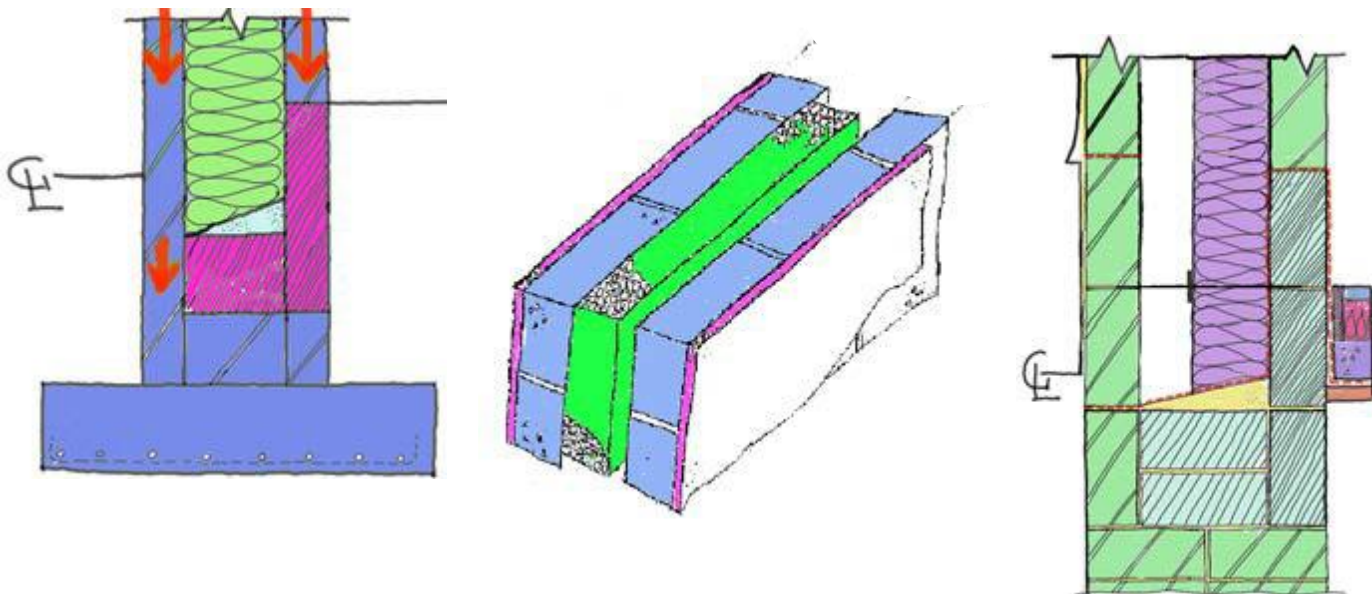


External Walls

Function of the external wall

- Keep the occupants safe, dry and warm – shelter from the elements
- Support the floors/upper floor(s) and roof
 - Anchor roof to walls
- Spread evenly the superimposed loads over the foundations
- Provide robust openings for doors and windows
 - Have sufficient structural integrity to avoid cracks or other failure under load
 - Provide low-maintenance climate-proof exterior surfaces
- Prevent the transfer of heat to the outside or to the inside of the dwelling
 - Insulate evenly against the formation of cold bridges
 - Prevent the formation of condensation and dampness
 - Prevent interstitial dampness
 - Prevent the uncontrolled passage of air through the structure
- Stop the ingress of water
- Prevent access of vermin to the building and the roof space
- Be aesthetically pleasing and be in keeping with the surroundings of the dwelling.



