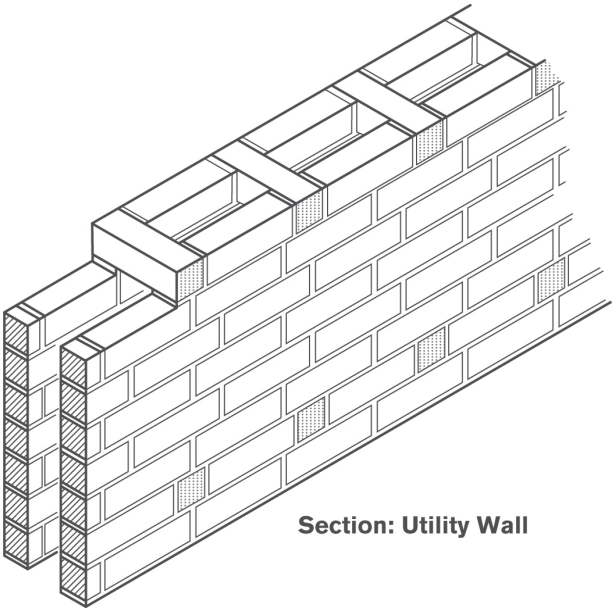
The Utility Wall is the name given to a special type of wall that is technically classified as a Masonry Bonded Hollow Wall in some building codes. The utility brick is a modular unit with nominal dimensions of 4” x 4” x 12” (3 1/2” x 3 5/8” x 11 5/8”) and is used throughout most of the walls.



Section: Utility Wall

Masonry Bonded Hollow Walls are different from Cavity Walls in that wythes of Masonry Bonded Hollow Walls are bonded with masonry headers, as the name implies, while wythes of the Cavity Wall are bonded with wire ties. The headers create an 11 5/8” thick composite wall where both wythes move together when subjected to external forces.

Due to a greater strength in bending, the Masonry Bonded Hollow Wall, or Utility Wall, is allowed a higher ratio of unsupported height (or length) to thickness (h/t) than the Cavity Wall in most empirical building codes. This allows the Utility Wall to qualify as a loadbearing wall in a majority of industrial and commercial buildings, warehouses, and public buildings where high walls are required.

The coursing is typically 1/3 bond for 5 courses and a special bonding, using headers, for the 6th course. The headers are started 24” from the left outside corner on each wall.

Laying out the perimeter dimensions in increments of 4” can help reduce the amount of brick cuts the mason may need to make. As a rule of thumb for a four sided building, make each wall an even number of feet plus 4”; i.e., 21’ - 4”. The same criteria is used for the wall lengths between the control joints. The location of doors and windows, measured from the corners, can be in any length of 4” increments.

Closure brick may be needed depending on the wall length. The distance of the brickwork between doors or windows can also be in any 4” increment. If the building has offsets, then the length of each wall meeting at the internal corner should be in increments of even number of feet; i.e., 21’ - 0”. The Utility Wall must be supported by an independent footing with both wythes of the wall bearing upon a common foundation. Normal flashing and weephole guidelines should also be used for this wall system.

Utility Walls require control joints (expansion joints) to allow for the change in wall lengths due to moisture and temperature movements without developing stress cracks. For a four sided building, control joints spacing on a straight wall should not exceed 40’ - 4” and 30’ - 4” maximum around the corners. If there are offsets, then the spacing of the control joints around the internal corner should not exceed 29’ - 8”. These suggested lengths may be reduced by one foot increments. Control joints should not be placed alongside a window or door jamb when a lintel supports the brick over the opening.

Advantages of the Utility Wall

Resistance Against the Elements

The Utility Wall provides extra protection for the inside of the building by having a 4 hour fire rating. A high resistance to moisture penetration is achieved because of the 2 wythes of brick and foam insulation in the cavity. A high resistance to sound penetration occurs due to the high density of brick. The estimated STC, Standard Transmission Class, is between 50 to 55.

