



CEU accredited presentation sponsored by S. Rose Company and Haworth, Inc.

Walking on Air: Building the Foundation for High Performance Workspace

This presentation explores underfloor air as a viable solution toward reducing overall costs and providing improved indoor air quality and comfort for office occupants. It proposes that sustainable construction, along with an integrated, collaborative design approach, can meet these challenges competitively.

- Understand Underfloor Air distribution and why it is a viable alternative to overhead systems
- Learn how UFAD impacts LEED applications and improves Indoor Air Quality
- Discuss the importance of a collaborative design approach.

Brian Vogel has been involved with the architectural and engineering industry for 12 years. His direct involvement with over 7 million square feet of raised access flooring applications utilizing Underfloor Air Distribution enables him to assist facility professionals, design teams, contractors, and others to address the requirements of flexible interiors and high performance real estate.

Thursday, October 20, 2005

*3 Sessions are available:

8:00—9:30 AM
11:30—1:00 PM
5:00—6:30 PM

*30 minute registration/networking at start

Where:

S. Rose Company
1213 Prospect Avenue
Cleveland, OH 44115
216.781.8200

RSVP by October 14:

Sheryl Dement at 216.447.9973
Seating is limited so register early!

CEU Forms Provided

0.1 CEU ASID/IDC/IDEC/IIDA #4727

AIA Course #HAW527 INCLUDING HSW



HAWORTH®
change by design

Walking on Air: Building the Foundation for High-Performance Workspace
By Brian Vogel

Course Information

Course Title: Walking on Air: Building the Foundation for High-Performance Workspace

Subject Code Index: 5. *Technical Knowledge* - 10. *Interior Environments & Indoor Air Quality*
2. *Interior Design* – 12. *Sustainable/Environmental Design*

Use of Course: CEU Manual

Instructors

Instructor: Brian Vogel

Instructor's Profile:

Brian Vogel has been involved with the architectural and engineering industry for 12 years. His direct involvement with over 7 million square feet of raised access flooring applications utilizing Underfloor Air Distribution enables him to assist facility professionals, design teams, contractors and other to address the requirements of flexible interiors and high performance real estate.

“Walking on Air” provides an introduction and overview to Raised Access Flooring systems and their key role as a platform for adaptable office environments. The concept and basic fundamentals of Underfloor Air Distribution will be highlighted along with key issues of cost effectiveness and its impact on occupant comfort and productivity.

Materials for Review

Course Objectives:

- Understanding Underfloor Air distribution and why it is a viable alternative to overhead systems.
- How UFAD impacts LEED™ applications and improves Indoor Air Quality
- The importance of a Collaborative Design approach.

Content Outline:

- I. Introduction - (5 minutes)
 - Introduction of Sustainable Design Concept
 - Goal of Collaborative Design Strategies

- II. Overview – (10 minutes)
 - Environmental impact of Construction
 - Green Buildings – Benefits
 - “Not My Job”
 - The Construction Industry – What is holding us back?

- III. Presentation (15 minutes)
 - What is LEED™? Points, Products.
 - Integrated Design and starting early
 - Cost – perceived vs. real, Green Building premium
 - Life cycle Costing

- IV. Detailed Presentation – (15 minutes)

- Underfloor Distribution – differences
- Indoor Air Quality
- Types of access floors
- Case Studies
- Modular technology solutions

V. Summary and Conclusion - (15 minutes)

- Portfolio examples
- Questions and Answers

Course Description:

