Welcome to today’s presentation on:

Workplace Solutions, Acoustic Design, and their Impact

The presentation will start at 9:00 AM PDT

Note: Phones are automatically muted during the presentation. You have the ability to send questions to the host and presenters through the “questions” feature on your control panel located on the right of your screen. We will answer as many of the questions as possible at the end of the presentation. All questions will be captured, and answers sent to all participants within 2 weeks.
Client Enrichment Series

Tackling the No. 1 Complaint in the Open Office
Acoustic Comfort

Hosted by: David Lee, Regional Account Manager, GSA Region 9

Presented by: Kevin Kelly, Workplace Program Expert, Center for Workspace Delivery

GSA Public Buildings Service
Client Enrichment = “A well-informed consumer is our best customer”
Poor Acoustics is the Number 1 complaint in the open office

Pre- and post- results from seven federal offices that were redesigned to better align with each agency’s business goals and missions.
How we got here...

This was probably quieter than you think:
High background noise /no phones/
everyone doing the same routine/
interaction elsewhere

Understanding the evolution of the office illuminates present challenges
Look at the size of them cubicles!

(there was also probably 40 decibels of background noise and work was much more deskbound / very absorptive panels and surfaces)

Action Office, Herman Miller, circa 1969
Circa 1980

- + loud background noise to cover speech
- -the haves and have nots: no spatial equity
- -little interaction / lots of “hiding”
- -horrible lighting, HVAC and acoustics due to high partitions

Circa 2007

- + more light and view for every one
- + seated privacy but standing awareness of others
- + higher quality ceiling absorbs more noise
- + more interaction which is in organization’s interest
- - glass and all of the reflective surfaces means more noise
As the new workplace becomes denser and more varied, acoustic design wisdom is key.

- Ceilings should be NRC .90
- 25% of the walls should be NRC .80
- Panels should be NRC .70 to prevent noise ricochet.
Caulking at top and bottom is necessary to contain sound. (Think of it like water!) Correct sound absorption of surfaces can also help.

NIC Noise Isolation Class measures sound from room to room in the BUILT condition: MUST specify the desired NIC in specifications.

Sliding doors are cool: But all too often they lack gaskets/ are noisy and are a source of poor acoustics.
Sometimes the counter-intuitive is true

Even with all the partitions, the “privacy” is fictitious.
The (tragic) organizational results of a flat earth view of acoustics ...

The agency made the decision that managers who didn’t “rate” an office should have a workstation with higher partitions.
The Earth is Round view of Acoustics

1. Voice is modulated because there is greater awareness of proximity
2. A highly absorptive ceiling reduces distraction still further
3. Collaborative work can continue at full voice without disturbing, especially when private offices become conference rooms that have correct acoustic separation

51-54” seated privacy
This restaurant may have more speech privacy than this library.

Participant poll:
Which has better speech privacy?
VOTE!
The “wicked problems” we need to address to have a 21st Century workplace:

The conundrum:

- Collaboration and concentration
- Interaction and solitude
- Being available and having privacy
- Getting group work done and getting individual tasks done
GSA sponsored an acoustics workshop with acoustics experts, manufacturers, workplace strategist, psychologists and clients to produce understandable acoustic guidance.
Sound Matters shows how to go from acoustical distraction...

Workplace Distractions (letters refer to plan above)

A. Conference room/teleconference.*
B. Hallway discussion near workstations
C. Informal meetings and conversations
D. Employees on the phone (especially standing above the acoustic absorption of the workstation or on a sneakerphone)
...to acoustical comfort

**Improved Acoustic Features**

1. Low workstation partitions but with adequate seated privacy and acoustic absorption of NRC 0.7 in partition material located in front of the worker when seated, typically in any furniture partition.
2. High noise reduction coefficient (NRC) in the ceiling and/or on walls.
3. A sound masking system.
4. Enhanced employee awareness of co-workers.
Audience Vote:

Who’s most satisfied?

People who have high partitions?

People who have low partitions?