Industrial Protection

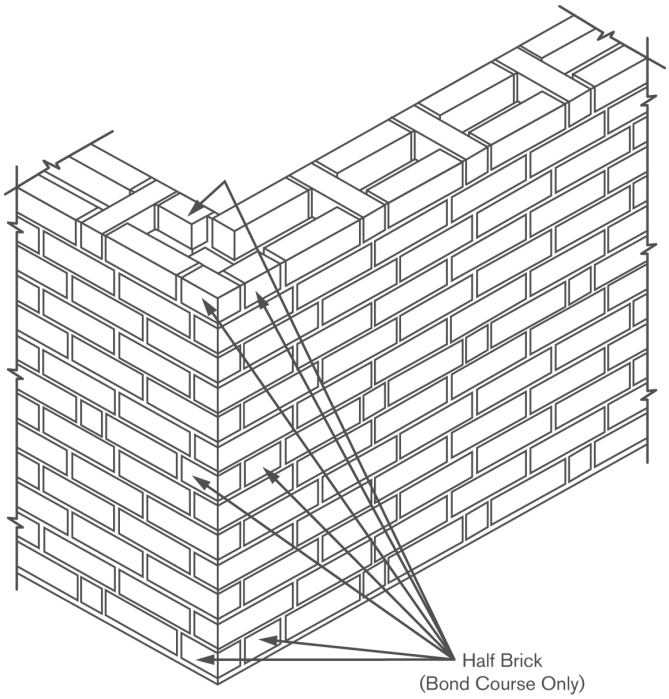
The walls provide a high degree of protection against theft; i.e., 2 wythes of brick versus metal siding. Since the insulation is in the wall, it cannot be damaged. The interior brick wall is more resistant to impact damage from heavy equipment.

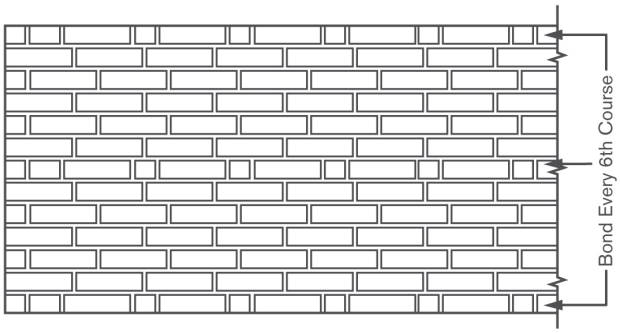
Economy of Maintenance and Energy

The walls are cost effective because they require no maintenance, inside or out. They conserve energy since the walls are well insulated with foam creating an R-19 (U value, uninsulated =.29, U value, insulated = .09). The inner wythe helps conserve energy since it stores heat and cold because the brick is inside of the insulation. It is true however that there is some heat and cold lost through the brick headers.

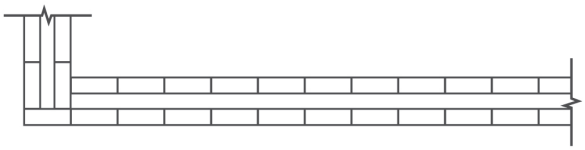
NOTE: Designers are cautioned about using this wall system in the severe northern climates as the bonded headers can cause thermal bridging, resulting in condensation on the inner wythe.

Bond Course





Courses No. 2 & 4



Courses No. 1, 3 & 5

Bond Course
(Every 6th Course)

Loadbearing Construction

The composite wall is capable of carrying roof and floor loads without structural steel. Empirical codes allow the laterally unsupported wall heights to extend 20 ft. without pilasters or 35 ft. with pilasters not spaced further than 20 ft. apart. The reinforcing for the pilasters needs to be determined by an engineer. These heights can be extended by reinforcing the bottom of the wall as shown on the detail “Extended RBM Foundation Wall.”

