Getting to Best Practice while Meeting Code: Dealing with Real and Perceived Barriers

National Workshop on State Building Energy Codes

Atlanta; June 24, 2003

Steve Andrews

On contract to PNNL

Example: A slam-dunk project on which to pull a permit in 1988, eh?

Hanging permits happen…

Stop-construction issued

- **Shallow foundation in Pueblo**
- **10-inch round supply plenum for two-story homes in Pueblo (CO)**
- **Unvented crawl spaces (Denver metro; several jurisdictions)**
- **No-header design on non-load-bearing wall (almost…)**

A process to smooth code bumps

- **Projected directed by PNNL**
- **Colleague: Eric Makela**
- **<u>Step 1:</u> Identify persistent problems**
  - **New materials and/or products**
  - **New information (e.g., building science)**

A process to smooth code bumps

<u>Step 2:</u> Generate *short* (2-pager*) supporting documents

- **Statement of the problem/rationale**
- **Background/description/rationale**
- **Plan review/field inspection guidance**
- **Supporting citations from the code(s)**
- **Illustrations/photos**

*** most of the time (crawl spaces? 2-page opus?)**

Please make this an interactive session

- Expect to hear your suggestions
- What troublesome items, technologies, products would you like to see covered?
- What about priorities?

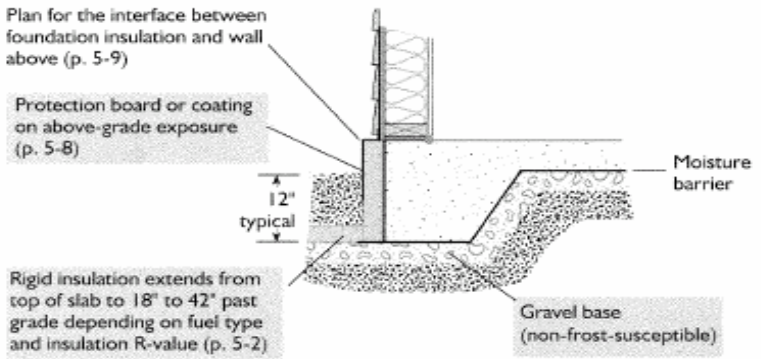
Exterior foundation insulation effectively raises the frost depth, protecting the footing from frost heave. In Fort Collins, "frost-protected shallow foundation" (FPSF) footings must extend only 12" below grade, reducing excavation, forming, material and labor costs. FPSF may be used for slab-on-grade under conditioned space or warm crawl spaces. Consider a FPSF for the exposed edge of a walkout basement. Refer to [NAHB-2] for more complete design guidelines on FPSF. Consult a soils engineer for approval of a FPSF.

Although FPSF insulation requirements for protection against freezing are less than energy code insulation requirements, energy code requirements must be met. For FPSF crawl spaces, with exterior insulation, slab-on-grade insulation requirements apply.

Foundations

Frost-protected shallow foundation

Insulate full slab perimeter, including next to garages, patios, and other unheated spaces



TIP: Pour concrete with rigid insulation in place. Consider using insulation as formwork.

1. Frost-Protected Shallow Foundation

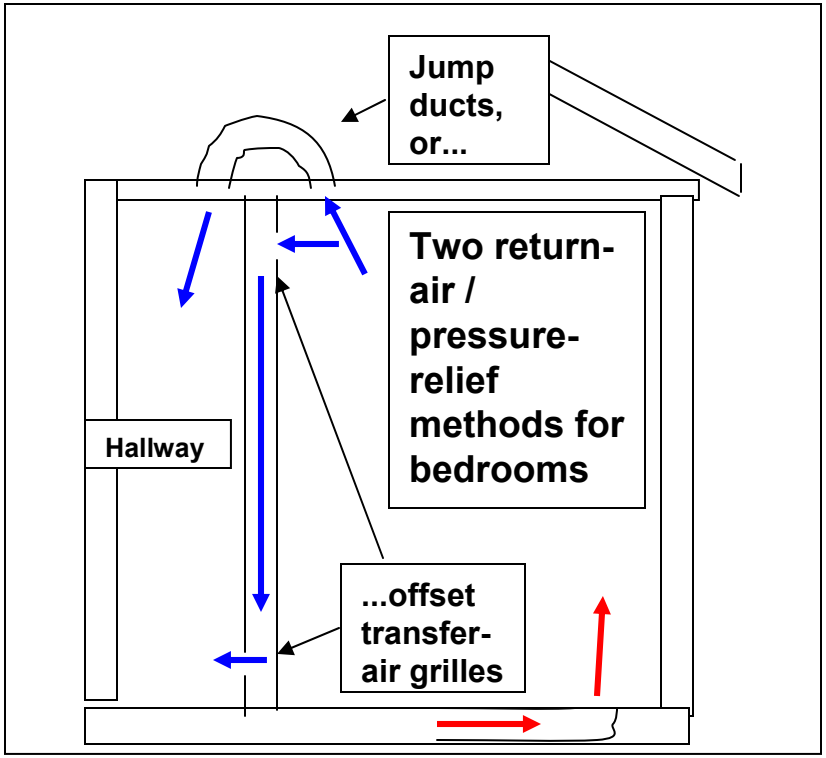
- Problem
- Background/description
- Plan reviewer/inspector guidance
- Code citations
- Diagrams

