

Construction Technology A



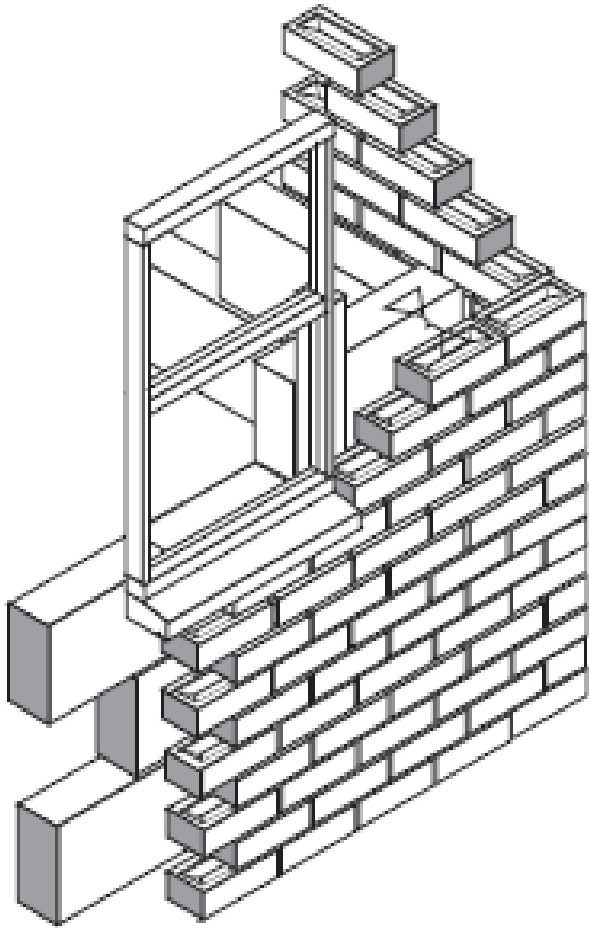
More about walls...



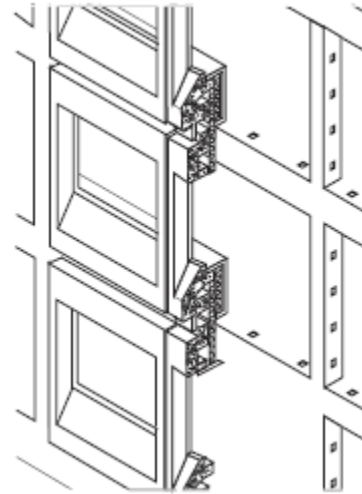
Wall construction
continued...



