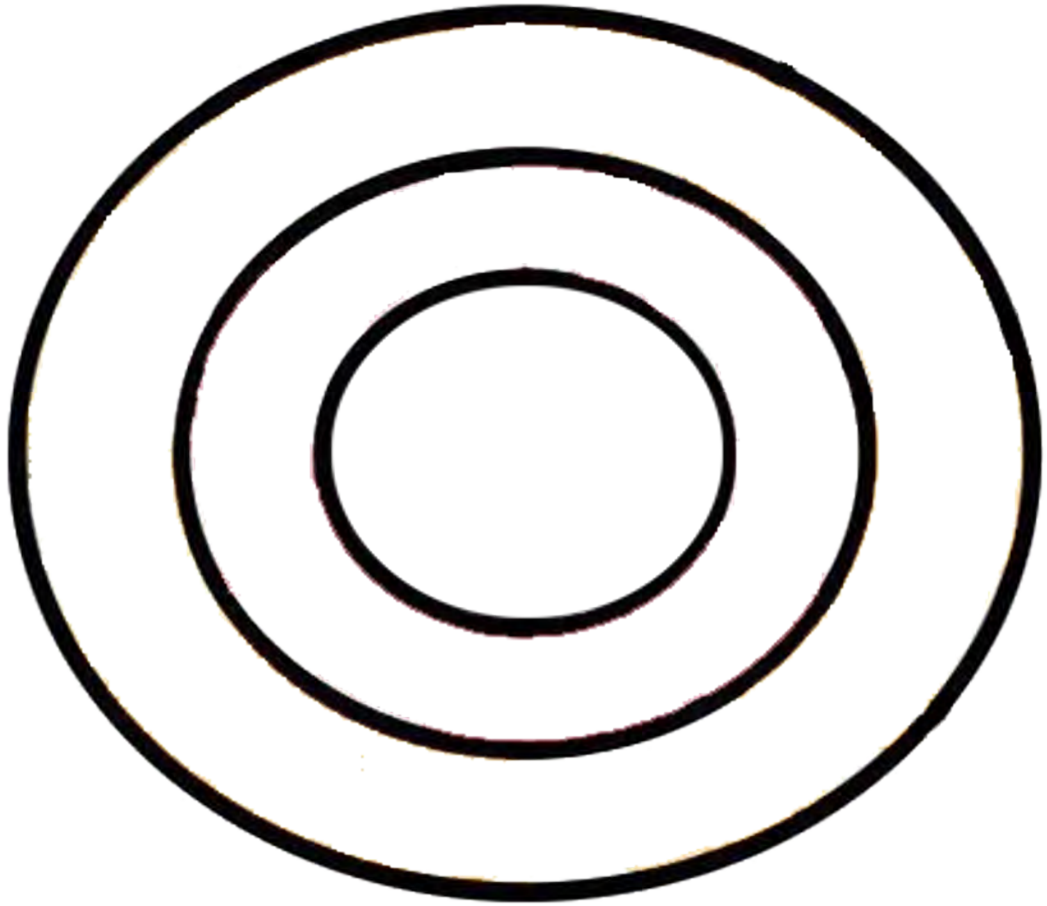
Working hard for something
we **don't care about** is called **stress**.

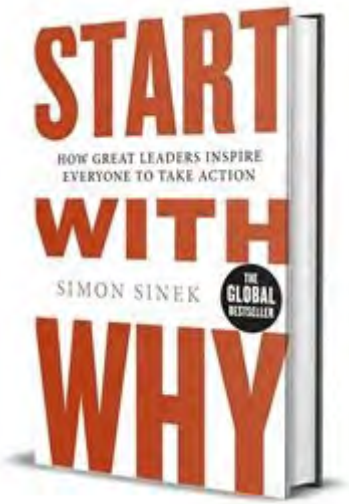
Working hard for something
we **love** is called **passion**.