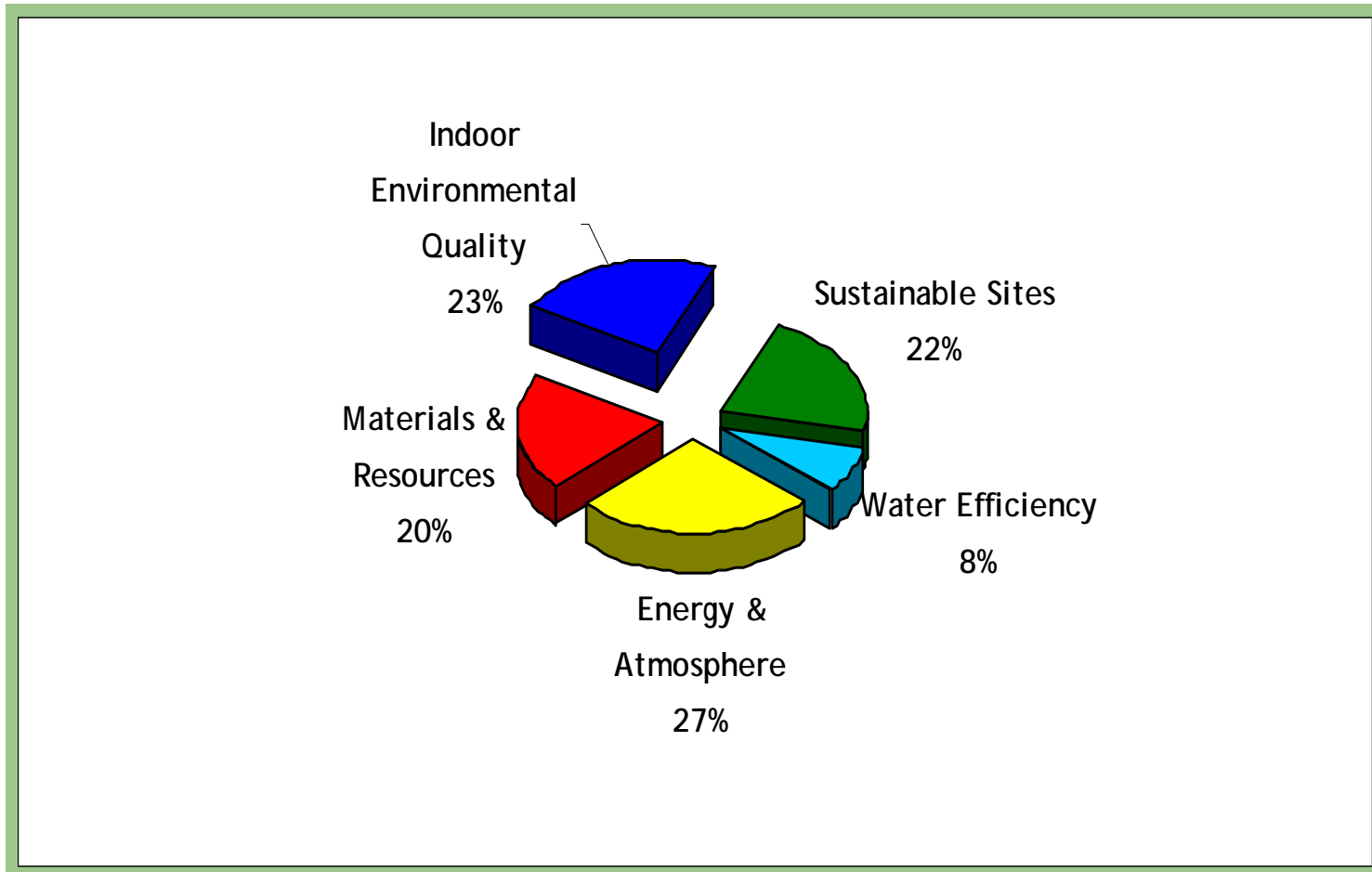
This presentation discusses the climate of overall cost reductions and improved occupant comfort demands. It proposes that Sustainable Construction along with an integrated design approach can meet these challenges and demands at a competitive cost. This presentation introduces the concept of Underfloor air as part of this solution as well as being an integral part of the collaborative design process.

Contact Hours: Course will consist of one hour of contact time.

