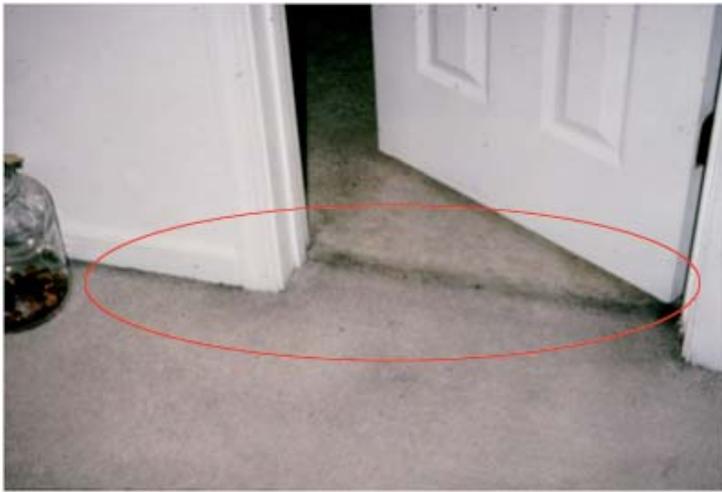
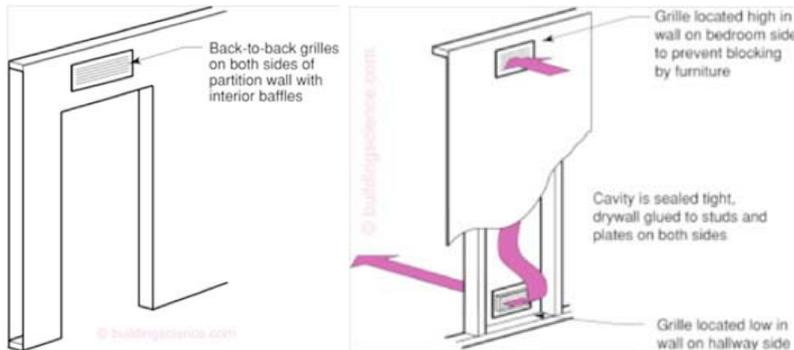


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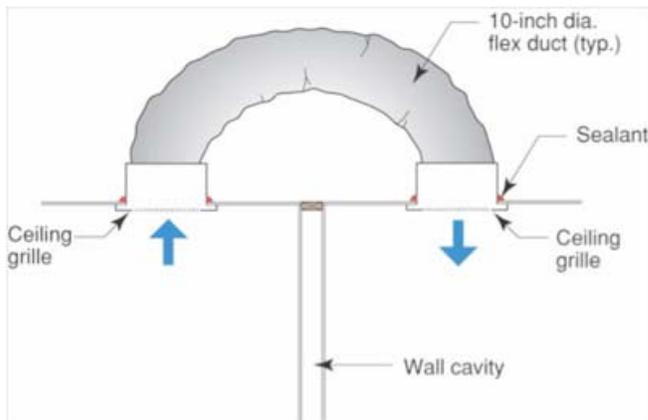
What's Wrong With This Practice? Undercutting Doors



- Carpet filters air from a pressurized bedroom



- Transfer grille examples to alleviate pressure differences



- Jump duct transfer grille to alleviate pressure differences

Issue

Undercutting bedroom doors to provide return airflow from bedrooms.

Description of Implementation Error

Conditioned air supply registers are located in the bedrooms, and the return to the conditioning equipment is often located in a hallway or on another floor. This means the bedrooms, hallways, and stairwells are part of the return pathway for air movement back to the air conditioning system.

Risks

This approach is acceptable but Building America research has demonstrated that the common technique of undercutting bedroom doors does not provide for enough airflow and there is often a pressure imbalance resulting in a positively pressured bedroom. In addition to an energy-inefficient loss of conditioned air to the enclosure or outdoors, warm moist air may be pushed into a cold enclosure possible allowing for condensation within the wall and resulting moisture durability issues. Door undercuts are often obstructed by carpets further reducing return pathways. Carpets will filter the air and remove all the candle soot and other airborne particulate, as it is forced under the bedroom door due to a high pressure difference. Also associated with high pressure differences on the return pathway is an increased air leakage rate (ACH) from the building. The increased air leakage from the building can result in a 10% to 20% increase in energy required for space conditioning.

Required Corrections

The solution to this problem is to provide pressure relief between the bedroom and hallway either with through-wall transfer grilles or jump ducts through the attic!

1 BSC, Info-604: Transfer Ducts and Grilles, Information Sheet, www.buildingscience.com, 2009

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Transfer grilles are preferred to keep the air movement inside the conditioned space in the case of ventilated attics. Ducts should be sized to maintain less than a 3Pa pressure difference across a closed door².

References

BSD-150: Black Stains on Carpets and Ghosting of Framing³

BSI-039: Five Things⁴

Built Wrong From the Start⁵

² Rudd, A., Research Report – 0006, Discussion of the Use of Transfer Grilles to Facilitate Return Air Flow in Central Return Systems, www.buildingscience.com. 2000

³ Lstiburek, Joseph. (December 2006). "BSD-150: Black Stains on Carpets and Ghosting of Framing." Building Science Corporation, <http://www.buildingscience.com/documents/digests/bsd-150-black-stains-on-carpets-and-ghosting-of-framing/view/>. Accessed March 22, 2011.

⁴ Lstiburek, Joseph. (April 2010). "BSI-039: Five Things." Building Science Corporation, <http://www.buildingscience.com/documents/insights/bsi-039-five-things/>. Accessed March 22, 2011.

⁵ Lstiburek, Joseph. (April/May 2004). "Built Wrong from the Start." Fine Homebuilding, <http://www.buildingscience.com/documents/published-articles/pa-built-wrong-from-start/view>. Accessed March 22, 2011.