Ease of Construction

The 4 1/2” cavity space provides sufficient room for insulation, utility lines and reinforcing bars. Channels for vertical seismic reinforcement are made by mortaring headers into the cavity, 8” apart.

The rebar is installed and then grouted. Bond beams are constructed by using 1/4” wire mesh, hardware cloth, across the cavity and then grouting the cavity for 3 courses above the mesh. Rebar and metal inserts for connecting the roof bar joists to the wall can be embedded in the bond beam. Since the walls need control joints shear keys are built to keep the adjoining walls in the same plane.

The shear keys are headers that are mortared into the cavity on one side of the control joint and extended 4” into the cavity of the adjoining wall.

The extended brick has 1/2” concrete expansion board placed on its three sides to develop a tight fit for the brick in the cavity, yet permit the walls to move due to a change in temperature. If an extra heavy steel beam must bear on the wall, headers can be mortared 16” to 24” apart in the wall cavity below the beam. Then the cavity space is grouted solid. This will provide a larger bearing surface. Reinforcing may be necessary depending on the weight from the beam.

Since the Utility Wall is constructed from the outside of the building,laying the inner wythe of brick overhand, the interior steel and plumbing can be simultaneously installed without interference from the masons.

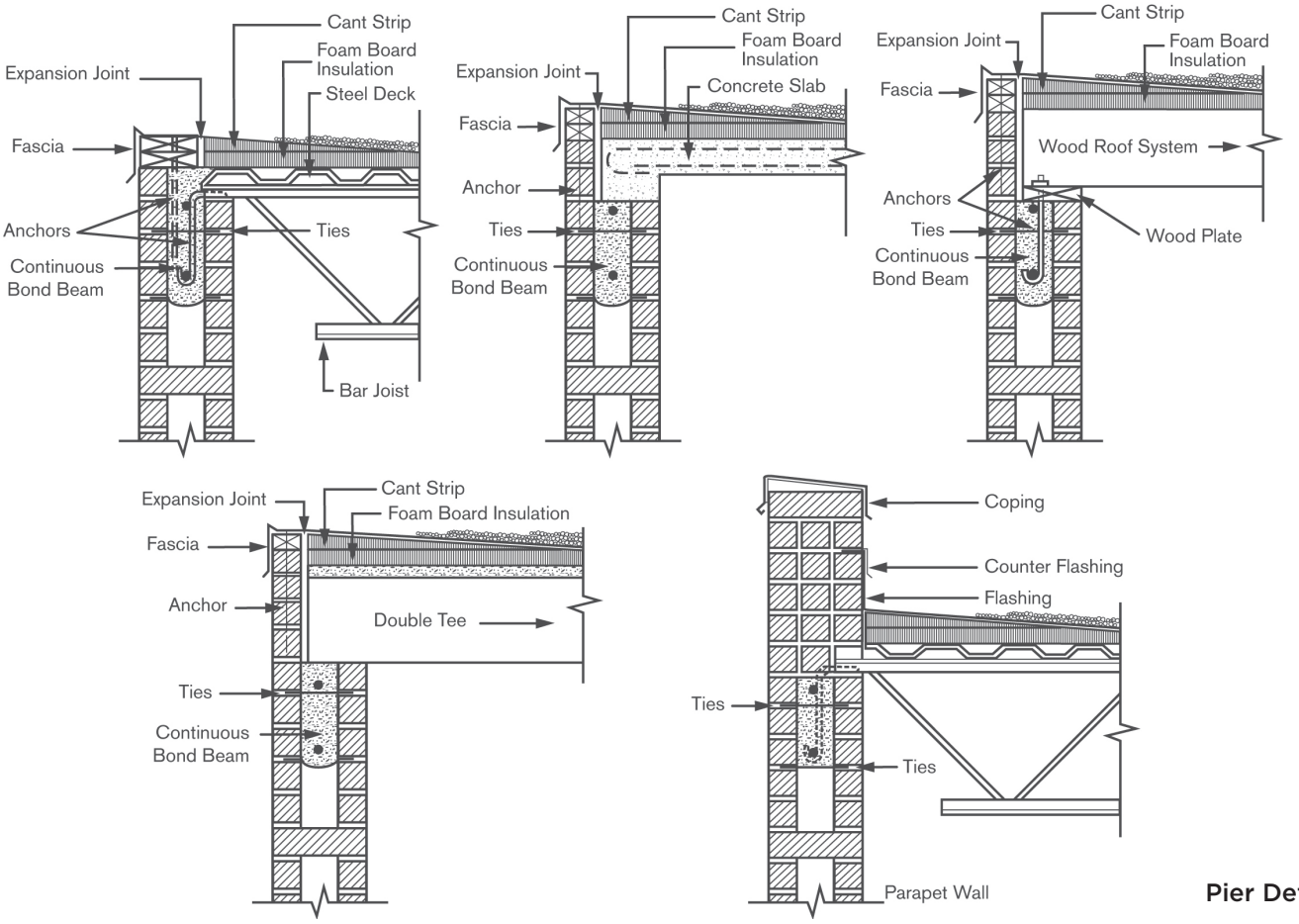
When the walls are complete, the interior steel will have been erected, the roof can then be placed and the building is enclosed except for windows and doors. The walls go up faster than 12” block due to the large but lighter units, making handling for everyone easier. The entire wall is built by one trade with no need for a time delay between subcontractors.