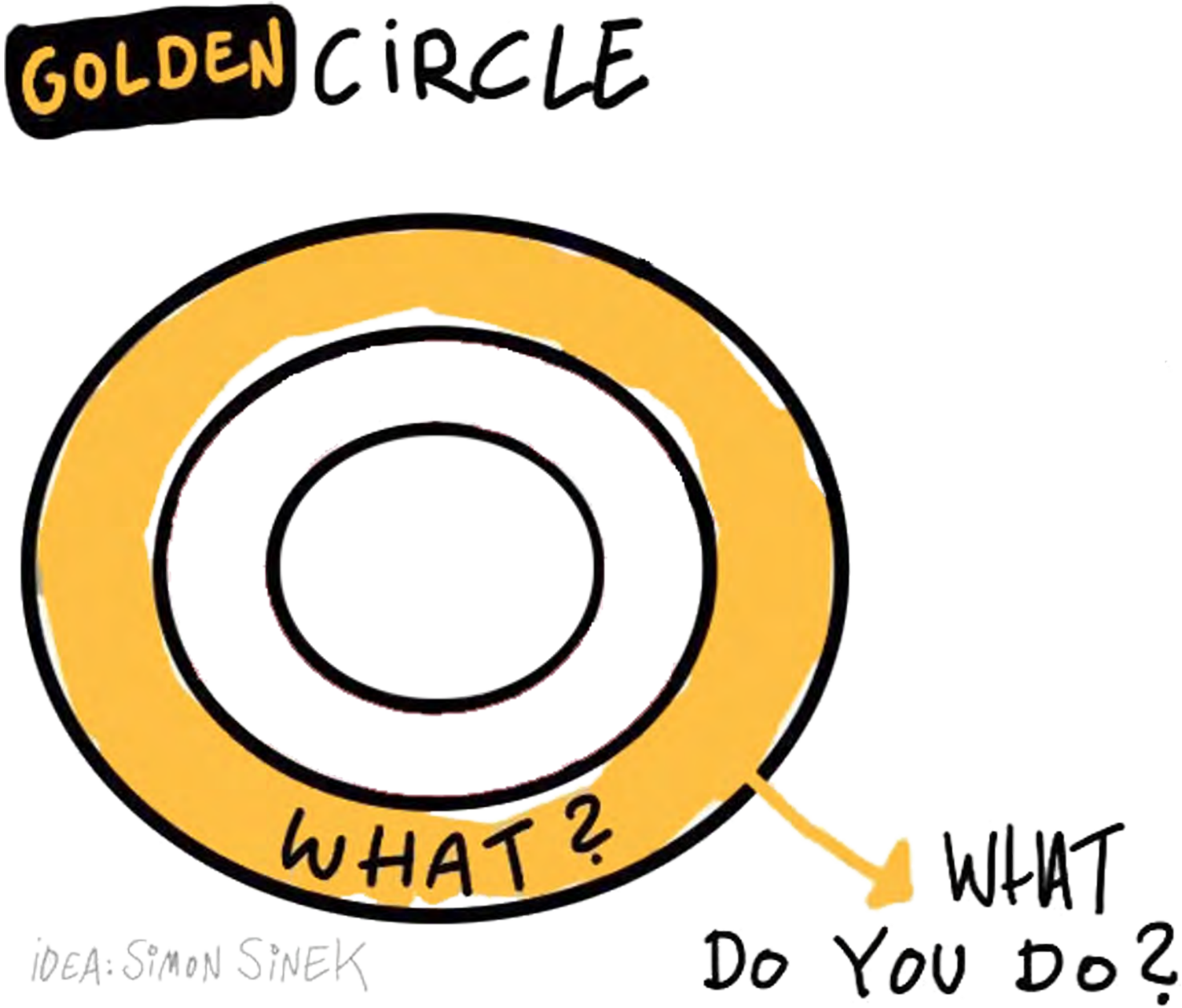
- Simon Sinek

GOLDEN CIRCLE



IDEA: SIMON SINEK




GOLDEN CIRCLE
WHAT?
WHAT DO YOU DO?
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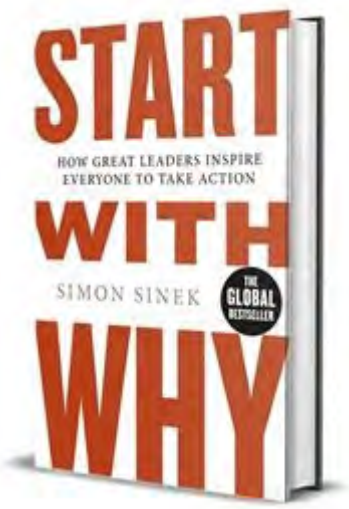
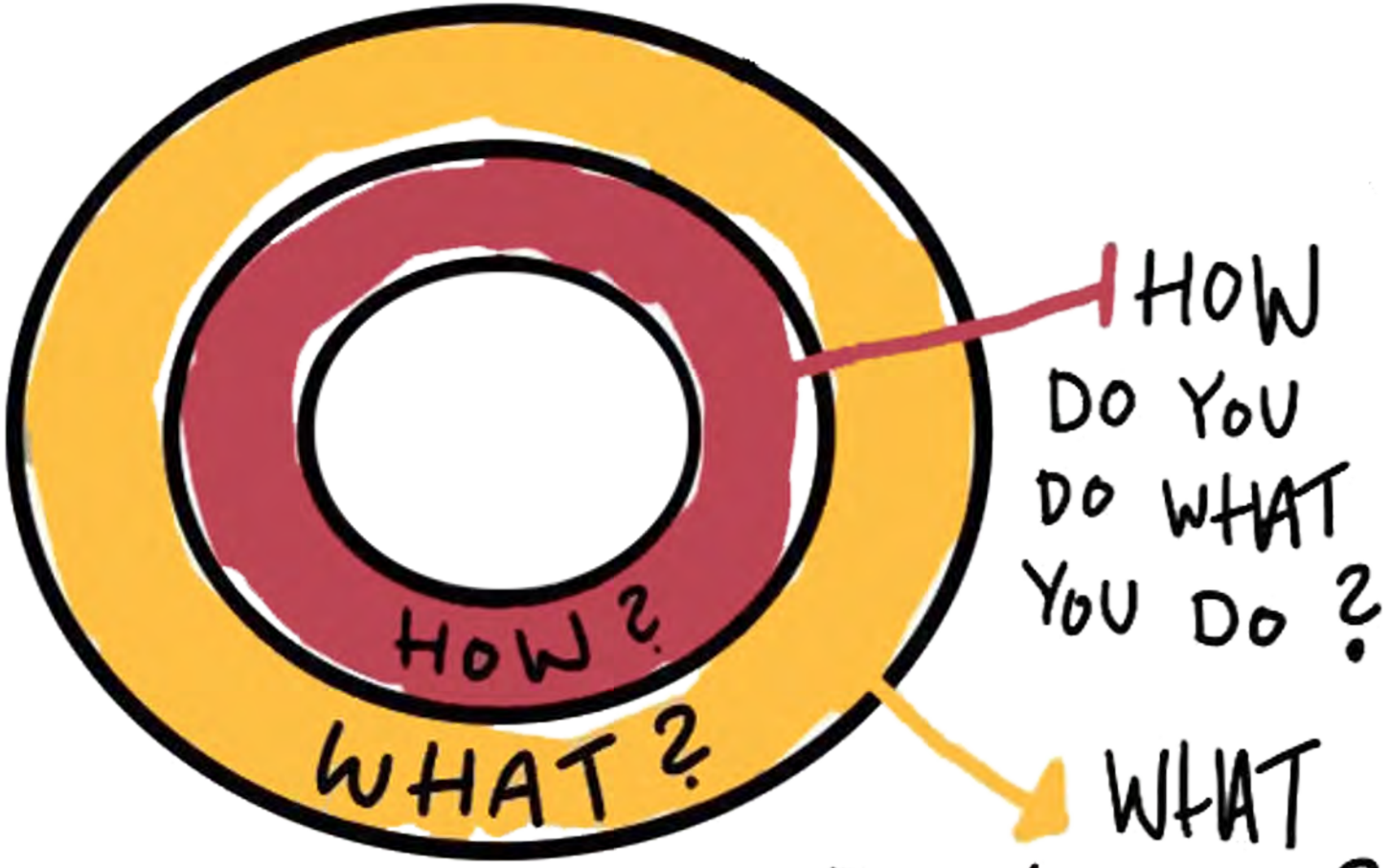
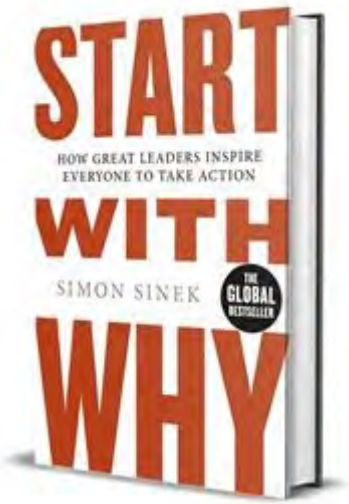
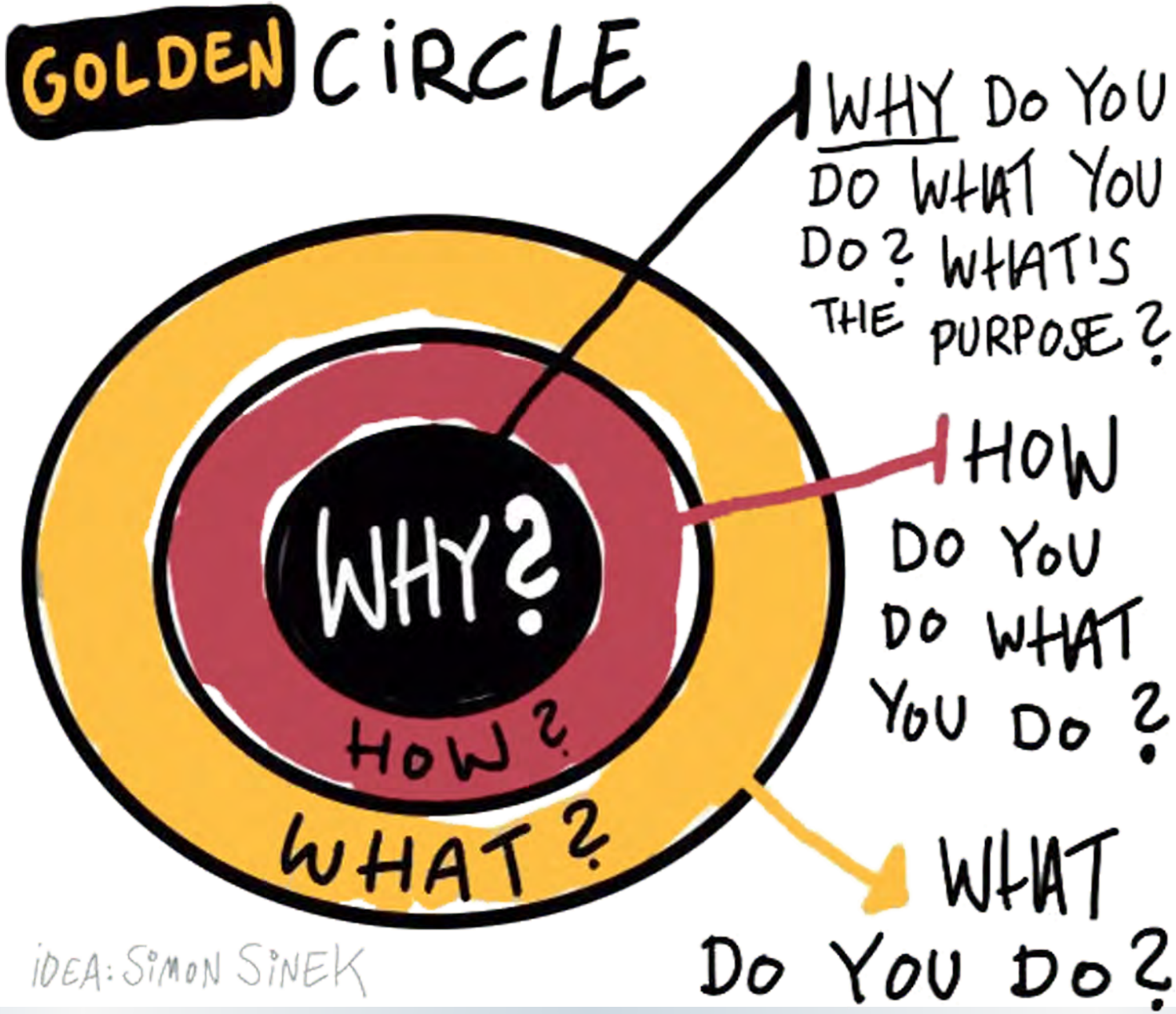