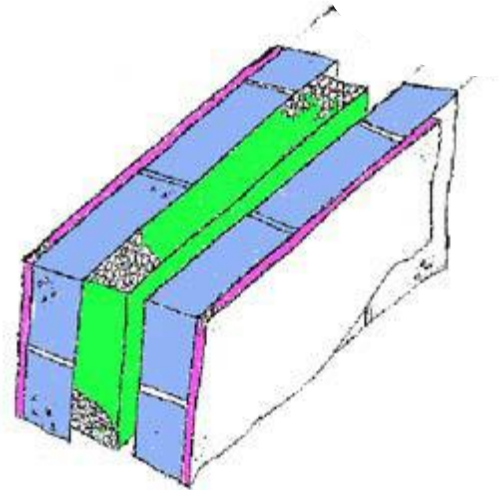
Different types of external walls

- Concrete block with partial-fill insulated cavity
 - Concrete block with full-fill wide insulated cavity
 - Timber frame with insulated inner leaf and weatherproof external cladding
 - Timber frame with concrete block external leaf and insulated inner leaf
 - Light steel frame or combination wood and steel frame with insulated external cladding
 - Solid concrete block with external insulation and weather proof exterior finish
 - Timber frame with external insulation and weather proof external rain screen
 - Solid stone walls with breathable insulation and plaster

Evaluate two different external walls

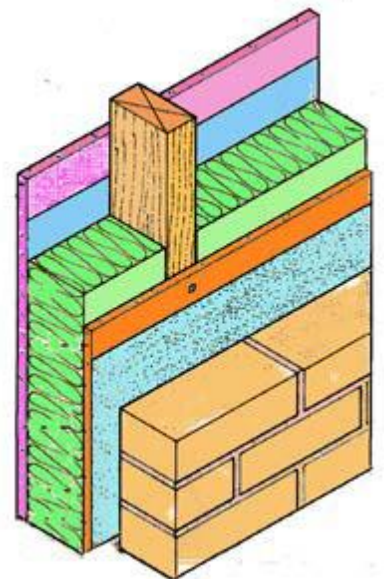
Concrete block with insulated cavity

- Robust inside and outside
- Readily takes a range of economical, easily applied finishes
- Provides a heat sink in the blockwork of the inner leaf
 - Needs relatively more heat to bring the internal temperature up from cold
- The insulating materials are protected from accidental damage
- Materials and skills widely available – traditional skills of blocklaying
- Convenient and robust fixing for cills, windows, door frames and other components.



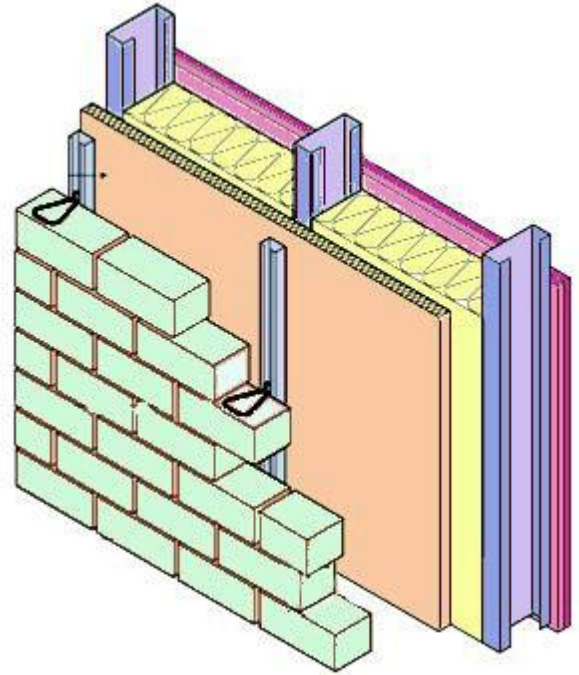
Timber frame with insulation and weather proof external cladding - such as

- Easily accommodates greater thicknesses of insulation
- Uses of sustainably produced materials – low embodied energy
- Wood aids carbon sequestration • reduces use of concrete – less CO₂
- Quicker heating of living spaces - using less energy
- Allows wide choice of rain screens and external finishes
- Cement board can be used as external rain screen
- High air-tightness standard, particularly if sections are manufactured off-site
 - Services more easily accommodated within the service cavity
 - Quick to erect - saving on erection and drying-out time, can be assembled off- site



***Light steel frame or combination wood and steel frame
with external insulated cladding***

- Speedily erected
- High insulation values possible
- More complex detailing required around openings, particularly in the fixing of door and window frames and at cills
- Mounting of fittings, such as light fittings, rainwater goods etc, on external surface more exacting
- Exterior finishes available more limited.



Images are sourced from State Examinations Commission Marking Schemes