External walls

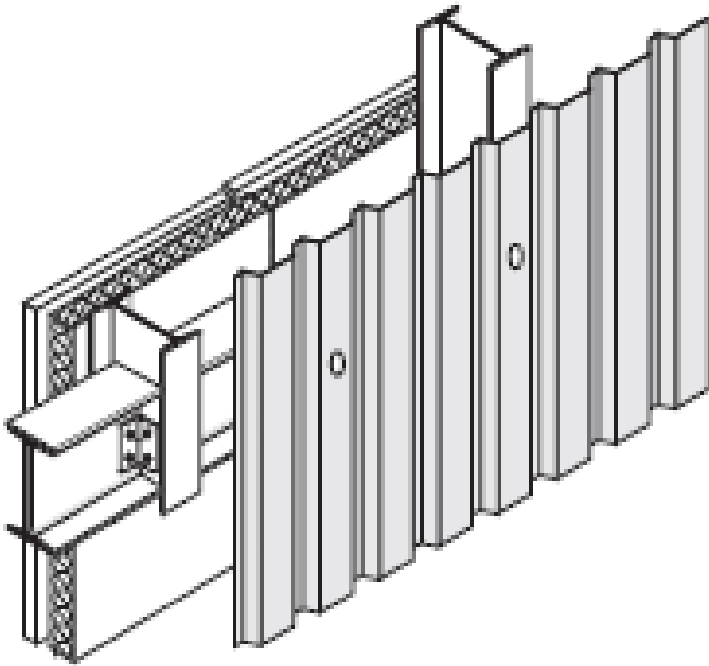


Integral structure



Fitting between structure

External walls

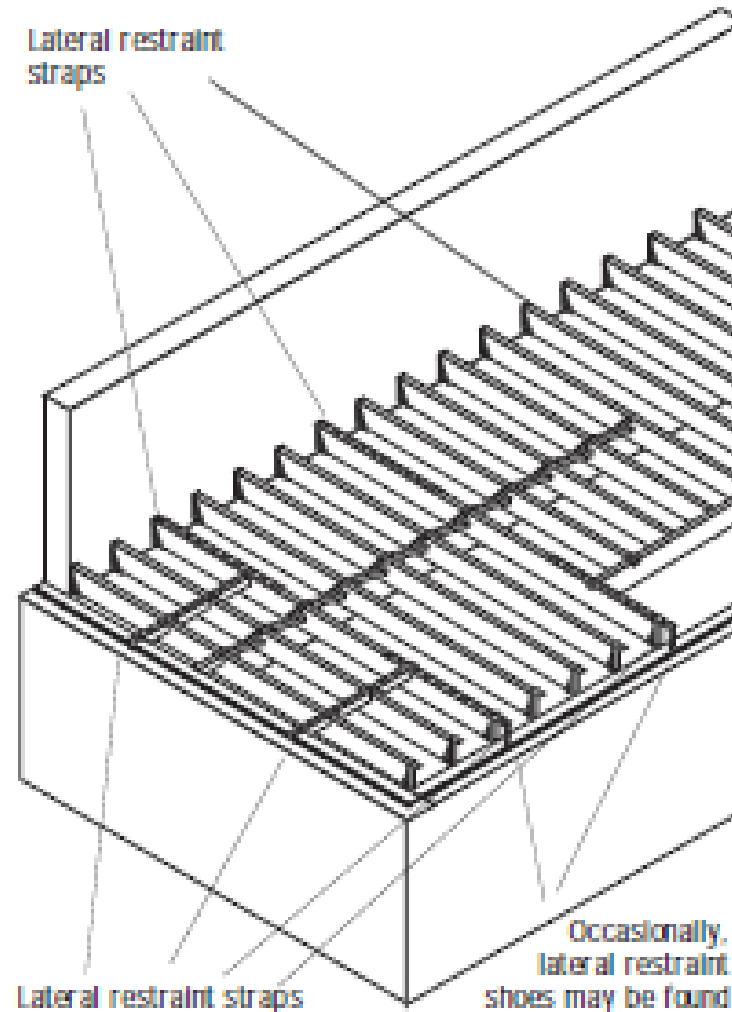


Clear of structure

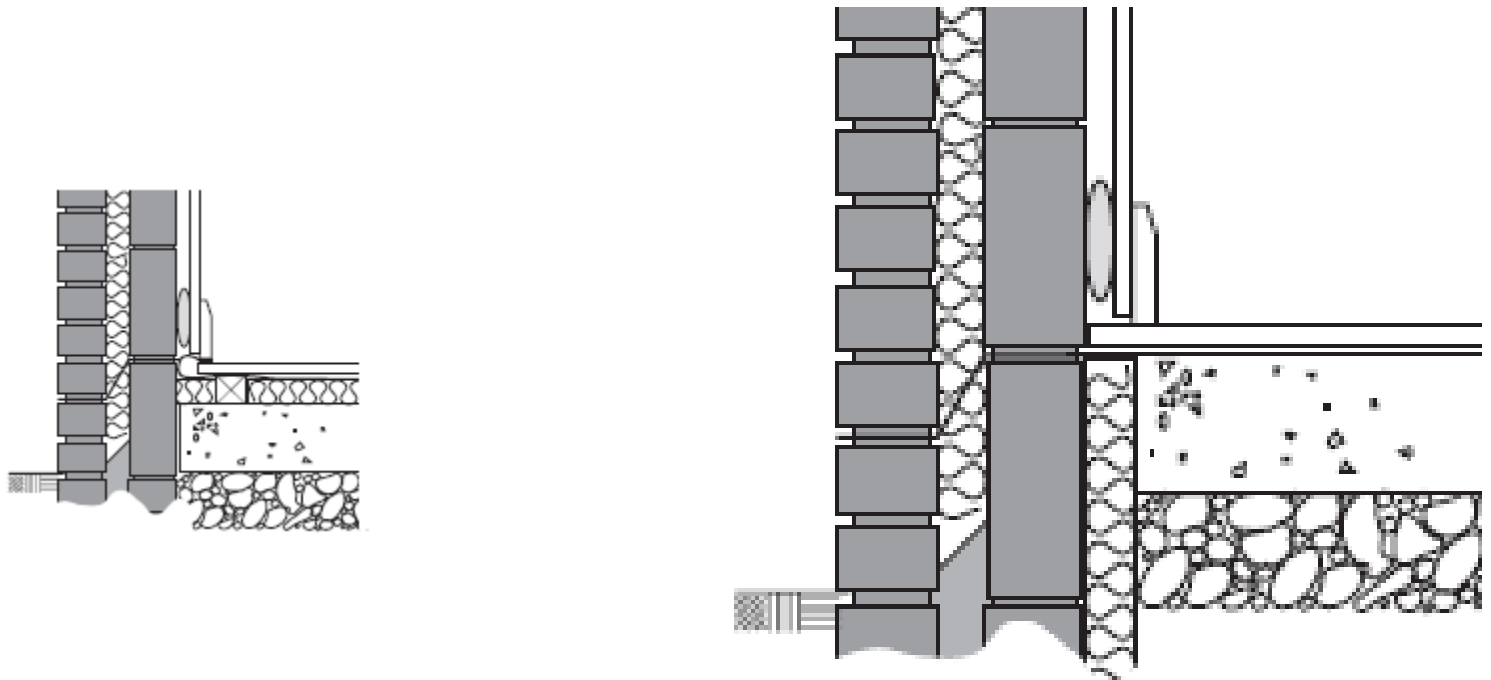


Fixing devices and their structural performance

- Wall ties
- Shear ties
- Slip ties
- Straps
- Joist hangers
- Brackets



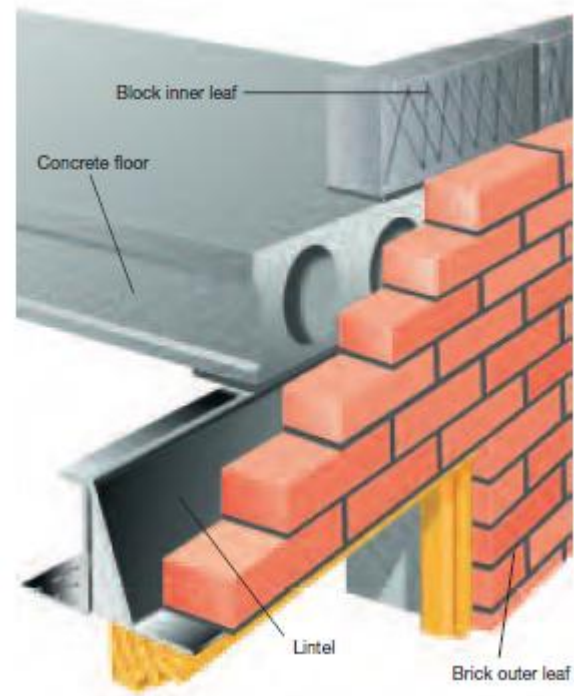
External walls: insulation

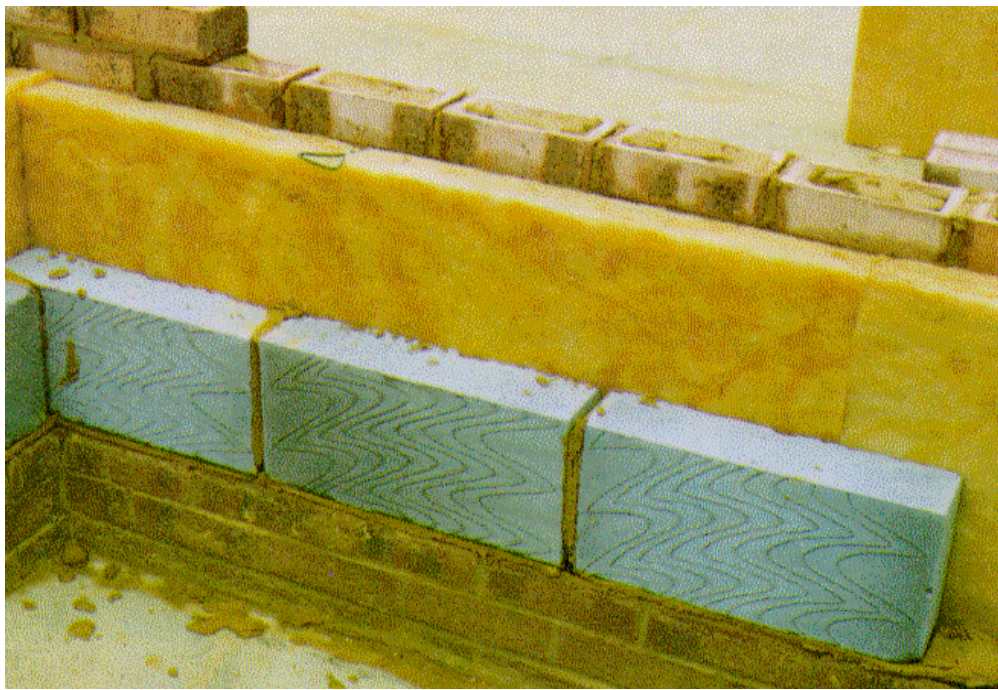


External walls



Lintel Design





Insulating cavity walls

Mineral wool: complete fill

Plastics: partial fill