START
HOW GREAT LEADERS INSPIRE EVERYONE TO TAKE ACTION
WITH
SIMON SINEK
THE GLOBAL BESTSELLER
WHY

GOLDEN CIRCLE






GOLDEN CIRCLE
WHY DO YOU DO WHAT YOU DO? WHAT'S THE PURPOSE?
HOW DO YOU DO WHAT YOU DO?
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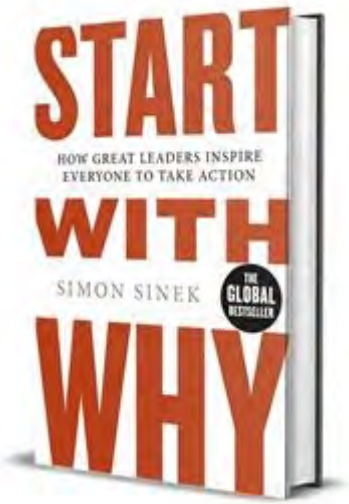
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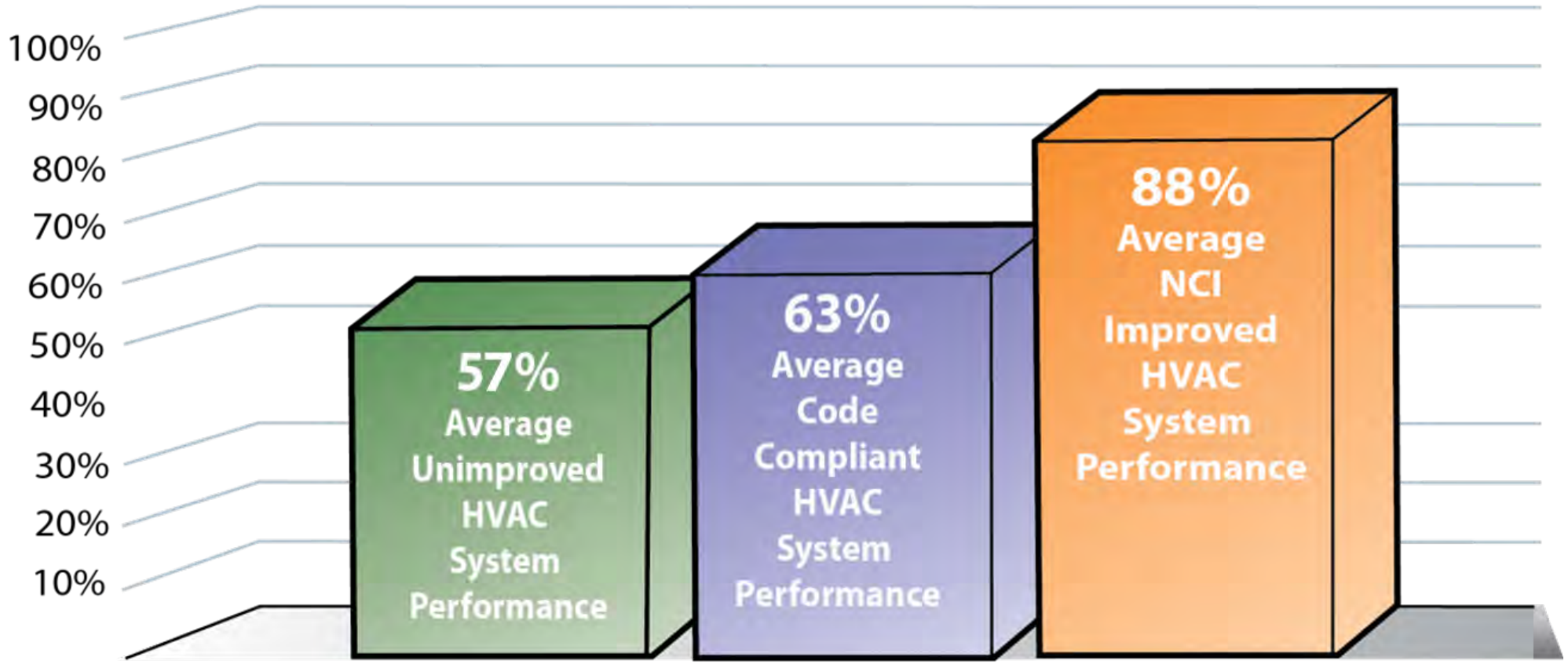
Preview

- The State of the Typical HVAC System
- The Air Upgrade Approach
- How to Discover Sick HVAC Systems
- Offering the Cure
- Review and Next Steps