Top 10 Issues Affecting Lease Decisions

	Issue	% of respondents who said this is very important
1	Comfortable Temperature	95.3
2	Tenant Control of Temperature	85.0
3	Indoor Air Quality	93.5
4	Acoustics/Noise Control	90.3
5	Availability of On-site Parking	84.8
6	After Hours Security	89.3
7	Quality of Building Maintenance	93.0
8	Management Responsiveness	92.2
9	Cost of Parking	77.9
10	Management Ability to Meet Needs	91.8

LEED-NCTM Point Distribution



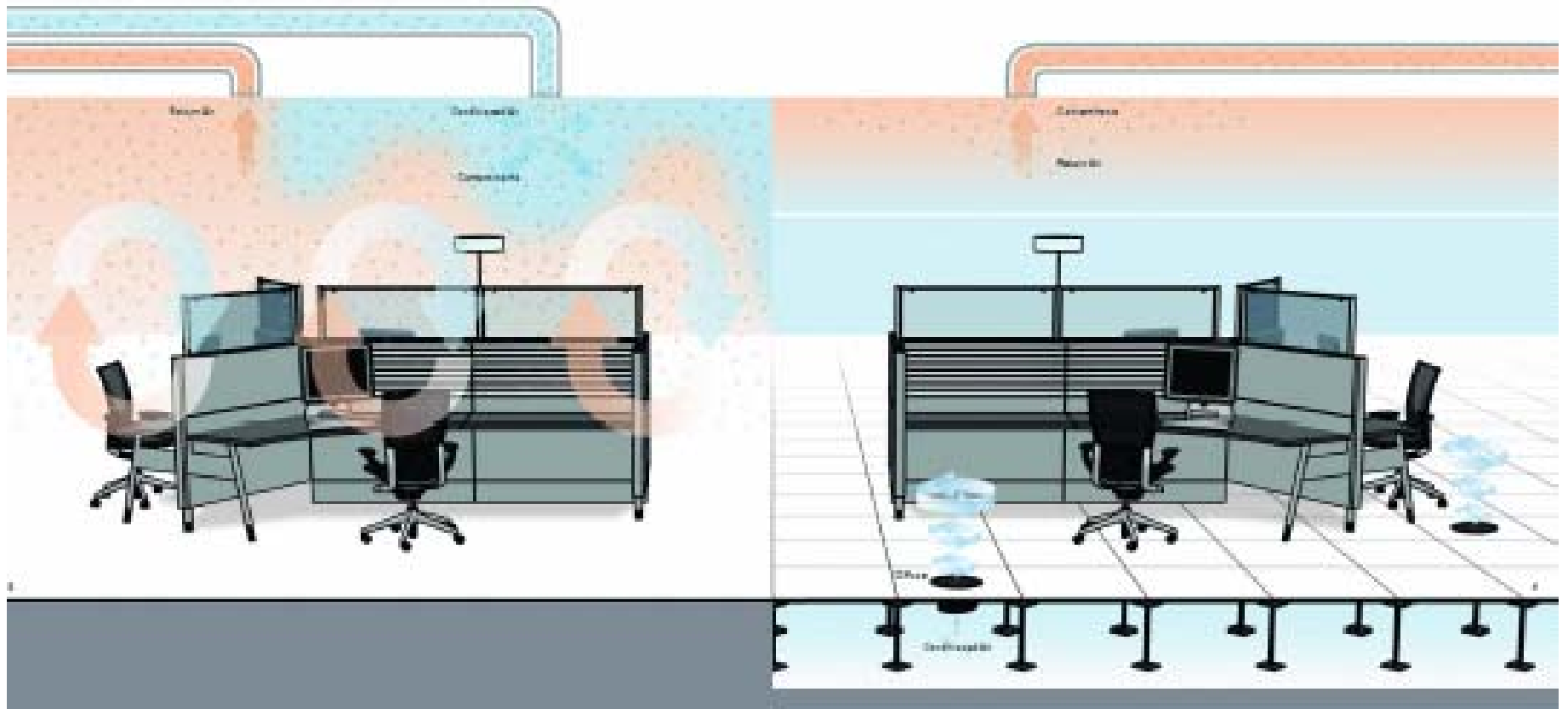


Access Floor System LEED™ Points

1. (EQ-2) Increase ventilation effectiveness +1 pt
2. (EQ-6.2) Controllability of systems +1 pt
3. (EQ-7.1) Thermal Comfort ASHRAE 55 +1 pt
4. (EQ-7.2) Thermal Comfort – Permanent monitoring +1 pt
5. (EQ-1) Co2 monitoring + 1 pt
6. (EA –1) Energy efficiency + 1 to 10 points
 - 1 = reduce 90.1 energy budget model by 15%
 - 10 = reduce 90.1 energy budget model by 60%

