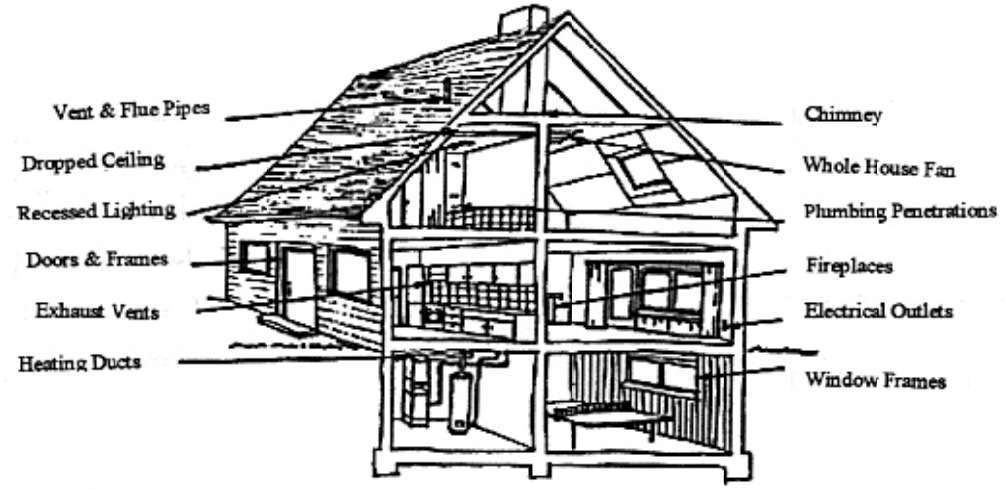
BUILDING CONSTRUCTION PROBLEM AREAS

Houses often have construction flaws that cause energy waste. A house's shell is its bottom floor, exterior walls, and roof. The shell's greatest energy weaknesses are at its edges and corners and where there are protrusions, indentations, and penetrations.

Protrusions include bay windows, dormers, cantilever floors, and porches. Indentations include recessed entryways, porches, and windows. Protrusions and indentations are areas where the house's insulation and air barrier may not be continuous. This allows air leakage between indoors and outdoors and convection within the house's cavities. Convective airflow accelerates heat transfer and reduces the effectiveness of insulation. Protrusions and indentations also increase a house's surface area and contain a concentration of joints between materials that can be pathways for air leakage.

Penetrations occur where mechanical and electrical components enter the house by penetrating the shell.

Following are locations where energy waste is likely to occur in site built homes:

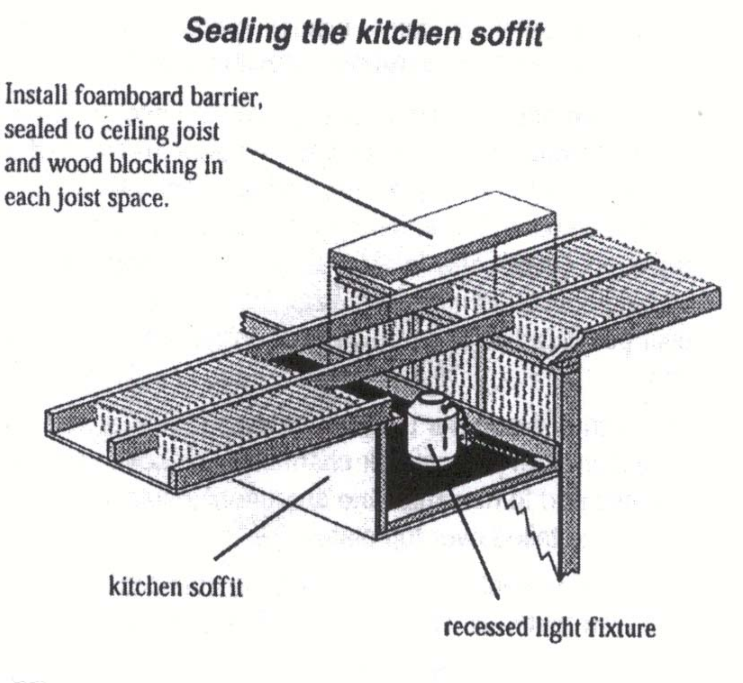


Porches	Wall cavities
Roof overhangs	Areas of plumbing near bathrooms and kitchens
Crawlspaces	Areas containing wires near service boxes
Suspended ceilings	Connections between floors, walls, and ceiling cavities

SUSPENDED CEILINGS AND SOFFITS

Suspended ceilings create invisible horizontal cavities that give convection and air leakage a way to transfer heat. Because suspended ceilings are often used to cover up holes in the original ceiling, they often are connected directly to the house's attic.

Soffits often connect directly to unconditioned attics or floor cavities above them. Air convection in the soffits increases heat transfer.