The State of the Typical HVAC System



Our Industry Lost Focus on What's Important

Safety

Health

Comfort

Efficiency

The results are sick HVAC systems

Symptoms of Sick HVAC Systems

___ Hot and cold rooms

___ Excessive utility costs

___ Poor IAQ

___ Uncontrollable humidity

___ Compressor floodback

___ Cracked heat exchangers

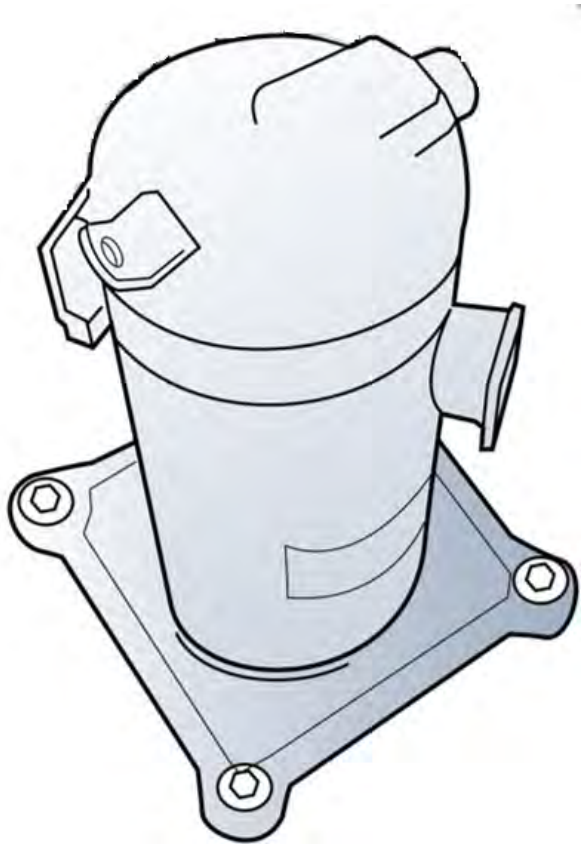
___ ECM hunting and failure

___ Furnaces cycling on primary limit

___ Condensate drainage issues

___ Erratic TXV operation

___ Constant equipment problems



Compressor Failure

Our Industry Needs Duct Doctors and Thermal Therapists

Air Upgrade Approach

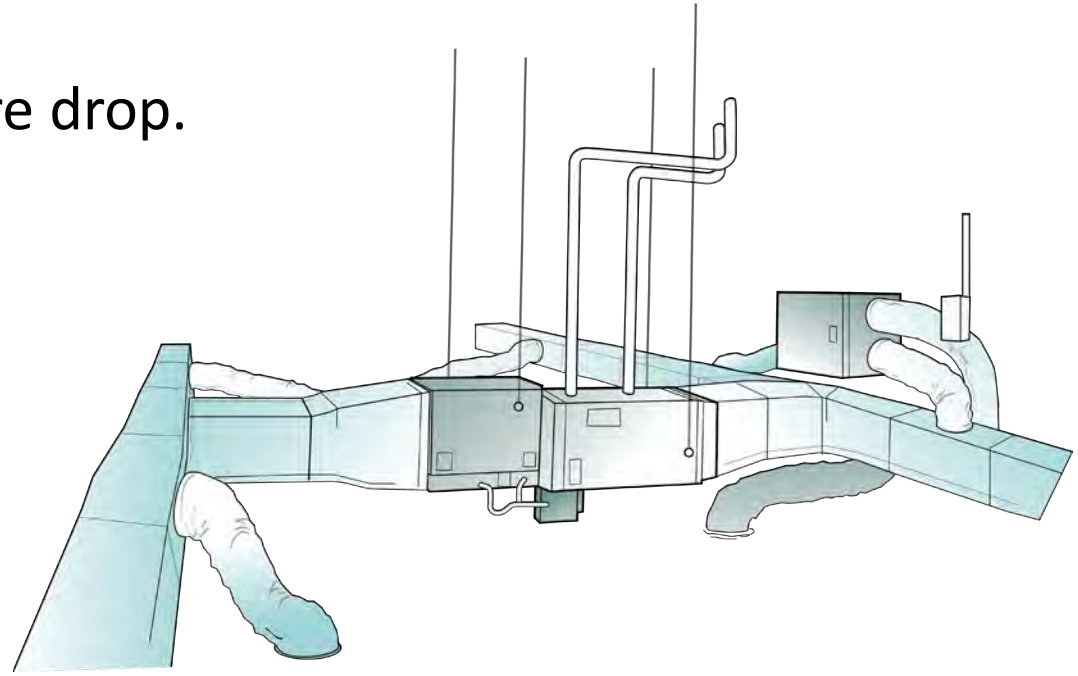
Air Upgrades focus on improving static pressure and airflow.

They are pre-packaged duct repairs priced with flat rate.

Typical Air Upgrade Features

Equipment Improvements:

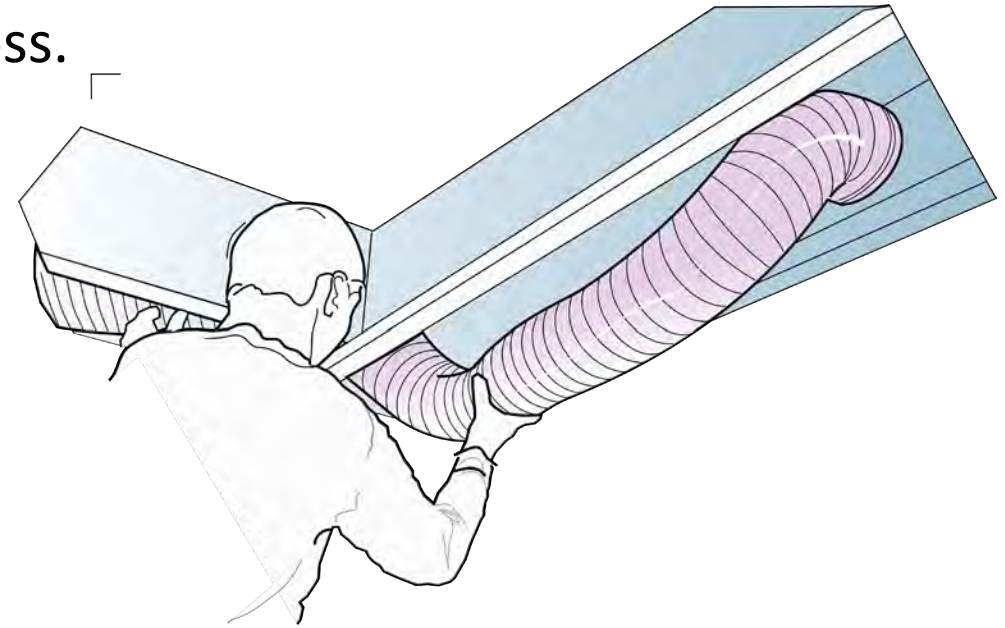
- Rework **filter system** to reduce filter pressure drop.
- Improve **duct fittings** at the equipment.
- Provide basic **system cleaning**.
- Test, adjust, and **set fan speed**.
- Readjust **refrigerant charge**.
- **Test out** static pressures and fan airflow.



Typical Air Upgrade Features

Duct System Improvements:

- Add **one oversized return duct and grille** into a large open area.
- Replace **3 or so 6” supply ducts with 8” ducts** and balancing dampers.
- Seal accessible **duct leakage** to reduce airflow loss.
- Add **strapping** to support the duct system.
- Replace **restrictive duct fittings**.
- Upgrade **grilles and registers**.



Four Vital Signs

Your Doctor Uses as Baseline Measurements

Blood Pressure

90/60 to 120/80 mm Hg

Pulse

60 to 100 beats per minute

Temperature

97.8˚ F to 99.1˚ F

Weight

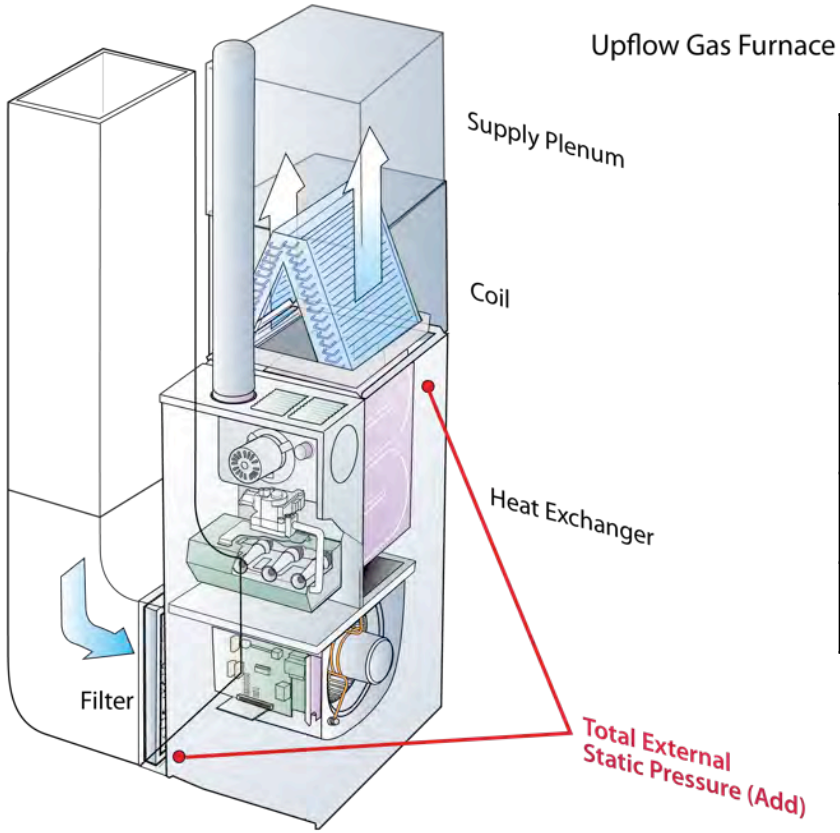
Depends on sex and height

Just because you can measure everything doesn't mean that you should.