2. HVAC Design: Pressure relief in bedrooms

- Problem
- Background
- Plan review/inspection guidance
- Code citations
- Graphic/photo

Pressure relief in bedrooms

- **Acceptable solutions**



3. Condensing dryers

- Problem
- Background
- Plan review/inspection guidance
- Code citations
- Graphic


DON'T WORRY. TECHNOLOGY WILL SAVE YOU.
MUELLER

…unless codes don't allow it

Allowable Use of Sealants on Ductwork

18A ++ THE DENVER POST Tuesday, October 16, 200

Good ol' duct tape sticks as wart cure

By Dan Vergano
USA Today

Chalk up one more use for duct tape — wart removal.

A new study shows duct tape is "significantly more effective" than liquid nitrogen treatments that remove warts by freezing them.

As many as 10 percent of kids get warts and finding effective and less painful treatments for the ugly skin growths is a priority for dermatologists.

Published in the October Archives of Pediatric and Adolescent Medicine, the study compares the common doctor's-office treatment of cryotherapy with duct tape for wart removal.

In the study, cryotherapy consisted of freezing the skin growth for 20 seconds with liquid nitrogen at minus 345 degrees Fahrenheit. Treatments are repeated every two to three weeks.

The duct-tape patients covered their warts for six days, followed by daily soaking, filing with an emery board and overnight taping for two months or until the wart disappeared. Of 51 children and young adults in the study, the half using duct tape were 85 percent likely to see their warts disappear versus only 60 percent in the freeze group. On average, when the treatments both worked they removed warts within a month.

Pain and burning were severe for some cryotherapy patients. One child vomited with fear before each liquid nitrogen application.

"The most frequent complaints in the duct tape [randomized] were difficulty in keeping the tape on and minor skin irritation," wrote the study authors, who were led by Dr. Dean Focht of Children's Hospital Medical Center in Cincinnati.

"I'm thrilled someone has finally put this treatment into print — something so simple, effective, cost-effective easy to do at home, cheap and safe with few side effects," says pediatric dermatologist Jonathan Mancini of Children's Memorial Hospital in Chicago, who was not part of the study.

Most warts go away as the body's immune system attacks the virus that causes them, he notes.

"So for something that is mostly a cosmetic nuisance, why not try a less 'traumatic treatment?'" he asked.

The researchers theorize that the duct tape treatments stimulate the immune system to speed up the natural removal of warts.

Some patients getting duct tape treatments on particular warts had them in more than one spot and found that the untreated warts also disappeared.

Most doctors believe the tape actually works by slowly removing dead layers of skin from the wart, says Mancini.

Scientists would likely need to see evidence of increased immune-cell activity from biopsies of treated warts before they buy the immune-system theory, he thinks.

Because no medicine stops the human papilloma virus that causes warts, the skin growths will likely remain a bane of children and dermatologists for some time.

The virus spreads from person to person, most often through breaks in the skin, and can live on dusty surfaces such as shower stalls, pool decks and gym floors.

Duct tape can cure it, warts and all

A new study Monday showed that duct tape is as effective at removing warts as traditional methods. Home improvement's all-purpose wonder tape has also been used ...

