



Build it Right to Maximize Indoor Environmental Quality

Presented by
Tom Bell AIA and Karen Benson LEED AP BD+C



Carrollton-Farmers Branch
Independent School District
... An Innovative Leader in Learning ...




STEELE & FREEMAN, INC.
CONSTRUCTION MANAGERS • GENERAL CONTRACTORS

Healthy School Environments Across Texas

Indoor Air Quality (IAQ)


Action Planning Guide

As you listen to this presentation, use the chart in your Action Planning Guide to write down any key strategies to install the Six Technical Solutions in your district.



Indoor Air Quality (IAQ)

Learning Objectives




- Identify at least three benefits realized by increasing IEQ at your school using key drivers.
- List at least three things that can be done while building and renovating schools to improve Indoor Environmental Quality within a traditional school budget.

Indoor Air Quality (IAQ)


Organize Set District IEQ Goals


- Comprehensive IEQ policy
- IEQ construction specifications includes architects and builders. Build green – new, additions, renovations, upgrades.
- Green purchasing policy – purchase only non-formaldehyde containing products
- Green purchasing policy – green cleaning

Indoor Air Quality (IAQ)



What Schools Say





“What if we could raise test scores by 3% to 7%?”


“What if we could decrease absenteeism by 5%?”

“Asthma affects 1 in 4 of our students and it’s getting worse”.
- North Texas School Districts

“We can’t afford not to address IEQ but we don’t know how” -
Your School District

Educate

Indoor Air Quality (IAQ)



School Indoor Environmental Quality (IEQ) – What’s in it for me – the Facilities Staff?


- More durable materials
- Utility & water use reduced
- Use of fewer, less toxic cleaning products
- Savings of time and money

“We cut buses, we even cut some football (In Texas!) but we did not cut our IEQ Program.”
- Frank DiNella, Director of Operations, Keller ISD

Educate

Indoor Air Quality (IAQ)

School IEQ – What’s in it for me – School Administrator?




- Fewer absences
- Higher test scores
- Savings on utility and water bills
- Lower O&M costs
- More durable finishes
- More money for education

Educate

Indoor Air Quality (IAQ)

School Lifecycle Costs- A different paradigm

Evaluate



50 Year Building

| | |
|---|--|
| <p>1st 2-5 years = 30-40% of lifecycle cost</p> <p>Includes design and construction, O&M</p> | <p>45-48 years = 60 to 70% of lifecycle cost</p> <p>Includes everything: operations, maintenance, upgrades</p> |
|---|--|

Source: National Institute of Standards and Technology www.nist.gov

Indoor Air Quality (IAQ)

Maximize IEQ in Pre-construction

- The more familiar your architect and builder are with IEQ protocol, the less it will cost.
- Involving your contractor in pre-construction to keep the design within budget will maximize IEQ.



Indoor Air Quality (IAQ)

Pre-Construction Charette

- Involve departments and the community
- Ongoing discussion between Construction, Maintenance, and Operations



Communicate


Indoor Air Quality (IAQ)

Results from implementing IEQ Measures

using EPA Tools for Schools

Assess

Act



- **Test Scores Increased**

| | | | | |
|------|------|------|------|-------|
| 2007 | 2008 | 2009 | 2010 | % INC |
| 79 | 82 | 85 | 87 | 10.1% |
- **Scholarships Increased (in millions)**


| | | | | |
|--------|--------|--------|--------|-------|
| 2007 | 2008 | 2009 | 2010 | % INC |
| \$24.3 | \$30.7 | \$37.2 | \$40.2 | 65.4% |
- **Reduced Cost per Sq Ft (Operations)**

| | | | | |
|--------|--------|--------|--------|-------|
| 2006 | 2007 | 2008 | 2009 | % DEC |
| \$.234 | \$.243 | \$.227 | \$.232 | .008% |

A Decrease in Operations Costs

Indoor Air Quality (IAQ)

Write IEQ into Plans and Specifications



- Require A/E/C to include occupant health plan in total project / contractor bid specs
- Make plan public
- Update emergency plan to account construction zones
- Separate zones from occupants
- Use low-emissions interior finishes (paints, glues)
- Allow off-gassing time prior to re-occupancy

Indoor Air Quality (IAQ)

Construction for IEQ (For success implement systems)

- IAQ
- Cleaning
- Noise
- Lighting
- Toxic Chemicals
- Mold



Indoor Air Quality (IAQ)

Construction of Nancy Strickland Elementary School



Indoor Air Quality (IAQ)

Where does the trash go



Need trash and recycling bins on the job



Indoor Air Quality (IAQ)

Trash in exterior walls



Watch for contraction debris



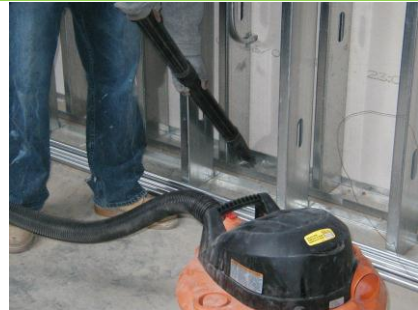
Indoor Air Quality (IAQ)