W. Edwards Deming

Measure Total External Static Pressure

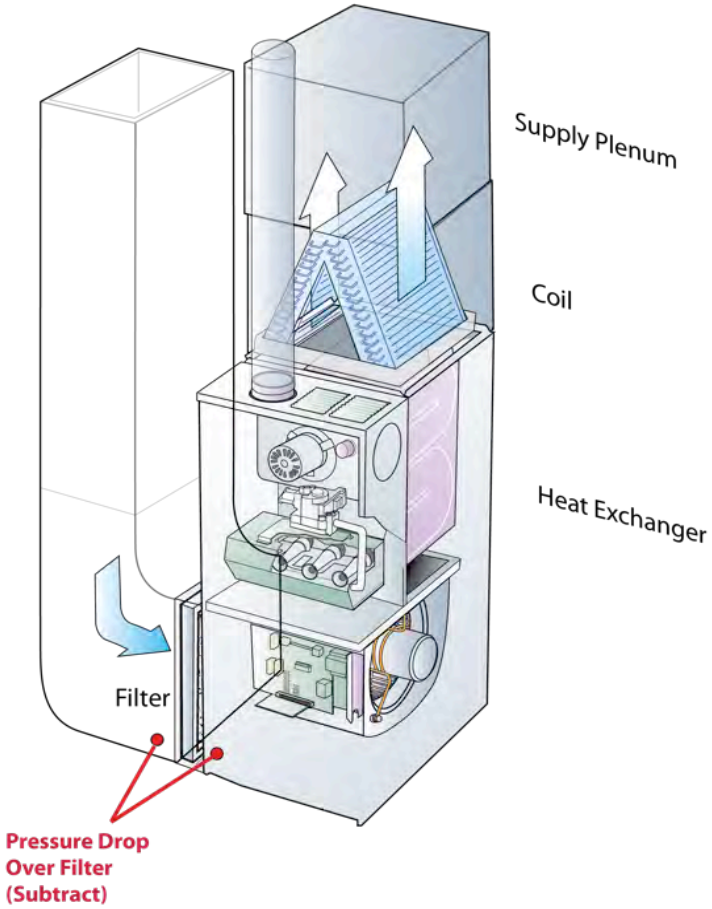
Total External Static Pressure



Total External Static Pressure	
Entering Pressure	0.40
Exiting Pressure	0.50
Total External Static Pressure	0.90
Rated Total External Static Pressure	0.50
Percent of Rated	180%

Measure Component Pressures

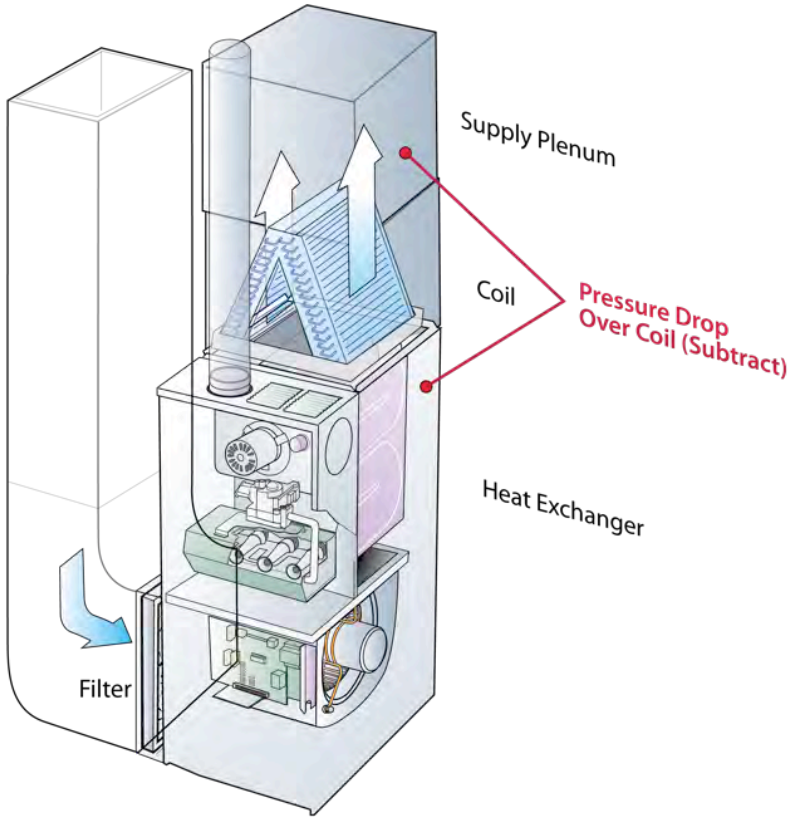
Filter Pressure Drop



Filter Pressure Drop	
Entering Pressure	0.23
Exiting Pressure	0.40
Pressure Drop	0.17
Pressure Budget	0.10
Percent of Budget	170%

Measure Component Pressures

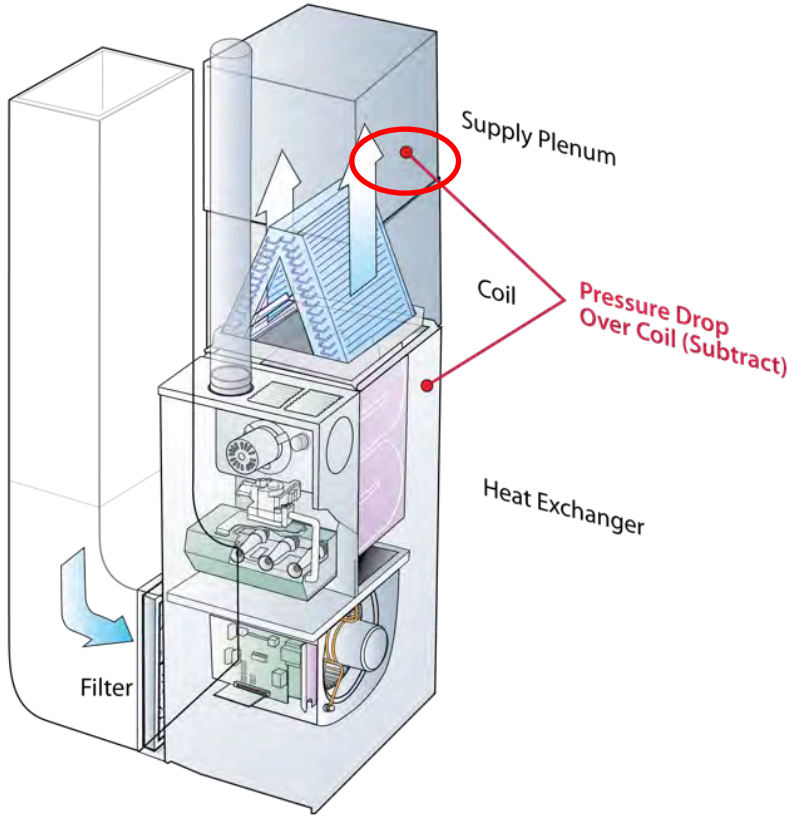
Coil Pressure Drop



Coil Pressure Drop	
Entering Pressure	0.50
Exiting Pressure	0.20
Pressure Drop	0.30
Pressure Budget	0.20
Percent of Budget	150%