SOURCE: ASSOCIATED PRESS

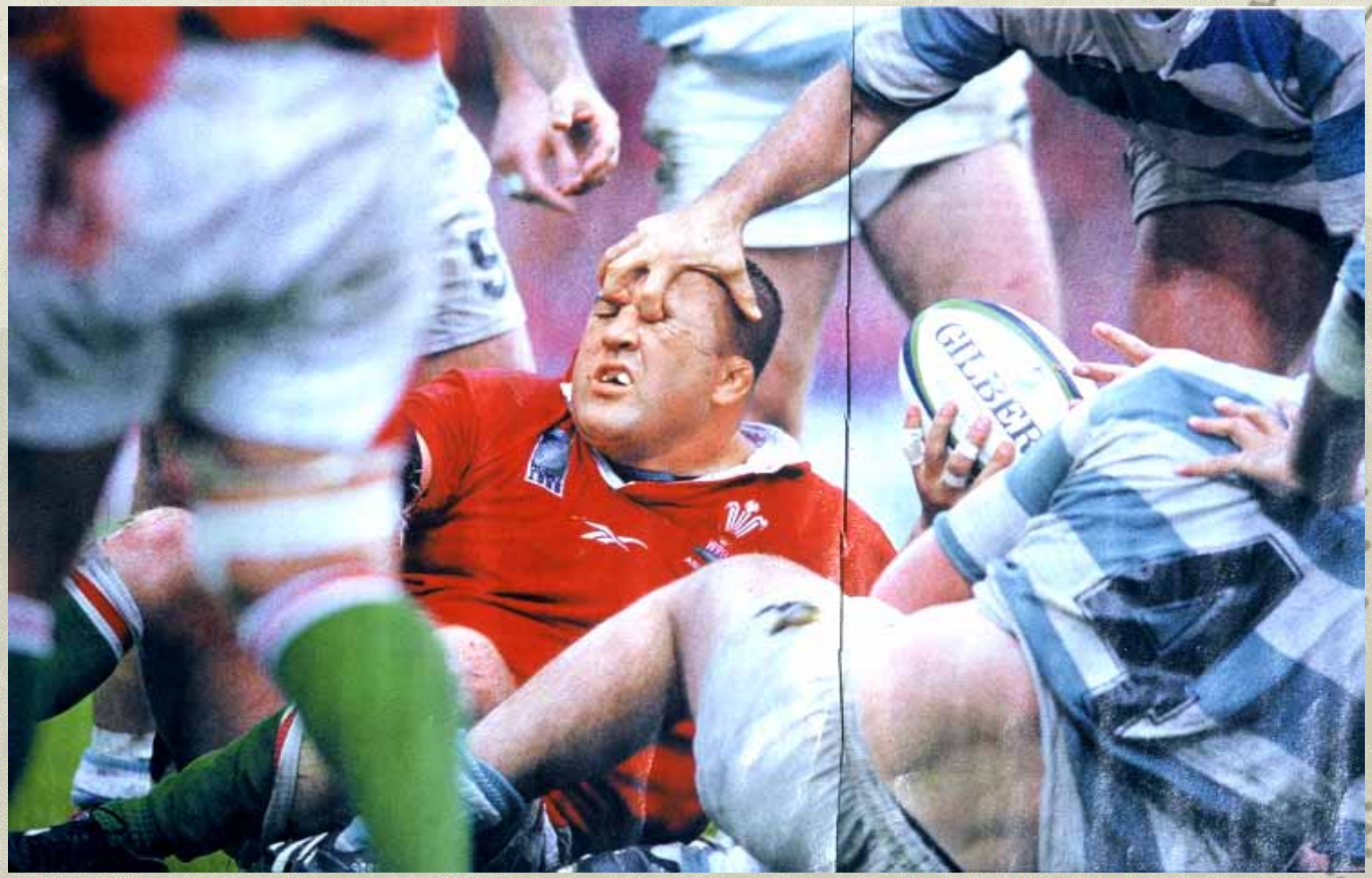
4. Allowable duct sealants

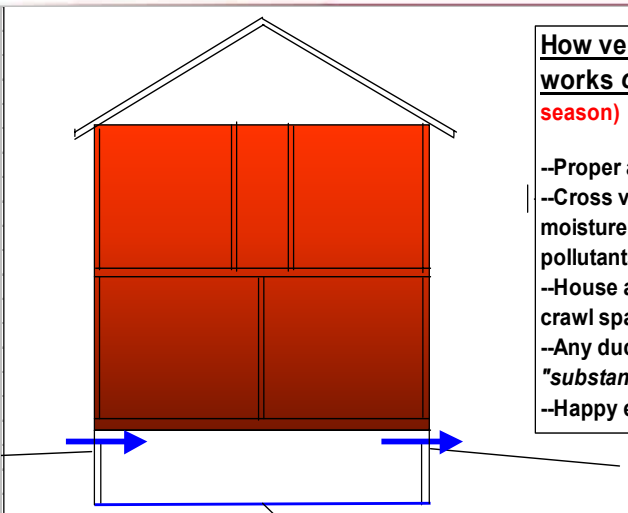
- **Problem**
- **Background**
- **Plan review/inspection guidance**
- **Code citations**
- **Graphic**

*(No: this is **not** a product promo…)*

5. Crawlspace: everyone's winner

Battling over crawl spaces…

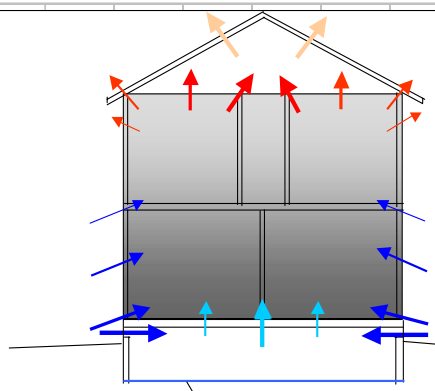




How vented crawl space works *on paper* (heating season)

--Proper amount of vent installed
--Cross ventilation carries out moisture, soil gases and other pollutants (e.g. leached pesticides).
--House above is isolated from crawl space.
--Any ductwork in crawl space is *"substantially airtight,"* per code
--Happy ever after, end of story.

