AS Unit 1: Our Built Environment

2.1.7: SUPERSTRUCTURES (2 OF 3)

EXTERNAL WALLS AND CLADDING

Cavity wall construction

Typically, an outer skin of facing brickwork, a separating cavity, and an inner skin of insulating concrete blockwork. The cavity prevents water passing through the outer skin from reaching the inner skin, as it runs down the internal surface to weep holes in the mortar joints and then drains to the outside. Cavity trays are required above elements that bridge the cavity, such as lintels or service ducts, to divert any water in the cavity to the outside.

Wall ties, usually stainless steel wire, are built into the bed joints at regular vertical and horizontal centres to tie the two skins together. The ties are shaped to be set into the mortar and include a drip or twist located in the cavity to prevent water transfer.

Cavities provide a space for thermal insulation, which is usually fixed to the external face of the inner skin, with a vapour barrier on the warm side to prevent condensation.

Cavity fill insulation can also be used in existing walls. This requires care to avoid creating any paths for water penetration.

In the UK, most new, external masonry walls have been built as cavity walls since the 1920s.

Brick cladding

Cladding using brick slips, intended to match the appearance of conventional brickwork, but typically only 20 mm thick with 'specials' made for corners etc. to replicate the appearance of full brick walls. Brick slips are fixed using a mortar based adhesive and pointed to match traditional brickwork. They may also be installed as prefabricated, insulated free-standing panels anchored back to the structural frame and provide the advantages of being light, durable, fire resistant and decorative.

Timber cladding

Cladding using softwood boards, usually 12-18 mm thick x 125-225 mm wide, fixed on battens to run horizontally or vertically to suit a design. The boards can be stained or painted and machined to create a range of profiles, including tongue and grooved, square-edged, feather edged (tapered across their width), and shiplap (where the top of each board fits behind the bottom edge of the following board).

Composite cladding

Composite cladding panels, or sandwich panels, consist of an insulated core sandwiched between two metal or plastic facings. They have good thermal insulation properties and are light weight for easy construction. Older panels may present a fire hazard. New projects will use panels with cores of foamed glass, glass fibre, or compressed mineral wool, which are non-combustible.

Metal sheet cladding

Metal profiled sheets, widely used for wall and roof cladding on agricultural, commercial, and industrial buildings. Galvanised steel sheets are available in a range of profiles and coatings for site assembly on steel spacers on internal pre-finished metal liners, with insulation between. Alternatively, flat, aluminium faced, composite cladding panels are used where a different appearance is required. Standing seam systems are another alternative, either as prefabricated-insulated panels or sheets (copper or zinc) that are seamed on site over a boarded deck. The seamed joint detail will allow all other fixings to be concealed and reduces the possibility of any leaks.

Curtain walling

Non-structural cladding systems generally associated with multi-storey buildings, comprising a lightweight aluminium frame with glazed or composite infill panels.

OPENINGS IN EXTERNAL WALLS

Lintels

A structural member used to span an opening in a wall, usually over a window or door. Timber lintels are used to span openings in timber framed structures. Precast concrete lintels are used in blockwork partitions, and have been used in cavity walls, although complications with weatherproofing and detailing have led to the use of steel lintels for most applications.

Made from either stainless or galvanised steel, roll-formed or pressed into the required shape, steel lintels are light and easy to handle and can be shaped, with shelves to support the masonry skins and an upstand in the cavity for strength. They are designed so that the steelwork is not visible above the opening, making finishes easier to apply. Steel can be used to form lintels for arched openings, corner windows, projecting bays etc. and to form openings in the brickwork cladding of a timber frame. Lintels in masonry walls must have adequate laps or end bearings over the supporting walls, normally 150 mm at each end and often include rigid insulation shaped to suit the lintel profile.

Detailing and cavity closers

A cavity tray may need to be fitted above the lintel or a damp proof membrane laid over to direct water to the outside through weep holes. Stop ends at either end of lintels should also be fitted to prevent water flowing off the ends of the lintel back into the cavity.

Insulated pre-formed plastic closers can be used to close cavities at door / window jambs and sills to ensure that there are no thermal bridges in the insulation layers. Mineral fibre cavity closers may be used to provide fire stops where cavity walls pass party walls and floors and to close the cavity at roof level, to prevent any spread of fire into the roof void.