People who have no partitions?
Understanding acoustical principles

24,000 respondents to CBE survey of typical office space workers
Sound Matters dispels acoustical myths

"If only my workstation were bigger, I could concentrate better."

NRC .7 at seated height panel

A drop of (maybe) 5 decibels: "A drop in the bucket."
How to Control Sound (Before it controls you)!
So What Can I Do?

Absorb
Surfaces which absorb sound, particularly in the ceiling*, diminish the strength of the sound from the sender as it travels across the path to the receiver. Walls and floors are also potential sound absorbers. With reflective floor finishes, such as marble, footfall can be especially annoying to workers.

*since it serves as a reflector

Block (inadequately)
This is the typical way that high workstation partitions are arranged and it illustrates why this arrangement is doubly ineffective: 1) Sound, being like water, leaks into the receivers’ work area and 2) the sender cannot visually gauge the effect of their voice level on coworkers who are not in their line of sight.

Block
The strategy illustrated is very effective and very expensive. It requires that the ceiling be interrupted, requiring significant labor since the partition continues to the structure above the ceiling. Where the partition only stops at the ceiling which is typical commercial office construction, the blocking action is not nearly as effective because sound leaks are inevitable at the ceiling plane.

Cover (Mask)
Another important mitigation available for the open workplace is to supply additional sound, either through “white noise” or background noise such as mechanical equipment, which counteracts the typical quietness of a modern, open workspace. Masking helps to cancel the sound disturbance emanating from the sender.

From Sound Matters
www.gsasoundmatters.com
GSA’s Work Pattern Methodology helps zone the workplace for acoustic comfort:

- Desk Bound (interactive or concentrative)
- Internally Mobile (I / C)
- Externally Mobile (I / C)

Each Pattern is further distinguished as either Interactive or Concentrative.
Zoning the Office: (To limit incompatible adjacencies)

- Zoning map of Paris
- Zoning map of an office with all 6 work patterns

- Internally-mobile Interactive
- Externally-mobile Interactive
- Desk-bound Interactive
- Internally-mobile Concentrative
- Externally-mobile Concentrative
- Desk-bound Concentrative
HOW GSA CAN HELP?
Setting targets: if you don’t ask for what you need, you won’t get what you want.
I could have had a V-8!
Or (again) “A well-informed consumer is our best customer…”

A. General Building Requirements

6. A variety of inexpensive and moderately priced fast food and eat in restaurants should be located within three blocks.

7. Services, utilities and maintenance will be provided daily, from 7:00 a.m. to 5:00 p.m., except on Saturday, Sunday and federal holidays.

8. The space shall be accessible 24 hours a day, seven days a week, and include use of elevators, restrooms, lights, and normal office equipment.

9. Cleaning shall be performed during

If you don’t tell us how important acoustics is there is no way we can transmit its importance to the offeror!
### Range of Costs

<table>
<thead>
<tr>
<th>Cost Type</th>
<th>Cost per Square Foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acoustically Useless NRC .55 Ceiling</td>
<td>$5.42</td>
</tr>
<tr>
<td>Acoustically Superb NRC.90 Ceiling</td>
<td>$6.97</td>
</tr>
<tr>
<td>Sound Masking System</td>
<td>$1.80</td>
</tr>
<tr>
<td>Average Employee Costs (Annual)</td>
<td>$3,122.00</td>
</tr>
</tbody>
</table>

**Poor Acoustics = unbelievably poor business decision**

* 2012 prices; one time cost

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** Per Michael Pessina, Product Development, Lutron Electronics (2010)
Sound Matters Provides Detailed Guidelines and Cost Comparisons

**FIG 16. ACOUSTIC DESIGN AND ZONING DETAILS**

- **A** Other partitions for offices and conference rooms, STC 40-45. Acoustic treatment on vertical surfaces recommend to increase sound absorption. Attenuate open plenum return diffusers.

- **B** High isolation: slab to slab (caulked at sill and head). The partition achieves a minimum of STC 53. This high level of isolation is more expensive than some other partitions, but may be necessary to allow for concentration. Personnel costs far exceed the cost of this mitigation! (Example justification: workplace next to child care or cafeteria).