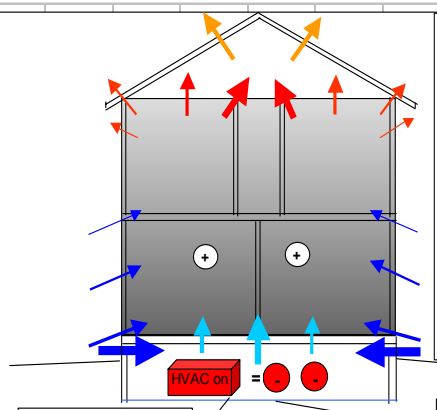
Poly ground cover helps reduce moisture and size of venting required



How crawl spaces typically work
(heating season)

--Poor sealing of house-to-crawl floor.
--When delta T = 15 degF+, and no wind, stack effect draws crawl space air into home. When delta T = 30 deg +, stack effect can overcome breeze.
--Homes with passively vented crawls +/- 25% leakier than homes over other foundation types.
--Pollutants in crawl space air enter home before exiting high-side holes.

Poly ground cover helps reduce moisture problems



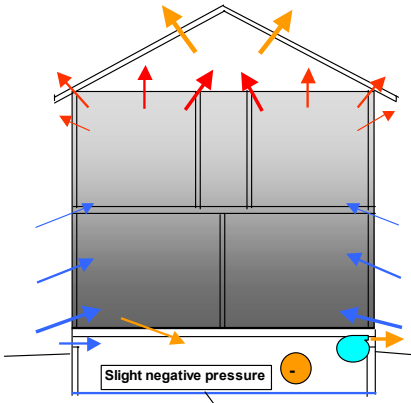
How crawl spaces typically work
(HVAC on -- heating season)

--Poor sealing of house-to-crawl floor.
--When delta T = 15 degF+, and no wind, stack effect draws crawl space air into home. When delta T = 30 deg +, stack effect can overcome breeze.
--Homes with passively vented crawls +/- 25% leakier than homes over other foundation types. When HVAC blower operates, house air leakage can *double*.
--Pollutants in crawl space air enter home before exiting high-side holes.

When furnace operates, leaky return ducts create negative pressure, draw in more cold outdoor air.

Poly ground cover helps reduce moisture problems

= cold outdoor air drawn in
= heated indoor air leaks out



Five steps to conditioned, vented crawl spaces
(heating season)

1. Vent the crawl with house air, drawn from house above through transfer-air grille(s)
2. Use a quiet (e.g., 0.5 sone) small fan (e.g., 40 cfm, varying with volume) designed for continuous operation (5-10 years)
3. *No atmospherically drafted combustion appliances within the conditioned space*
4. Sealing continuous ground cover to foundation/piers is *critical*.
5. *Seal all ductwork*

--Stack effect somewhat reduced
--Homes with conditioned crawls tighter than homes with vented crawls
--Crawl conditioning will be within a few degrees of house temperature and relative humidity

Continuous ground cover sealed to foundation walls and piers.

= cold outdoor air drawn in
= heated indoor air leaks out
= conditioned air

6. Drywall clips

- Problem
- Background
- Plan review/inspection guidance
- Code citations
- Graphic

Other items/products/topics

- **Advanced framing**
  - **7. Single top plates**
  - **8. No headers above windows (non-load-bearing walls)**
  - **9. Strapping walls (using foam sheathing)**
- **10. Evaluating HVAC sizing calcs**
- **11. Unvented insulated ceilings (climate specific)**

Other items/products/topics

- 12. Combo heaters
- 13. Sizing combustion air ducts

- 14. Issue of ducts in exterior walls
- 15. Cellulose insulation

- 16. Vapor barrier requirements (17, 18…)

Suggestions?

Contact info:

Steve Andrews @ 303-759-1998,
sbandrews@att.net

Craig Conner @ PNL509-366-0046

Craig.conner@pnl.gov

Historic natural gas spot prices

TFC Commodity Charts

Natural Gas (NG, NYMEX)

Monthly Price Chart

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