Measure Component Pressures

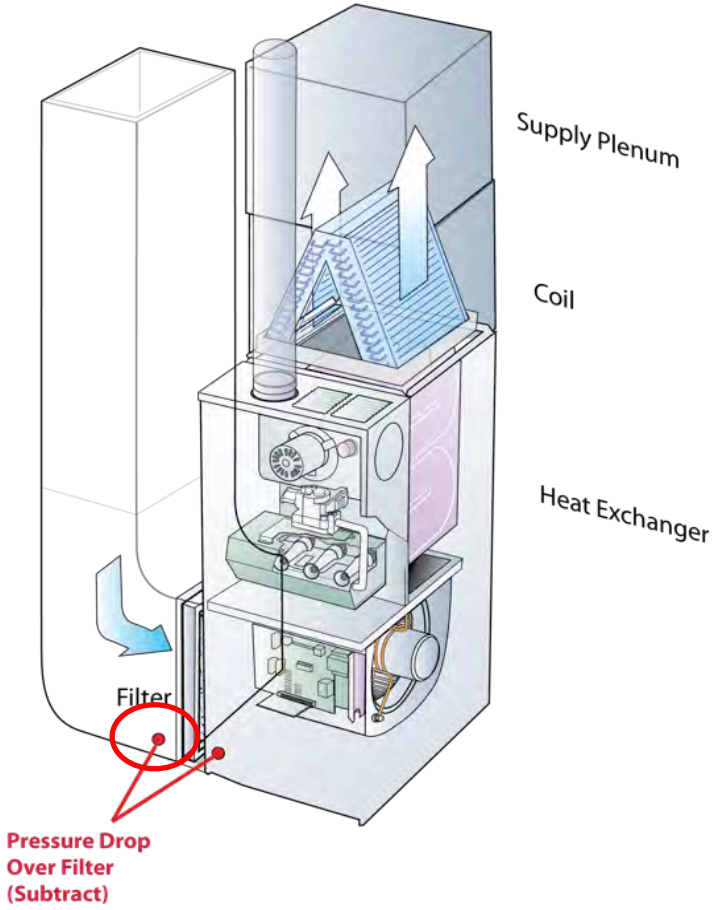
Supply Duct Pressure



Supply Duct Pressure	
Supply Duct Pressure	0.20
Pressure Budget	0.10
Percent of Budget	200%

Measure Component Pressures

Return Duct Pressure

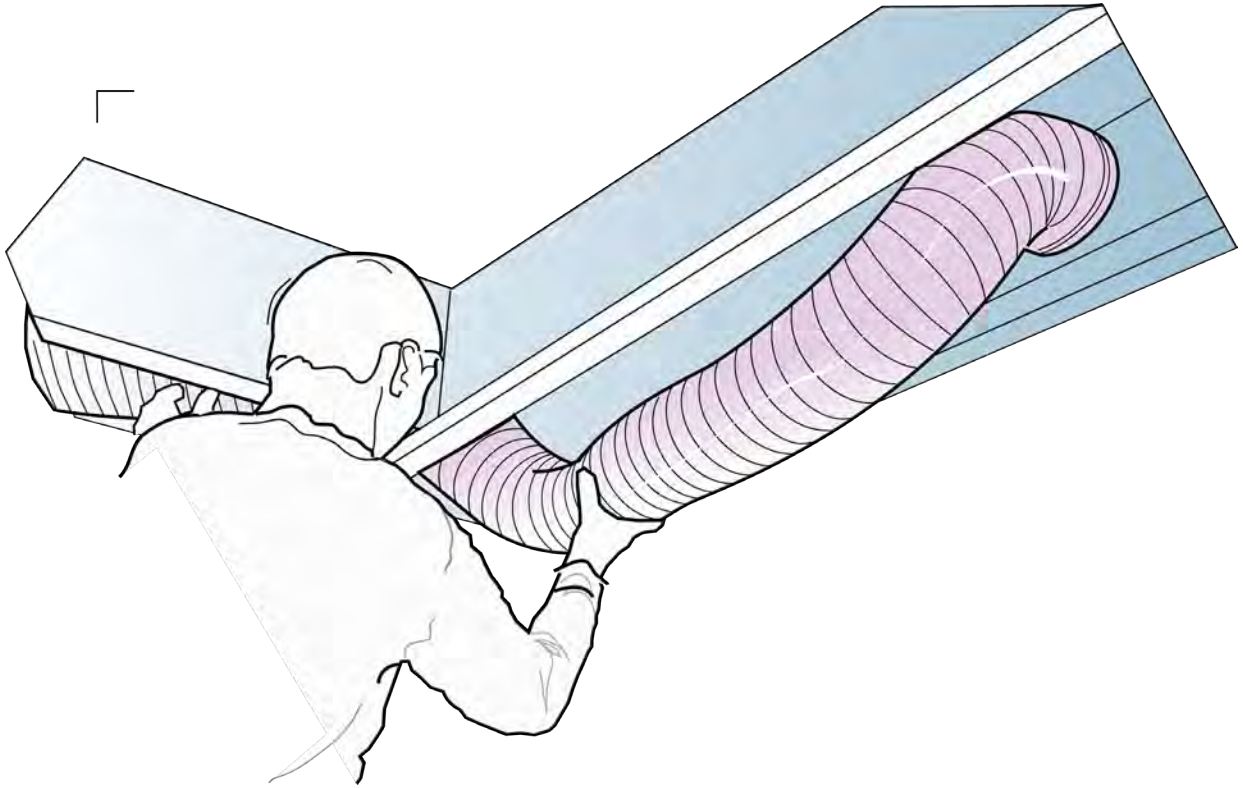


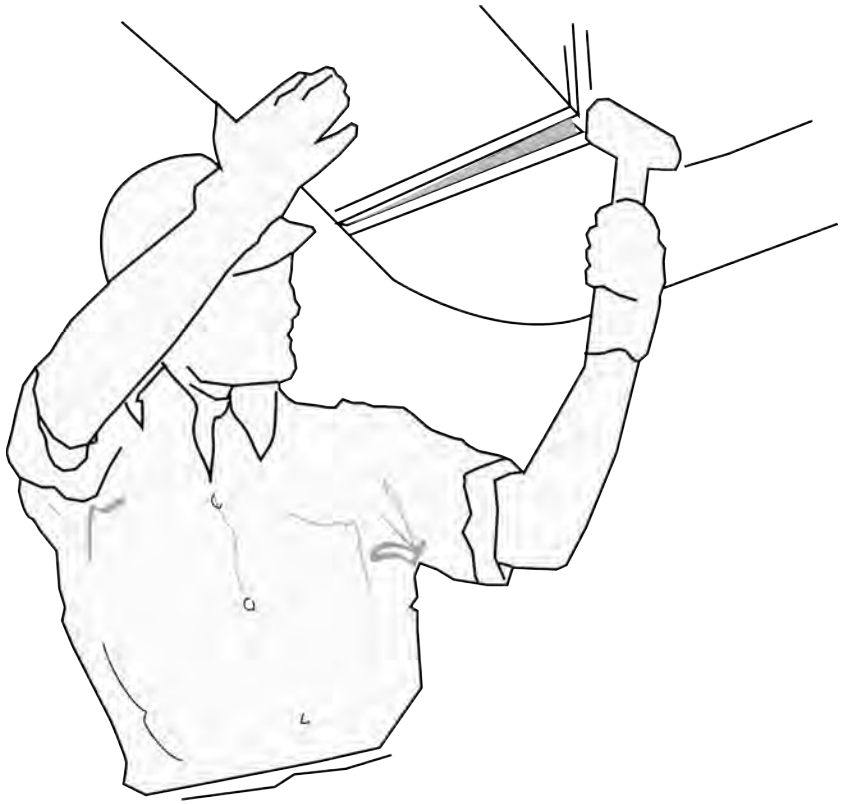
Return Duct Pressure	
Return Duct Pressure	0.23
Pressure Budget	0.10
Percent of Budget	230%

