

Turning Green into Gold

Keeping It Quiet in the Workplace - It's Easy if You Design it Right

by Alan Whitson, RPA

The **Center for the Built Environment** at UC Berkeley has a research program on **Indoor Environmental Quality (IEQ)**. As part of this program they created a web based occupant survey and reporting tool. The goal is to use occupant feedback to improve building design and operation. The survey is broken into eight categories;

- ▶ office layout
- ▶ office furnishing
- ▶ thermal comfort
- ▶ air quality
- ▶ lighting
- ▶ acoustics
- ▶ cleaning & maintenance
- ▶ general building & workspace.

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The IEQ database contains over 210 buildings, and more than 34,000 respondents. Since October 2004, 16 LEED-certified and 9 "self-nominated" green buildings were surveyed. So far the green buildings have gotten statistically significant higher scores from occupants for general building satisfaction, indoor air quality, and thermal comfort. The green buildings didn't out-perform the non-green buildings in the acoustics category. Actually, both the green and the non-green buildings performed poorly with almost the same score. Among all of the workplace satisfaction categories - acoustics is at the bottom of the barrel.

This is important because repeated studies have shown that conversational distraction and uncontrolled noise is the primary cause of lost productivity

in the office. Yet creating good acoustic performance is easy if you use an integrated approach, and it can be done for less money than most are currently spending.

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Acoustic performance is not a subjective issue. We can measure it; and it can be predicted with a high degree of accuracy with computer modeling taking all the guess work out of the equation. Much of this technology was developed during the cold war and is used on a regular basis by the defense industry, government organizations and major corporations.

The scale used to measure acoustic performance in the workplace is called the **Privacy Index (PI)**, which is broken down into four levels:

- ▶ **No Privacy** (0-69)
- ▶ **Transactional Privacy** (70-79)
- ▶ **Normal Privacy** (80-94)
- ▶ **Confidential Privacy** (95-100).

The higher the score, the greater the level of privacy provided.

Normal privacy (80-94) should be your target for an open plan area. Here some sentences are intelligible to coworkers, but the volume level is not distracting to them and they can generally continue their tasks.

Obliviously, confidential privacy (95-100) is for any room where you would want to have a confidential conversation. Coworkers can overhear muffled words, but the meaning of the spoken message is not intelligible and is not distracting to coworkers.

The typical open plan environment consisting of workstations with 48 inch



high fabric covered panels and a ceiling tile with a NRC of .55 has a PI of 10. The typical private office has a PI in the mid-70s to low 80s. Clearly, there's room for improvement.

This integrated collection of components can provide a PI of 87 in open plan areas and a PI above 95 in private offices. This represents the current best practice:

Sound Masking: This is the crucial element in improving acoustical performance. Don't confuse this with the white noise makers of the 60s and 70s. This is state of the art technology, not only does it work – it's cost effective. If your building has a raised floor, put it under the floor. This improves performance and saves money by reducing the number of speakers required and the labor to install them. If you need a high degree of audio security, you can take this technology to the next higher level, it's less money than any construction base alternative.

Ceilings: Since a bank of private offices can quickly become an area filled with workstations, use the same ceiling tile throughout the building. A high performance mineral board tile with a NRC rating of .70 is optimal. This provides an open plan environment with a PI of 87 when used with sound masking (55 without), for the private office the PI is 95 with sound masking (84 without). A foil backed fiberglass ceiling tile (NRC .90) will give an open plan area a PI of 88 with sound masking (57 without), yet, for the private office the PI is 91 with sound masking (72 without).

Workstations: Since most people work in the seated position, panel heights should be at least 60 inches but generally no more than 66 inches. Forget 80 inch high panels, they cost more, interfere with air circulation, and aren't any more effective in blocking sound than a 66 inch high panel. To get natural light into the workstations use panels where the upper portion is glass. Look at the layout, if you can see someone's mouth – you'll be able to hear them.

Cont'd on page 15, Green to Gold

...Green to Gold Cont'd from page 14

Walls: From a sustainability standpoint walls should be built to the underside of the ceiling; piercing the ceiling with a slab to slab wall adds significant cost, uses more resources, is costly to change, and offers little acoustic value – in short it's a wasteful practice. Also going to the underside of the ceiling allows the use of a moveable wall system which offers more flexibility and a shorter depreciation schedule. Typically a wall with a STC of 35 is sufficient. The STC can be raised to 45 or more by simply placing 3 inch fiberglass batting in the wall cavity.

Doors: Use solid core doors. The weak link is not the door but the opening. Install an automatic door bottom and a

gasket on the door frame to keep sound from leaking past the door.

Return Air Grills: Many buildings use an open plenum for return air; this becomes a super highway for conversations from one office to another. The solution is called an "attenuator." It's simply a trapezoidal metal baffle or two-sided metal box placed over the open return air grill. This simple but effective device will keep most of the sound from private offices from going into the plenum and then into other areas.

The Details: Do not install junction boxes back to back in walls, and seal all openings. Pay special attention to where different materials or surfaces intersect, this is typically the acoustic weak point.

This column is published in conjunction with the Corporate Realty, Design & Management Institute and the Center for Sustainable Real Estate. Click on www.squarefootage.net for a seminar schedule, books, and white papers on high performance and sustainable buildings. More than 30 educational seminars are planned in 2006. Alan Whitson will also speak at CleanMed Europe, IIDEX/NeoCon Canada and IFMA World Workplace. You can contact Alan Whitson at awhitson@squarefootage.net

1

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