FREQUENTLY ASKED QUESTIONS
CRAWL SPACE DECISION-MAKING

I am currently in the process of finding/purchasing my first home. Several homes have crawl spaces. What are the concerns associated with crawl spaces and what should I look for?

For a residential or commercial property, crawl spaces represent hidden remote confined spaces only rarely viewed by plumbers, pest control personnel, cable tv installers, building maintenance, etc. Environmental hazards associated with Crawl Spaces include mold, bacteria, allergens, odors, asbestos, radon as well as rodents, vermin, termites, carpenter ants, etc. Personnel entering this confined space should wear protective equipment such as disposable clothing, gloves, eye protection, as well as a minimum of an N95 respirator. Contamination on workers clothing is inevitable due to the limited height conditions and prevalent dusty conditions. Clothing contamination increases the risk of spreading contamination to others.

Nine (9) decision-making evaluation tips:

1. **Security/Safety**: Access doors and other openings (except maintained foundation vents) should be kept closed and secured to prevent access by both persons and animals. Inspection of the crawl space is critical during the home inspection process prior to property purchase.

2. **Flooring**: Most residential crawl spaces have dirt floors (i.e. exposed ground surface). The soil in crawl spaces can be a significant source of moisture resulting in mold growth and odors. Studies indicate the exposed ground surface can evaporate 12-18 gallons of water per day in a 1000SF crawl space where the water table is within 3 feet of ground level. Installation of an impermeable vapor barrier overlapped at the seams and extending up the foundation walls and columns can reduce water evaporation rate to <1 gallon per day.

3. **Wet Conditions/Control**: The crawl space ground surface should be dry with no obvious ponding. Exterior sources of water infiltration must be controlled by the following:

    a. Proper installation of rain gutters
    b. Extension of downspouts away from the foundation
    c. Sloping of the exterior ground surface away from the foundation walls
    d. Where standing water is periodically found and cannot be controlled, a sump pump should be installed at the lowest point and attached to a drainage system.

4. **Vented Crawl Spaces**: Air movement within crawl spaces is essential for moisture control. A vented crawl space should have a minimum of 1SF of foundation vents for every 150SF of crawl space floor area. Vents should also be located within 3 feet of the corners to allow for cross ventilation. Vents should not be clogged or blocked by debris or covered by subsequent construction (e.g., decking or shrubbery). Vents should be closed during the winter months.

5. **Non-Vented Crawl Spaces**: Where condensation can occur from reaching dewpoint conditions, crawl spaces are designed without exterior venting. Vents allow humid air to enter increasing the relative humidity. Condensation onto cool surfaces such as wood or metal will occur. Many of these crawl spaces use conditioned air from the home (exhausting outdoors) or incorporate a dehumidifier to vent/dry the crawl space. Usually the foundation walls are insulated but the flooring/joist space is not and a vapor barrier is in-place.

6. **Insulation**: Vented crawl spaces should have insulation installed in the flooring/joist space above. The paper side of fiberglass insulation should always face the heated living space. Hard surface insulation may also be placed on the foundation walls. Piping or ductwork within the crawl space should be insulated to prevent condensation. A small heater or heat tape can be used to keep piping from freezing in the winter.

7. **Asbestos:** Crawl spaces in older homes frequently contain piping and ductwork which may be insulated with asbestos. Suspect insulation must be tested and treated as ACM until laboratory results dismiss asbestos content. Damaged asbestos insulation often gets mixed with the dirt/debris on the floor increasing asbestos removal costs and exposure to persons entering the area.

8. **Odors:** Any odors in a crawl space can/will find their way to the occupied space above due to air migration into the occupied space. Warm air/odors will rise from cold areas such as the crawl space into warmer areas creating a stack effect. Exhaust fans can be installed to create negative pressure within the crawl space and actively exhaust/vent the air/odors outdoors.

9. **Humidity**: Relative humidity levels above 60-70% will result in spots of condensation in crawl spaces. Condensation will result in mold growth on wood surfaces and continual moisture problems including wood rot, structural damage and conditions favorable for insects and vermin.

Conclusion: Purchasing a property with a crawl space has unique risks and hazards. Risks/hazards are best controlled by keeping the crawl space dry (as possible) from water entry, excessive humidity or condensation. Whether to use a vented or non-vented design should be determined by an environmental professional.

When you need professional help or advice, email Alan Sutherland, CIH, CHMM at a.sutherland@aetinc.biz or call 610-891-0114. We provide nationwide services; phone consultations are free. Check out the full range of environmental contracting/consulting services we provide at our website www.aetinc.biz.