Others may apply depending on floor material and location

Overhead/Underfloor



Overhead HVAC Challenges

- **Short Circuiting**
 - Portion of the air discharged from the overhead diffuser never reaches the occupied lower space.
- **Dumping**
 - Velocity of the air is too slow to induce mixing and simply “dumps” to the floor.
- **Dead Spots**
 - Location of furniture and partitions inhibit complete mixing in the space creating “dead spots” of air.

UFAD Key Advantages

Thermal Comfort/Individual Control

- ASHRAE 55: Thermal Environmental Conditions for Human Occupancy (80% Occupant Satisfaction)
- Dress/Activity Variances
 - Business suit to slacks and short-sleeved dress shirt. Temp increased 4 degrees to maintain equivalent comfort
 - High Activity level versus sitting at desk. 3-5 Degrees.
- Occupants with no individual controls are twice as sensitive to temperature changes vs. Occupants with individual control.
- Facility complaints down to less than 1%.

UFAD Key Advantages

Indoor Air Quality

- Ventilation Effectiveness
 - How efficiently the system is able to move contaminated air from the room to the return air duct.
 - Ratio of contaminant concentration in the return air vs. the breathing zone of the room
- Overhead
 - Designed for 1.0
 - Data shows 0.5-1.0
- UFAD
 - Studies show 1.0-2.0

UFAD Key Advantage (Systems)

- Address Traditional Concerns
 - Short Circuiting
 - Dumping
 - Dead Spots
- Extended Economizer Cycle “Free Cooling”
 - Using outside air to reduce required mechanical cooling
 - 65 vs. 55 allows for extended economizer cycle
- Thermal Storage
 - Cooler outside evening air used to cool building to a minimum temperature. Cooled slabs act as a heat sink during the day to reduce demand for mechanical cooling.

UFAD Key Advantage (Systems)

- 60-85% Ductwork Reduction
- Fan Size/Energy Reduction
 - .1" w.c. vs. 3" w.c.
 - 35% Energy Savings

Reduction in Chiller Requirements

- M.I.T. Stata Center (105 ton reduction)

The Building-Productivity Link

- State of CA: 27,428 employees in 38 state-owned buildings
 - Average Annual employee Salary and Benefits \$65,141
 - Allocated Operations and Maintenance \$1,337

The Building-Productivity Link

- Verifone: Building retrofitted to cut indoor pollutants and IEQ
 - Absenteeism rates down 40% and productivity up 5%
 - Healthy workplace “has done more to boost productivity than all the bandwidth in the world.”
- West Bend Mutual Insurance Company
 - 2.8% Productivity Increase

Productivity Impacts

50,000 sf facility with **250 employees**. Based on an average salary and benefits of **\$50,000/yr**; **2,040 hours** of work per year; **245 working days** per year; a **1% increase** in productivity means the following:

- 1% = 5 mins
- 5 mins = \$ 2.00/day
- \$ 2.00/day x 250 employees = \$ 500/day
- \$ 500/day x 245 days = \$ 122,500/yr
- \$ 122,500 / 50,000sf = \$ 2.45/sf

Sprinkling Requirements

- NFPA 13: “Sprinklers shall be installed in all concealed spaces enclosed wholly or partially by exposed combustible construction as in walls, floors, and ceilings.
- Plenum elements Class A
- No Requirement