Cost Effectiveness

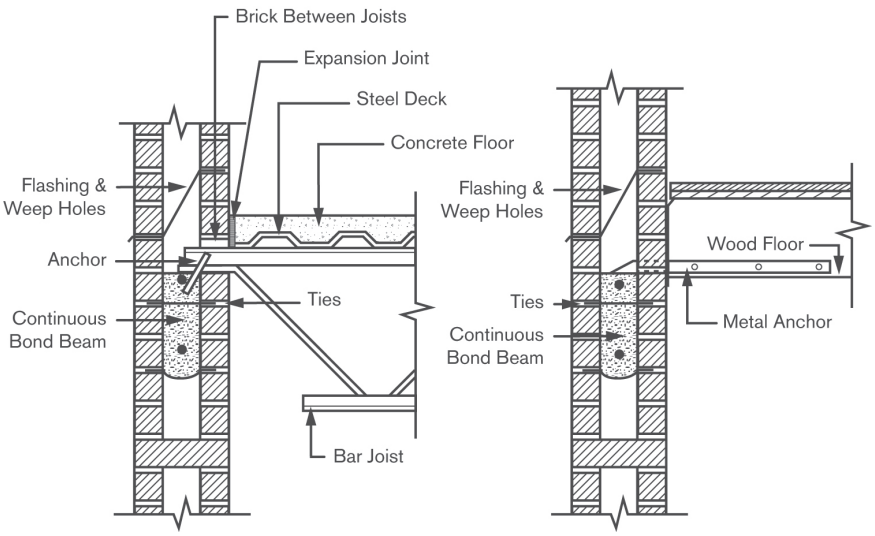
Faster erection means the building is earning money sooner. The interior and exterior walls do not require any maintenance. There is no perimeter structural steel necessary due to the load carrying capacity of the walls. Insurance premiums are lower than metal siding or stucco buildings due to higher fire ratings and greater thief resistance.

The labor and material costs for most other equivalent commercial wall systems are more expensive.

