

Hot & Cold Tenant Area Issues ...

By Mark Strahan



One comfort issue that can be challenging for a property manager to resolve is a difference in perceived comfort levels from one occupied area to another. This issue is often intensified by each individual's temperature preferences.

Several factors can contribute to uneven temperature levels including: diverse temperature settings, unequal loading, differing construction, different activity levels, different usage in the space, improper air flow, improper zoning, improperly sized systems, locations of air distribution devices, malfunctioning cooling or heating equipment, or human factors.

Understanding how different each solution might be for a different underlying problem can help you gather the information your building engineer or mechanical contractor will need to help you resolve the issue. In many cases there can be more than one factor that eventually results in a tenant complaint. What is essential is that the underlying factor(s) are clearly understood before an attempt is made to resolve the issue.

Let's address a few of the more common things that often result in comfort complaints.

When an air conditioning system is designed by a mechanical engineer, calculations are made to determine exactly how much air flow is required to provide adequate cooling or heating in an area. Individual areas are then grouped together into larger spaces that have similar cooling and heating requirements. These spaces are called zones.

A number of tenant comfort complaints we receive are the result of changes in the use of an area that cause improper zoning or improper air flow. This is particularly true if a tenant improvement contractor does not involve a mechanical engineer to redesign the air conditioning system for the new use of the tenant space. The following scenario is an extreme example of what might result from such a course of action.

Imagine that the original design in an existing open office space is for a single AC unit. A new tenant has a requirement to build a server room in the center of the area. The tenant decides to use the existing air conditioning system to cool both the office space and the new server room. The requirement for the server is a 72 degree temperature inside the room around the clock. The desired temperature of the office area in the tenant space is 76 degrees for 8 to 10 hours per day.

The first thing we notice is that now the time and temperature requirements for the two areas are not similar at all. Where do we put the thermostat or zone sensor to keep everyone happy? If we put the thermostat or zone sensor in the server room, the demand will always be for cooling. How would this affect the office area? The office area will get too cold. If we place the thermostat or zone sensor in the office area, how would this affect the temperature in the server room? The office will be comfortable, but the server room may get too hot. How do we resolve an issue like this? The ideal solution would be to install a dedicated AC unit for the server room.

While this is an extreme example, we see similar zoning issues in the real world all the time. It may not necessarily be a server room and an office that is involved, but whenever the heating and cooling requirements for each area are substantially different there will be comfort complaints.

Another factor that can produce comfort complaints is improperly balanced air flow. Over time dampers in a duct system may be adjusted by well meaning contractors in an attempt to address a localized comfort issue in a zone. As people are moved to other areas in the zone where the air flow has been adjusted to satisfy a previous comfort concern, the dampers may be adjusted yet again. Every time air flow is changed in one part of the zone by opening or closing a damper, the air flow will be changed throughout the other areas within the zone. Before long the airflow of the entire air distribution system becomes imbalanced. In extreme situations we have seen pieces of cardboard taped across the face of registers to completely close off air flow.

With regard to each space requiring a certain designed quantity of air flow to maintain a designed temperature, if there is inadequate or excessive air flow, the tenants will not be happy. Professionally balancing an entire air distribution system in a problem zone may be time consuming and expensive, but it is sometimes the only way to restore satisfactory operation.

Another common source of comfort complaints stems from different units serving the same area. You can imagine what could happen when one system is calling for cooling and the other is calling for heating. Below is one possible scenario illustrating how this situation could occur.

Mr. Principal has a corner office with a view on the south side of the building, it's the middle of the summer and Mr. Principal is too warm. A well meaning contractor takes a look at the supply air ductwork feeding the area and comes to the conclusion there is not enough air flow. While contemplating on the problem, he decides the most cost effective thing to do would be to run some additional ductwork into Mr. Principal's office from the unit that serves the interior office area. He proposes that idea, his proposal is accepted and he makes the ductwork modifications. Everything works pretty well during the summer because both areas are calling for cooling.

During the winter things change. Mr. Principal's office being an exterior wall with a lot of glass now needs heating in the morning not cooling. The only problem is that the internal office space warms up much faster than the room with the view and starts cooling. Since Mr. Principal's office is fed by units serving two different zones, they are now fighting against one another and Mr. Principal is not happy.

One way to identify and resolve this kind of situation is to have your building engineer or mechanical contractor make a zone map of the problem area. Draw in the rooms and the duct runs exactly where they are now and trace where every piece of ductwork comes from. It is amazing what you will find! If you do the zone map correctly you will know what you need to do to resolve many of the problems described above.

The following method may be useful in brokering a truce in thermostat and zone sensor wars! A thermostat or a zone sensor actually controls only the temperature where it is located. Several different work areas may be cooled by one air conditioning unit. See if you can get the tenant to agree that only one person will be responsible for the temperature setting. Help the occupants mutually agree on a set point that is reasonable for all parties affected by that unit. It is ideal if you can get buy in for one temperature for cooling and one temperature for heating for an entire tenant space. Inform people who call (if they are not the responsible party) that you have agreed to only accept calls from the person who is responsible for the temperature setting and refer them back to the responsible party. This requires the support of the responsible party to enforce the new set points, but can go a long way toward reducing comfort complaints to the property manager.

In the case of an occupant with unreasonable expectations or what you believe may be exaggerated comfort complaints, it is useful to obtain a record of the actual temperatures in their area throughout a specific time period. There is a relatively inexpensive device called a data logger that enables you to do just that. After leaving the data logger in the space for a reasonable period of time, the data can be downloaded to your computer and then displayed or printed in graph form. The time periods sampled are determined by how you initially set up the data logger.

Most of the time when we employ a data logger to explore a comfort complaint, the air conditioning is operating correctly as indicated by a 1 to 2 degree temperature swing throughout an entire work day. In some cases however, we find that an occupant was justified in complaining about wide temperature swings. An important point is that we now have obtained accurate information from the data logger that will help correctly identify and resolve the problem for the tenant.

Mark Strahan is a 35 year veteran of the HVAC industry and an account manager with Burt-Burnett, Inc., an HVAC mechanical service and EMS controls contractor. He can be reached with comments or questions at (480) 557-8593 or strahan@burt-burnett.com