- **C** Minimum: sound absorption of enclosing workstation partition: 0.8 NRC

- **D** Workstation, maximum 66” tall, with seated privacy recommended at 51” maximum. Use of glass panels above 51” strongly recommended (this will achieve 1 LEED interior point; possible additional points for even lower partitions, see LEED).

- **E** Speaker phones in open areas not provided and should only be located in enclosed offices and conference rooms with STC 45 min enclosures. Locate entrances to conference rooms away from work areas, especially where large groups may be able to congregate before entering.

**FIG 17. COSTS**

<table>
<thead>
<tr>
<th>Construction</th>
<th>Description</th>
<th>Cost Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall Type #1</td>
<td>Non-structural stud walls (NSW), 26” gypsum board back-splash, LBR &amp; finish, STC 39-45</td>
<td>$7.92/lin. ft., $7.39/1000 sq. ft.</td>
</tr>
<tr>
<td>Wall Type #2</td>
<td>Sound absorbing wall (NSW) - 2” gypsum board or 1” drywall, LBR &amp; finish, STC 44</td>
<td>$8.33/lin. ft., $7.67/1000 sq. ft.</td>
</tr>
<tr>
<td>Wall Type #3</td>
<td>Sound absorbing wall (NSW) - 2” gypsum board or 1” drywall, LBR &amp; finish, STC 45</td>
<td>$9.00/lin. ft., $8.31/1000 sq. ft.</td>
</tr>
<tr>
<td>Wall Type #4</td>
<td>Sound absorbing wall (NSW) - 2” gypsum board or 1” drywall, LBR &amp; finish, STC 46</td>
<td>$9.75/lin. ft., $9.06/1000 sq. ft.</td>
</tr>
<tr>
<td>Sound absorbing wall panel</td>
<td>(NRC 0.96)</td>
<td>$8.00/lin. ft., $7.39/1000 sq. ft.</td>
</tr>
<tr>
<td>Lay-in acoustical tile ceiling in 2x4 grid (no reliefing)</td>
<td>NRC 0.96</td>
<td>$8.00/lin. ft., $7.39/1000 sq. ft.</td>
</tr>
<tr>
<td>Lay-in acoustical tile ceiling in 2x4 grid (NRC 0.9)</td>
<td>NRC 0.9</td>
<td>$8.00/lin. ft., $7.39/1000 sq. ft.</td>
</tr>
<tr>
<td>Sound masking system</td>
<td>$1.00/sq. ft., $1.00/lin. ft.</td>
<td></td>
</tr>
</tbody>
</table>
We can advise on scopes for improving existing spaces.
Identify work patterns to determine level of quiet or interaction work requires / identify level of speech privacy required – confidential? / Institute behavioral protocols agreed on by the group

Zone work activities/ careful layout planning/ wise furniture selection

Sound absorbing ceilings (and some walls)/ sound masking/ correct partition specifications
For more information

http://gsasoundmatters.com

http://www.ted.com/talks/julian_treasure_why_architects_need_to_use_their_ears.html

The SOUND MATTERS “Acoustic Posse”:

GSA
  Michael Bloom
  Patricia Cheng
  Judith Heerwagen
  Diane Juba
  Kevin Kelly
  Kevin Powell

Business Place Strategies
  Paul Heath
  Clark Sept

Charles M. Salter Assoc.
  Charles Salter

Gensler
  Gervais Tompkin

Haworth
  Jay Brand

Place Coach
  Sally Augustin

IA Interior Architects
  R. J. Brennan

IDEO
  Beau Trinicia

Arup
  Nick Antonio

BRC Acoustics
  Dan Bruck

Acoustics Research Council
  David Sykes

Armstrong
  Ken Roy

US Social Security Administration
  Donna A. Ellis

US State Department
  Thierry Rosenheck

US Coast Guard
  Leo Lozano
Wait! Wait!  There’s more!

http://simplynoise.com/
( thanks to David Lee)

Questions?
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