Help, it’s running and I can’t turn it off!

**Introduction**

Chris Deel and his wife Colleen live in a two-bedroom, one-bath, 700-square foot apartment on the second floor of the Spencer View Apartments. The 272 unit complex was built in the mid 1990s in a style common to the area.

Each unit is supplied with special instructions about controlling moisture problems and excluding any unnecessary drafts. The leaflet asks tenants that the intensity of the bathroom fan/timer system is re-considered if the quietness of the bathroom/wind noise is heard. The manufacturer recommends that the fan run about 1-2 hours in the morning, and another hour at night; plus any time the bathroom high light is on.

In February, the average bathroom floor RH was 80.5% (as a good time to study humidity; conditions at their highest).

**Hypothesis**

The bathroom fan’s automatic daily run time is more than is required to control ventilation humidity in the apartment and/or acceptable.

**Methodology**

To test our hypothesis, we decided to record existing apartment conditions, then install a dehumidistat to run the fan for the hour that relative humidity reached a certain level.

**Step One: Recording Existing Conditions**

A log of temperature, relative humidity, and light was recorded in the bathroom, living room, and kitchen. We created an indicator to track fan run time. For six days, we determined our initial set point at 65% and restarted data collection.

**Step Two: Selecting a Set Point for the Dehumidistat**

We determined our initial set point of 65% was incorrect, as the bathroom ceiling humidity was significantly higher than 65%. We added a temporary light fixture to control the bathroom fan. We added a temporary light fixture to the ceiling of the bathroom to record the RH and dew point in the apartment.

**Step Three: Installing the Dehumidistat**

Following safe electrical working practices, we disabled and rewired the bathroom high light, and placed the bulb near one of the HOBO data loggers, creating an indicator to track fan run time. We added a temporary light fixture to control the bathroom fan. We added a temporary light fixture to the ceiling of the bathroom to record the RH and dew point in the apartment.

**Step Four: Revisiting the Set Point**

Following safe electrical working practices, we disabled and rewired the bathroom high light, and placed the bulb near one of the HOBO data loggers, creating an indicator to track fan run time.

**Step Five: Recording Modified Conditions**

After logging data for several days, we determined our initial set point at 65% was incorrect, as the bathroom ceiling humidity was significantly higher than 65%. We added a temporary light fixture to control the bathroom fan. We added a temporary light fixture to the ceiling of the bathroom to record the RH and dew point in the apartment.

**Conclusion**

After measuring the conditions with the timer-controlled fan, we determined that fan run time did not always correlate with humidity events in the apartment.

Our hypothesis that the dehumidistat-controlled fan disproved our hypothesis by significantly increasing run time. This additional fan use may have reduced the bathroom relative humidity to remain above 70% for more time.

Additional research points out that the dampness at indoor conditions such as a toilet tank is significant and affects the indoor environment.

**Design Lessons**

- Ventilation can improve air quality and reduce mold growth. The dehumidistat-controlled fan disproved our hypothesis by significantly increasing run time. This additional fan use may have reduced the bathroom relative humidity to remain above 70% for more time.
- Heating: Since cold surfaces can cause condensation, and lead to mold growth, a further step could investigate surface temperature in colder areas. The automatic fan system can reduce indoor humidity to below 70%.
- Heating: Since cold surfaces can cause condensation, and lead to mold growth, a further step could investigate surface temperature in colder areas.
- Ventilation can improve air quality and reduce mold growth. The dehumidistat-controlled fan disproved our hypothesis by significantly increasing run time. This additional fan use may have reduced the bathroom relative humidity to remain above 70% for more time.