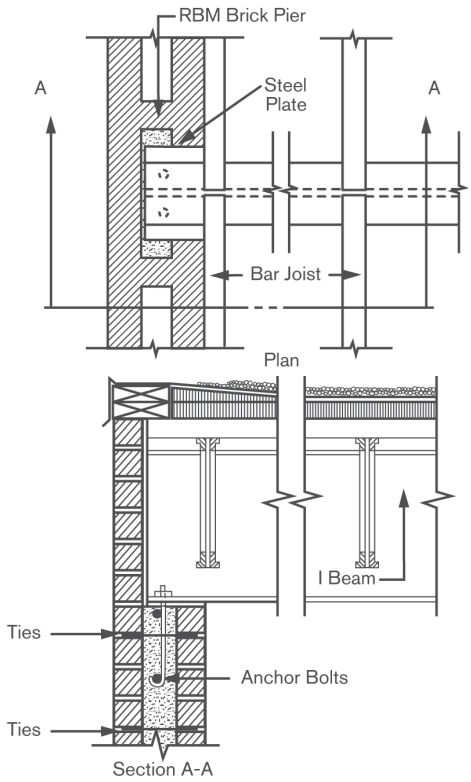
Roof Details



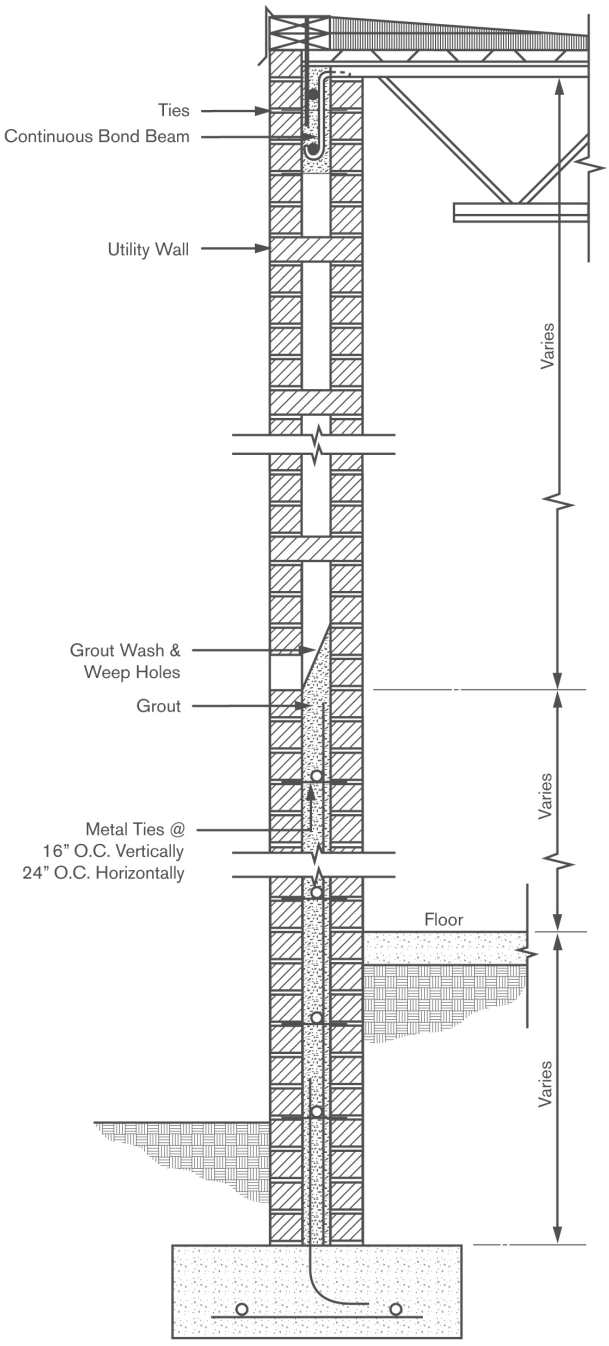
Intermediate Floor Details



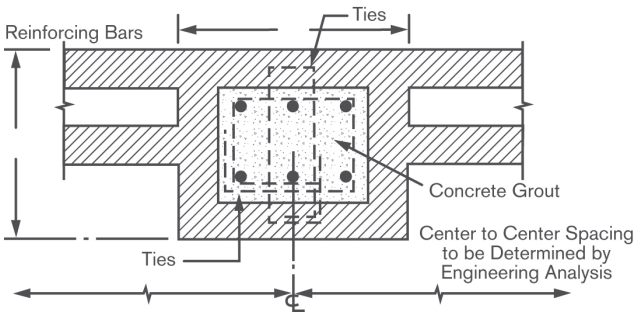
Pier Details



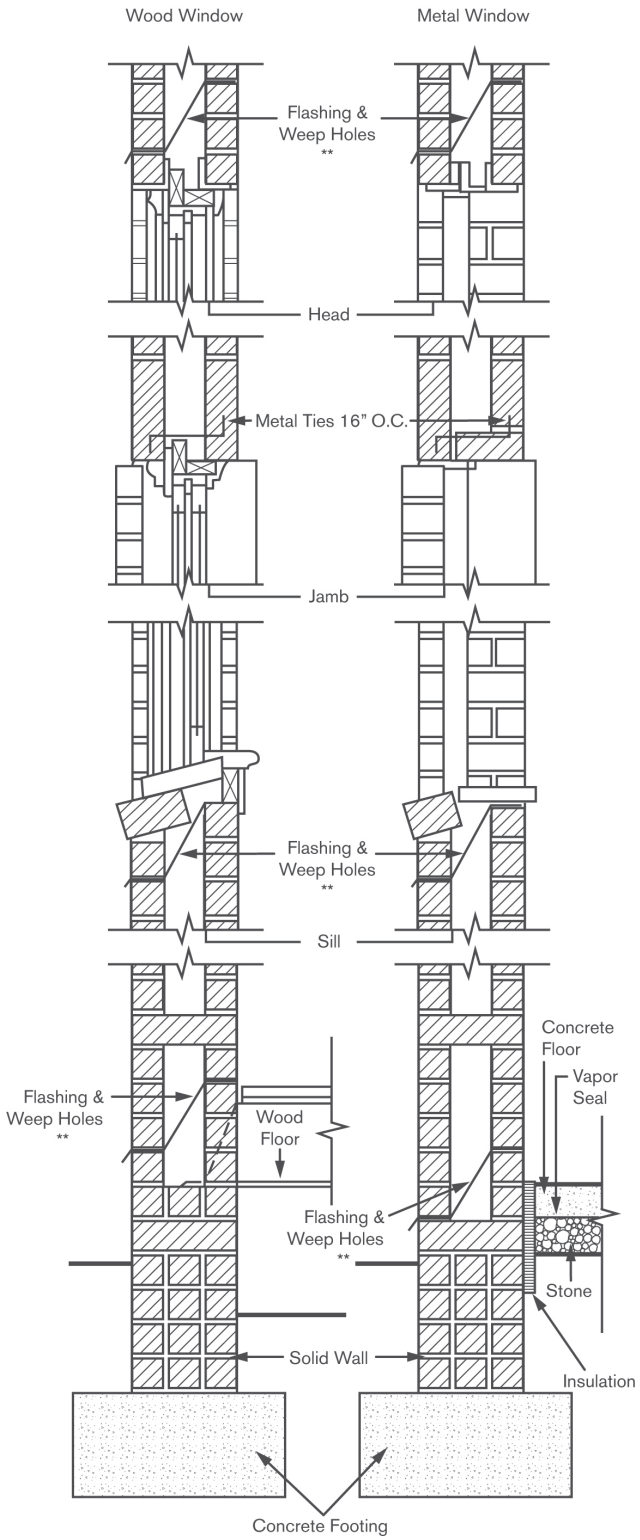
Extended RBM Foundation Wall



RBM Pilaster



Extended RBM Foundation Wall



**where building codes allow, the flashing can be held back 1/2" (12 mm), provided the flashing is placed on a bed of mortar. Mortar is also to be placed on top of the flashing. Refer to paper by Paul Perlman on Alternative Flashing Applications to Metal Drip Edges (in Brick Veneer).