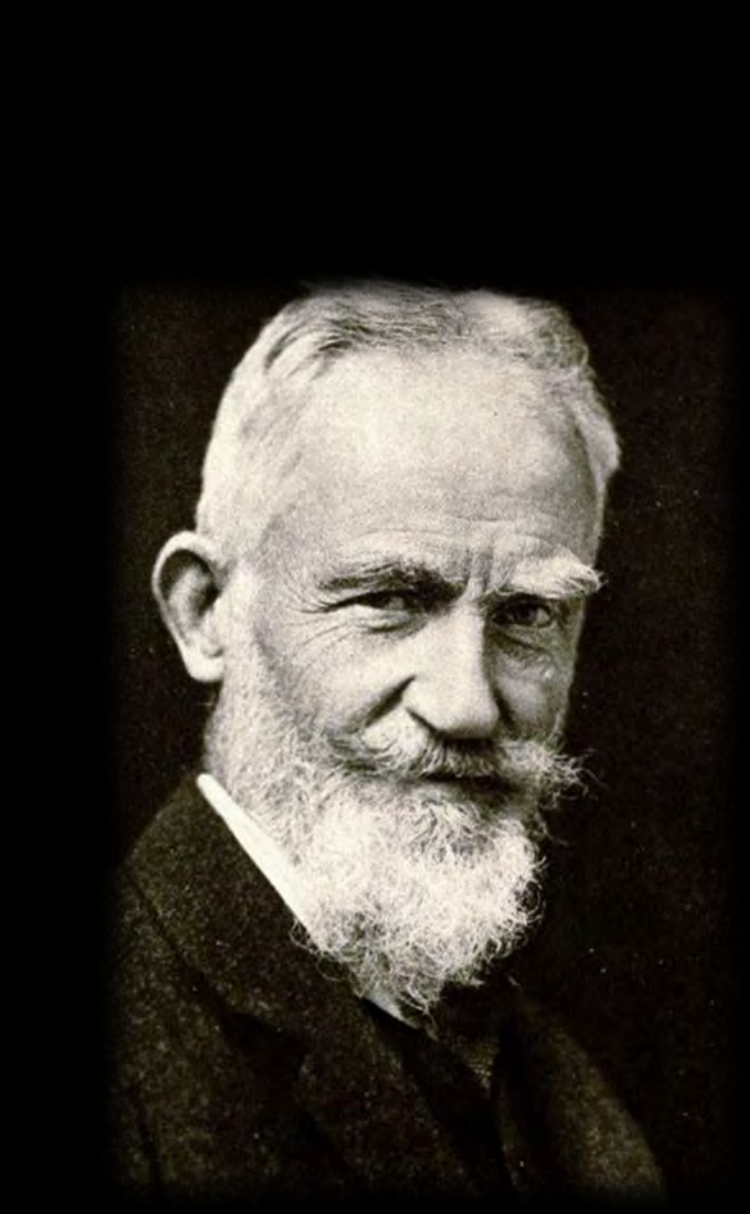
Measure Fan Airflow

Fan Airflow	
Required Fan Airflow	1200 cfm
Actual Fan Airflow	843 cfm
Percent of Required	70%

The cure focuses on the areas where measurements are farthest from manufacturer recommendations







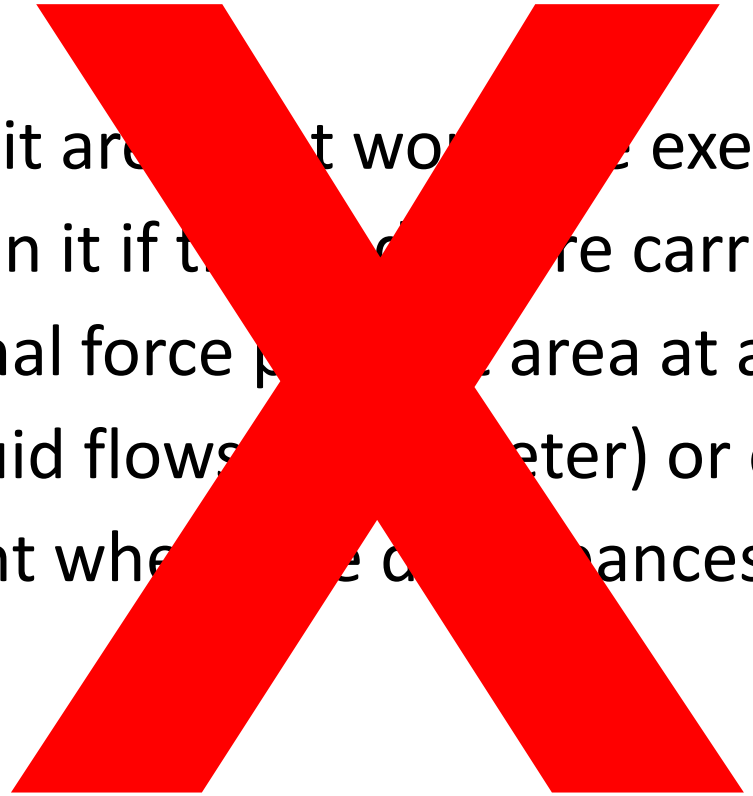
“The single biggest problem in communication is the illusion that it has taken place.”

George Bernard Shaw

Discussing Static Pressure Readings

Static pressure (S.P.)

The normal force per unit ar t wo exerted by a moving fluid on a small body immersed in it if t re carried along with the fluid. Practically, it is the normal force p area at a small hole in the wall of a duct through which fluid flows eter) or on the surface of a stationary tube at a point whe ances, caused by inserting the tube, cancel.



Think and speak of static pressure like blood pressure.

High static pressure, like high blood pressure indicates a serious problem.

Discussing Static Pressure Readings

Use every-day words and comparisons to help customers understand.

Static Pressure/Blood Pressure Table

	Hypotension (Low)	Normal	Pre-Hypertension	Hypertension (HBP) Stage 1	Hypertension (HBP) Stage 2	Hypertension (HBP) Stage 3
Blood Pressure	90/60	**120/80**	121/81 to 139/89	140/90 to 159/99	160/100 to 179/109	Exceeds 180/110 **Emergency Care Needed!**
Equipment Rated Static Pressure	.23 or less	**.30**	.31 to .35	.36 to .40	.41 to .45	.46 or above
	.38 or less	**.50**	.51 to .58	.59 to .66	.67 to .74	.75 or above
	.60 or less	**.80**	.81 to .93	.94 to 1.05	1.06 to 1.19	1.20 or above

Note: The above table is a combination of the categories suggested by the American Heart Association and NCI's Total External Static Pressure (TESP) Budgets. The table helps visualize the relationship between the equipment's TESP measurement and the Blood Pressure of a normal human being.