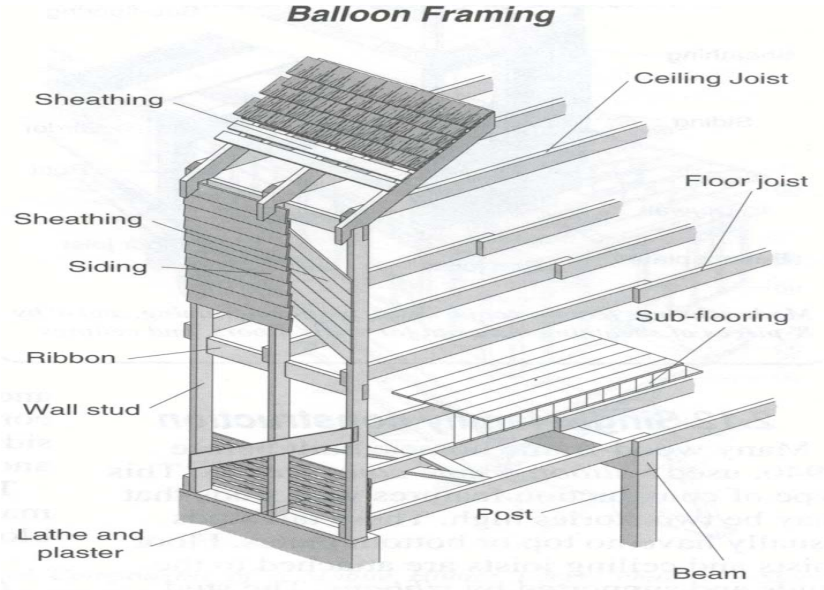


BALLOON FRAMING

Balloon framing creates an air convection raceway around the conditioned area. Even if the shell has an effective air barrier, this convection speeds heat loss. Most balloon-framed walls don't have top or bottom plates. Exterior or interior walls may be open to an unconditioned basement or attic.

If the balloon framing extends to an outdoor porch or bay window, the porch or bay window may connect the balloon-framed floor, wall, and ceiling cavities directly to the outdoors through porch lights or exterior joints.

Balloon-framed walls may be open (bare of interior or exterior sheeting) behind bathtubs, porch roofs, and interior soffits. This provides outdoor or indoor air entry to wall cavities where it convects or leaks through the cavity.



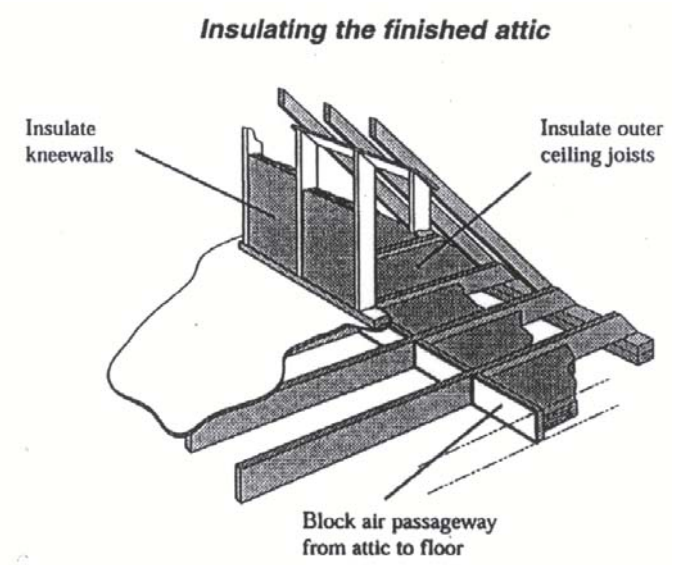
Balloon framing is characteristic of some older homes. The wall cavities of balloon-framed houses are often open to both the basement and attic.

FLOOR CAVITIES CONNECTED TO THE OUTDOORS

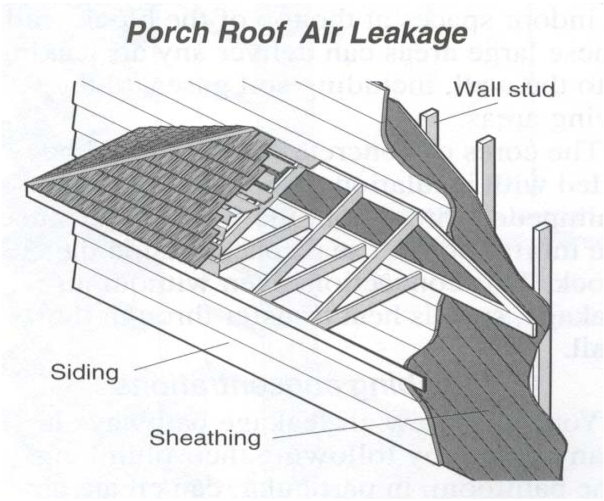
Cantilevered floors may give outdoor air access to the floor cavity. Convection may result in heat transfer.

Finished attics in a one and one-half story house often have floor cavities connected to the outdoors. The wedge shaped section of attic behind the kneewall is often leaky and the floor-joist space beneath the kneewall is usually not sealed. These openings can total dozens of square feet of openings into the floor cavity. The outdoor air convects through the cavity speeding heat loss. Outdoor air also leaks indoors if the floor cavity connects to leaks in the shell's interior.

ROOFS JOINING WALLS



Areas where roofs join walls are often a problem. Porch roofs, in particular, often create a connection between indoors and outdoors through joints in the porch's ceiling or cracks around the porch roof's perimeter. The porch's roof cavity may have direct connections to the second story's floor cavity or exterior wall cavities. Leaky porch ceilings may feed outdoor air into the second story's floor cavity.



Many porches on older homes were attached to the sheathing before the siding was installed. Since the sheathing isn't air tight, any air leakage into the porch can leak into the walls. An even more severe leakage problem results form the porch's rafters being attached to the wall studs in the balloon frame construction, where there is no sheathing behind the porch roof.