New Light in Crawlspace

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Problem

- Mold and rotting is a common problem in modern crawlspaces.
- Problems occur even with proper ventilation, impermeable ground cover, and drainage.
- There are situations when vented crawlspaces are necessary.
Causes

- Insulation in floor framing: heat from the house no longer warms the wood.
- Vinyl flooring: creates a vapor impermeable barrier.
- Before vinyl flooring and the use of floor insulation, problems did not occur.
- Floor framing was above the dew point temperature of the ventilation air.
- Floor finishes were vapor open.
Effects of Floor Insulation

- Insulation keeps heat from escaping through the floor.
- The floor joists become colder.
- The temperature of the wood and the insulation are now below the dew point of the crawlspace air.
- Condensation forms on the surface of the wood and insulation.
- Mold and rotting occurs.
Effects of Vinyl Flooring

- The vapor drive in the crawlspace is upward.
- Interior air is dryer than the air in the crawlspace.
- This causes moisture to diffuse through the floor into the building.
- Vinyl flooring is vapor impermeable and traps moisture under it.
- Mold grows and forms pink spots in the vinyl.
Example

- Dew point of crawlspace air is 65°F.
- Top of floor joist is at 75°F.
- Interior air has a dew point of 55°F.
- Vapor resistance of insulation can be ignored.
- Use a psychometric chart and a wood sorption curve to find the moisture content of the wood.
Psychometric Chart

Chart gives relative humidity of 70%.
Wood Sorption Curve

Sorption Curve gives moisture content between 10% and 16%
Analysis

- The moisture content increases downward.
- The warmer the wood is, the dryer it will be.
- Wood moisture content needs to be kept below 19% to prevent rotting and 16% to prevent mold.
Possible Solutions

- Install vapor permeable flooring (plywood sheathing and carpet)
- Furniture must be elevated
- Construct a conditioned crawlspace or mini-basement.
- Vented crawlspace may be necessary as in a flood zone
- Use foil-faced rigid insulation.
- Needs to be airtight (hard to accomplish)
- Apply spray foam insulation.
- Needs to be high density.