Review

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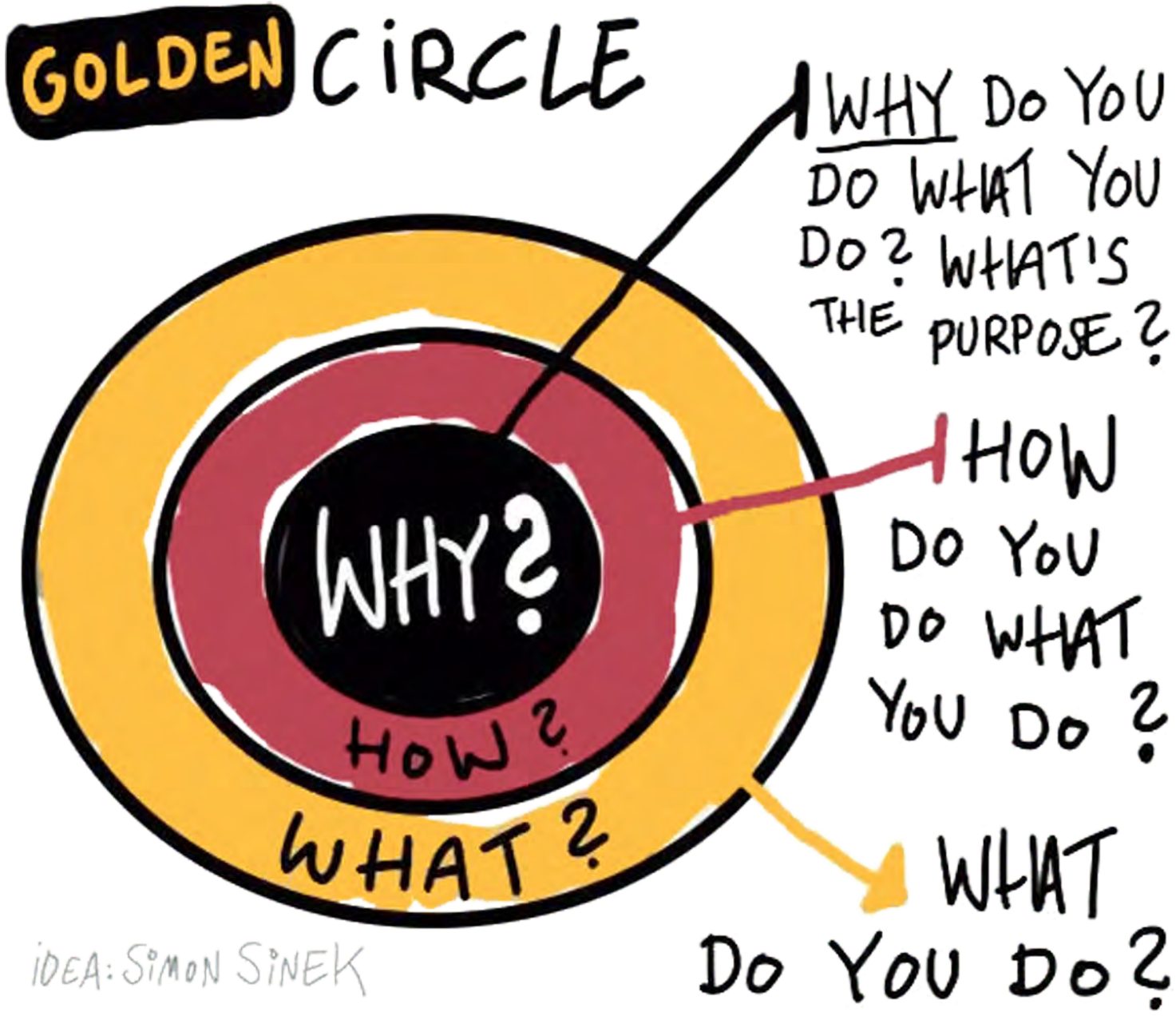
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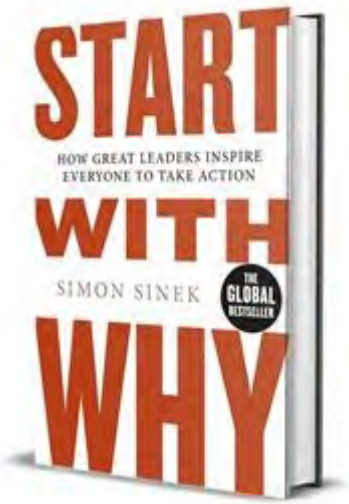
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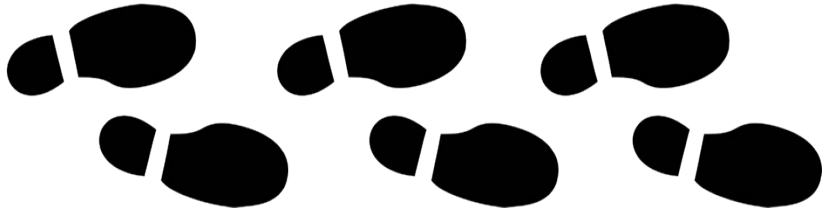

1. Figure out why you should offer Air Upgrades and write it down.
2. Purchase any needed test instruments you may not currently own.
3. Practice by testing and diagnosing systems in your home or office.
4. Teach others in your company as you learn.
5. Slowly add static pressure testing to your service calls and installs.
6. Increase your testing skills beyond static pressure and fan airflow.
7. Become known as the “airheads” in your community.

About NCI

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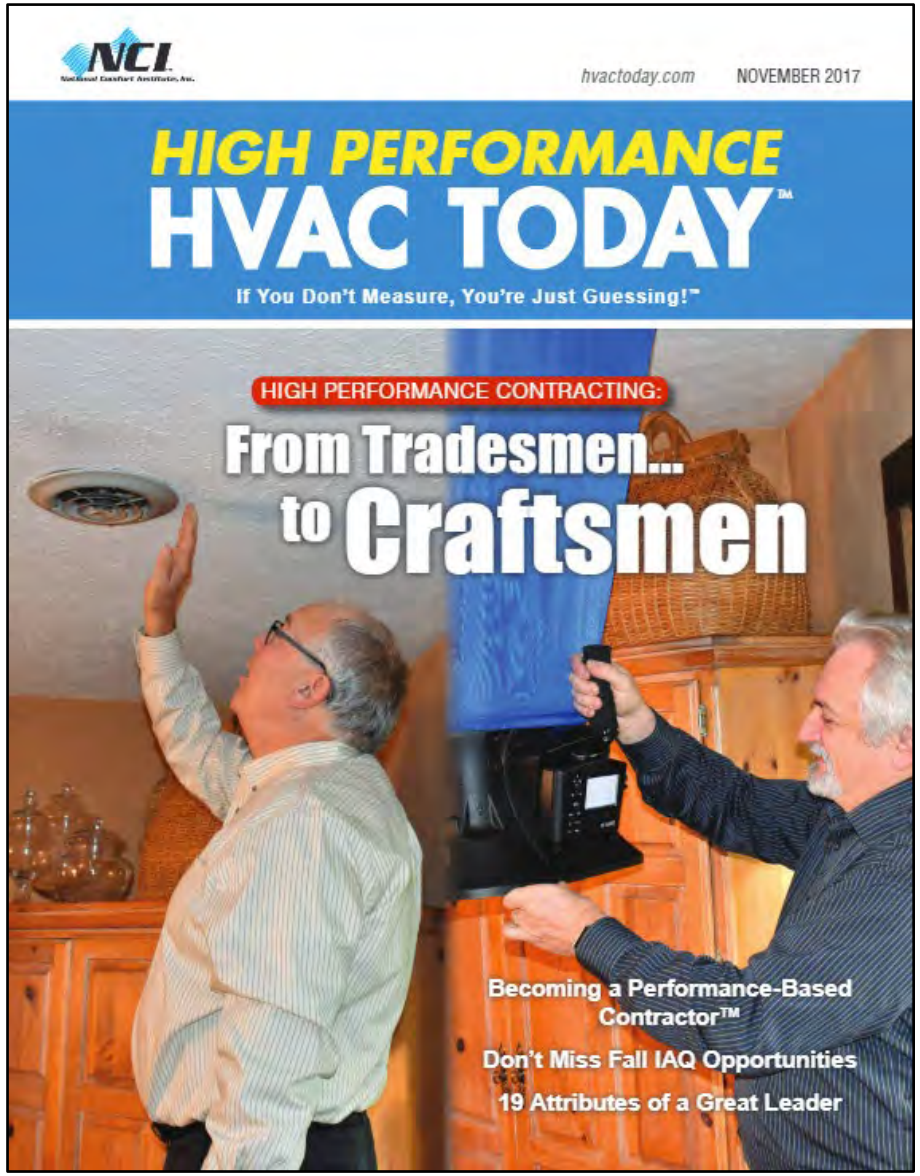

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