Vacuum is the start



Indoor Air Quality (IAQ)

Vacuumping track



Indoor Air Quality (IAQ)

Slab Penetrations



Be sure all slab penetrations are sealed



Indoor Air Quality (IAQ)

Chases must be clean

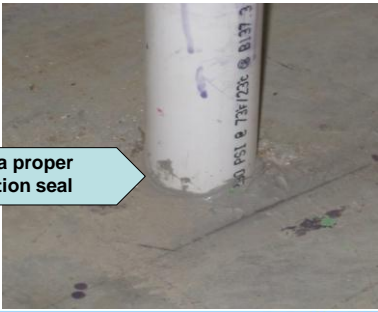


be sure all chases are clean and free of debris



Indoor Air Quality (IAQ)

A proper seal

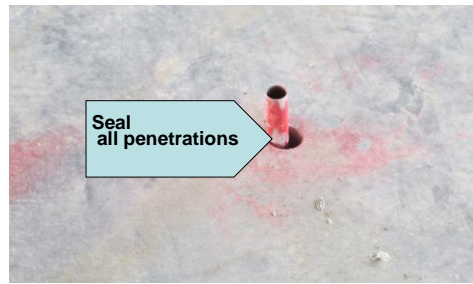


This is a proper penetration seal



Indoor Air Quality (IAQ)

2nd floor penetrations unsealed

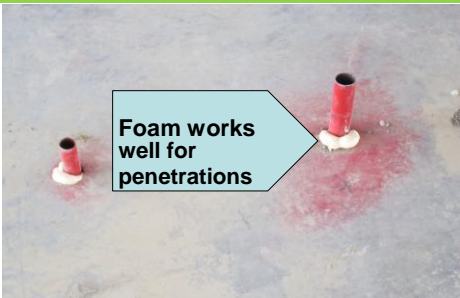


Seal all penetrations



Indoor Air Quality (IAQ)

2nd floor penetrations sealed



Foam works well for penetrations



Indoor Air Quality (IAQ)

Chases



Clean and sealed



Indoor Air Quality (IAQ)

What else needs to be done?



Indoor Air Quality (IAQ)

25

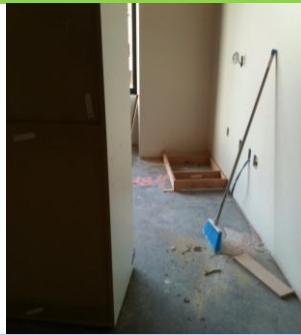
Your contractor should have a Quality Control plan that includes taking care of these tasks before closing up the walls



Indoor Air Quality (IAQ)

26

Sweep before installing casework



Indoor Air Quality (IAQ)

27

Indoor Environmental Quality Plan

Your new building shouldn't smell like a new building



Indoor Air Quality (IAQ)

28

IEQ Plan for construction

- Educate team on process & reasoning behind it
- Daily cleanup an internal policy
- Floor sweep & wet mop
- Floor prep with wet mop machine
- Specific protocol for interior finishes

Your building will never be cleaner than it is at the end of construction



Indoor Air Quality (IAQ)

29

IEQ Plan – Smoking

While under construction

- “No smoking in our buildings”
- “No smoking near our buildings”
- “No smoking on our campus”



Indoor Air Quality (IAQ)

30

We recommend paperless gypsum board (sheetrock)



Indoor Air Quality (IAQ)

IEQ Plan – VOC's

- Extensive review
 - Paint materials
 - Floor adhesives
 - Caulking & sealants



Indoor Air Quality (IAQ)

IEQ Plan – VOC's for Flooring

- Flooring selection
- VOC's for flooring glues & materials review
- I see carpet removal in your future



Indoor Air Quality (IAQ)

IEQ Plan – Mechanical Systems

- Equipment & duct materials delivered wrapped & remained wrapped
- Duct installers wipe inside of each duct section
- As each section of duct installed, gets rewrapped



Indoor Air Quality (IAQ)

IEQ Plan – Mechanical Systems


- Diffusers & grilles wrapped to protect from dust as installed
- All return air vents covered with filter fabric / MERV 8 filters
- Before equipment start up each unit inspected & cleaned



Indoor Air Quality (IAQ)

IEQ Plan – Mechanical Systems

- Building flush at completion of project
- Intent - move maximum amount of air through building



Indoor Air Quality (IAQ)

Build to maximize IEQ



- Spend money wisely
- Use 6 key drivers



37

Indoor Air Quality (IAQ)

Resources

- US Environmental Protection Agency Tools for Schools and Healthy SEAT www.epa.gov/schools
- US Green Building Council www.usgbc.org and Center for Green Schools
- North Texas Chapter USGBC and **Green in a Box** www.northtexasgreencouncil.org
- National Association of School Nurses www.nasn.org/Portals/0/education/flyermat.pdf



38

Indoor Air Quality (IAQ)