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Skip this chore: Cleaning your air conditioner condenser probably won't make it work better

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THE CONVERSATION

Academic rigor, journalistic flair



Scratch this off your to-do list. Florence Yuill, CC BY-ND

Skip this chore: Cleaning your air conditioner condenser probably won't make it work better

March 22, 2019 6:44am EDT

I asked my neighbor who hoses off his air conditioner condenser every spring why he does it.

“Because my dad always told me I had to,” he said.

Author



Conventional wisdom like what my neighbor's dad imparted may always seem right. But through my HVAC scholarship – the study of heating, ventilation and air-conditioning systems – I've learned that this particular presumption is probably wrong.

Dirty equipment

The equipment I'm talking about washing is the outdoor part of central air-conditioning systems that move heat from homes into the outdoors.

Technically known as condenser coils, they are usually about the size of a large garbage can but they can be as small as a bucket or as big as a refrigerator. Some are protected by louvered grilles but most are exposed to the elements. Their metal fins help transfer heat to the air. They contain tubes that carry the hot refrigerant, which gives off heat as it condenses.

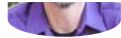
Stuff like windblown seeds, dust and grass clippings tends to collect on the coil surface. Most homeowners and HVAC companies envision that this untidy-looking stuff acts like an insulating blanket, slowing down the passage of heat from inside to outside. Any debris that accumulates would also interfere with airflow over the coil, further restricting the system's ability to expel heat.

The nitty-gritty

Mehdi Mehrabi, an architectural engineering graduate student, and I set out to learn the extent to which dirty residential air conditioners are less efficient than clean ones. What we found astonished us – and many of the other experts in this field.

Previous work on this question simulated outdoor dirt with synthetic materials in a laboratory setting, or used reduced airflow as a proxy for the effects of dirty coils. Although it's necessary to carefully control operating conditions, we took a novel approach: collecting condensers that had gotten dirty through ordinary residential use, and bringing them to the lab for study with a special test apparatus.

This meant that they were coated in real-world dust and other crud in everyday amounts. We tested



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the dirty air conditioners, then washed them thoroughly with a garden hose and tested again. We also used a commercial coil cleaning fluid and tested them for a third time.



Close-up of 7 grams of dirt per square foot on an air conditioner condenser and that same condenser after it's cleaned.
Mehdi Mehrabi, CC BY-SA

Surprisingly, we found that dirty air conditioner condensers often perform better than clean ones. The change in condenser coil heat transfer performance ranged from a 7 percent increase to a 7 percent decrease for the coils we tested. The average change was ... none at all.





Close-up of 17 grams of dirt per square foot on an air conditioner condenser and that same condenser after it's cleaned.

Mehdi Mehrabi, CC BY-SA

The coil that registered a 7 percent improvement after getting cleaned up looked quite dirty, with 7 grams of dirt per square foot of coil surface area. But the coil that performed 7 percent worse was even dirtier, with 17 grams of dirt per square foot. It was so filthy, in fact, that it was nearly impossible to see the metal fins before we gave it a wash. Most of the condenser coils we tested in the lab were cleaner than both of those.

Air conditioner performance

When engineers tested air conditioner condensers that got dirty in real-world conditions in a lab, they found no correlation between how efficiently this equipment operated vs how dirty they were.

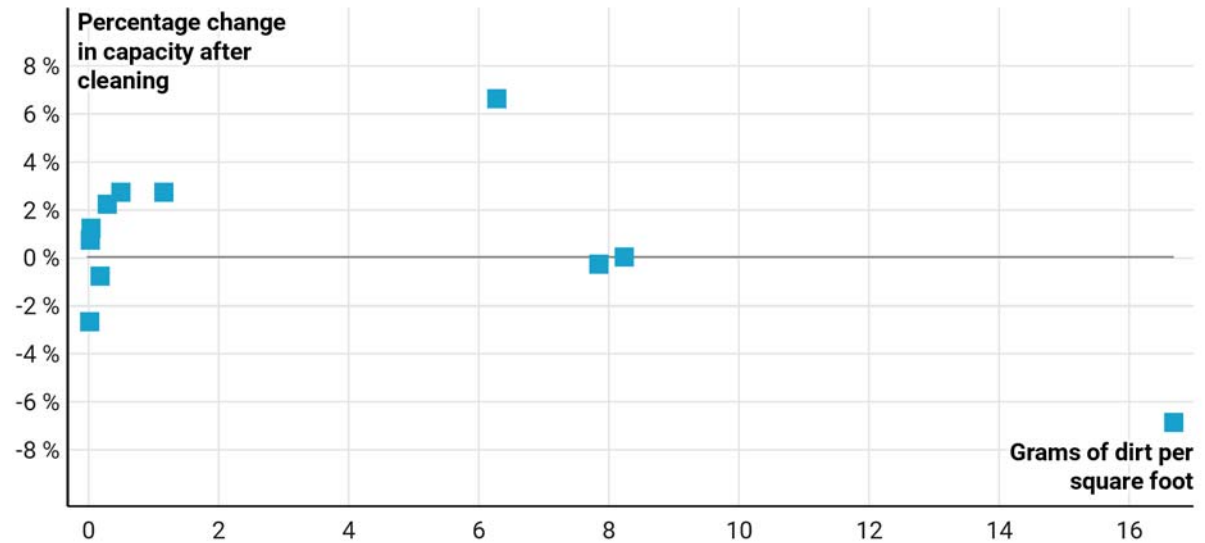


Chart: The Conversation, CC-BY-ND • Source: David Yuill and Mehdi Mehrabi • [Get the data](#)

No insulating blanket

To see how the equipment's performance could improve by getting dirty, we did further testing.

That next round of study suggested that the accumulated dirt stirs up the air passing over the condenser coils. Technically called "turbulence," these little gusts can transfer heat away from the coil better. For some coil designs, this can cause the equipment to perform better when it's dirty than when it's clean. This is true even when the dirt has reduced the airflow rate.

If your home has one of these things, you are probably wondering whether you should you wash your own condenser. Here's what you should know.





The author, doing a chore that his own research has found to be pointless. Florence Yuill, CC BY-SA

Cleaning your air conditioner might make it run better. It might make it run worse. But it probably won't make any difference. I now personally believe in skipping this task, unless the coil is so dirty that it's hard to see the metal fins. Although, if it will make you feel better, go ahead and hose it down. To be honest, that's what I plan to do from now on.

Letting go of deep-seated beliefs of any kind is hard, whether it's that dieting makes you lose weight in the long run – something recent studies do not support – or if this particular home maintenance ritual is justified. As news of our findings spreads, I'm bracing for some unpleasant responses from people who might lose out if the condenser-cleaning business dries up and others who simply refuse

to accept that there was no basis for the conventional wisdom on this question.



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