Sony: Culver City, CA

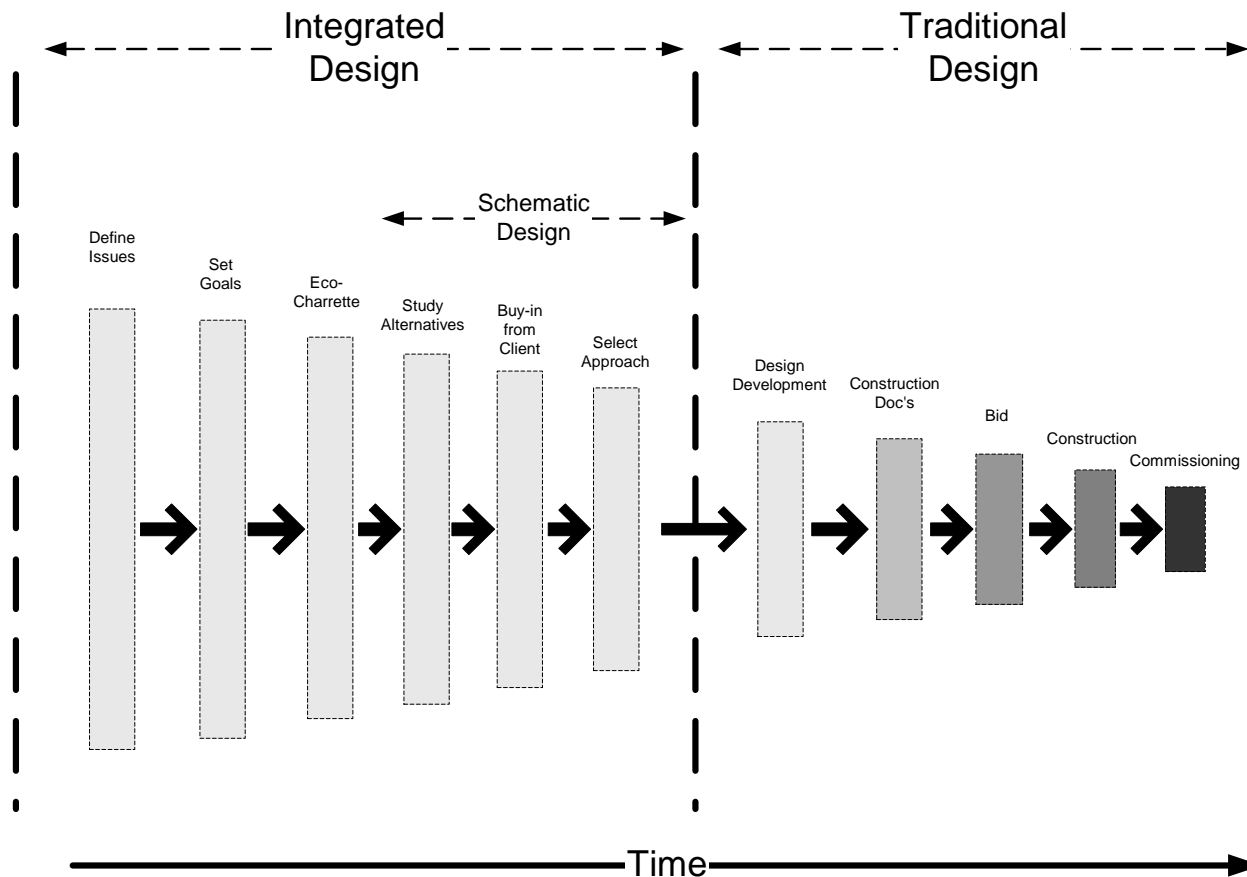
Shell & Core Cost Model

- 4 Story 300,000 sq.ft. (25% closed offices)
- \$1,400,000 RAF
- \$5/sf reduction in HVAC
 - Savings on air capacity, zoning, ductwork, controls
- Floor to Floor height reduced from 14' to 12'-8".
 - Savings of \$405,000
- 2% Cost Increase
- TI Budget providing \$3/sf allowance for ease of electrical, telephone/data, and HVAC distribution.

So, what are the steps to implement this?

2) Start earlier in the process.

→ Integrated Design Process Wednesday, January 26, 2005



Adapted from Kevin Hydes "Anatomy of a Green Building Project"