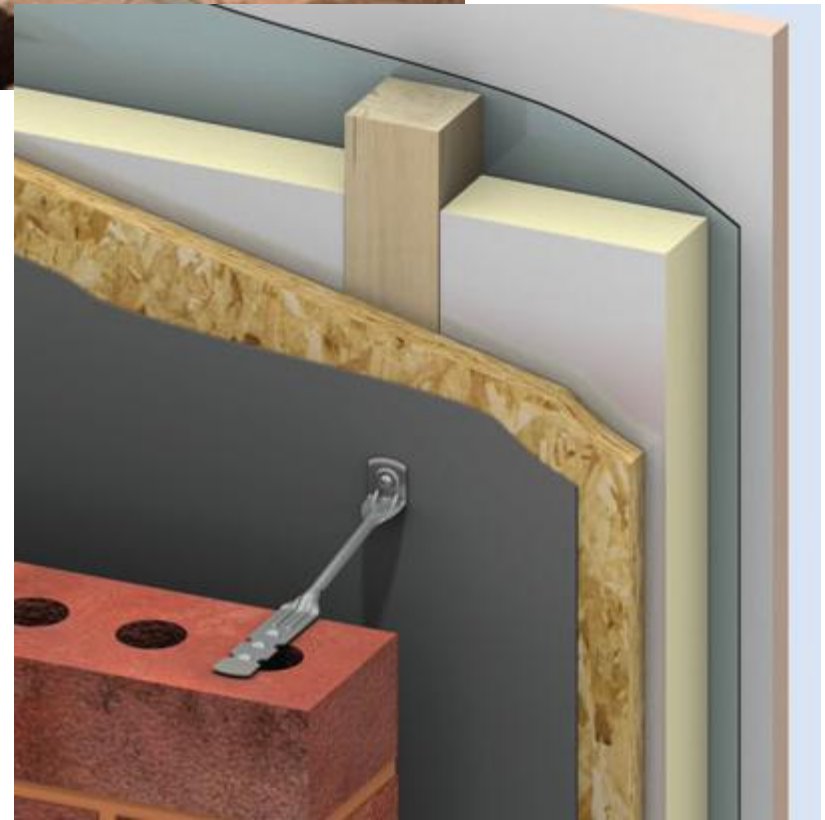
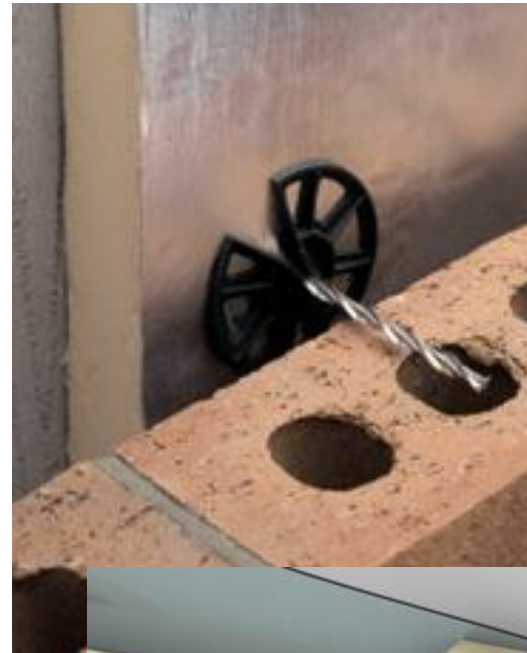
Wall ties and insulation clips

Used to provide stability to leafs of masonry. Wall ties were traditionally manufactured from metal, usually galvanised mild steel.

With concern over durability in exposed locations and in some structural applications stainless steel and plastic ties were introduced.

A risk of thermal bridging can arise where the cavity is partially or fully filled with insulation and is bridged by metal ties.

In new-build applications this bridging can be reduced by specifying plastic (where appropriate) or stainless steel ties or in existing walls by applying external insulation.



In addition to their traditional structural function of providing stability to the leaves of cavity walls, modern wall ties are also required to restrain and fix any insulation fitted within the cavity.

This is achieved by discs, clips or washers which are pressed against the insulation; they are particularly important where an unobstructed cavity of specified width is required to reduce the risk of rain penetration.



Wall ties

It is critical to the performance of the wall that:

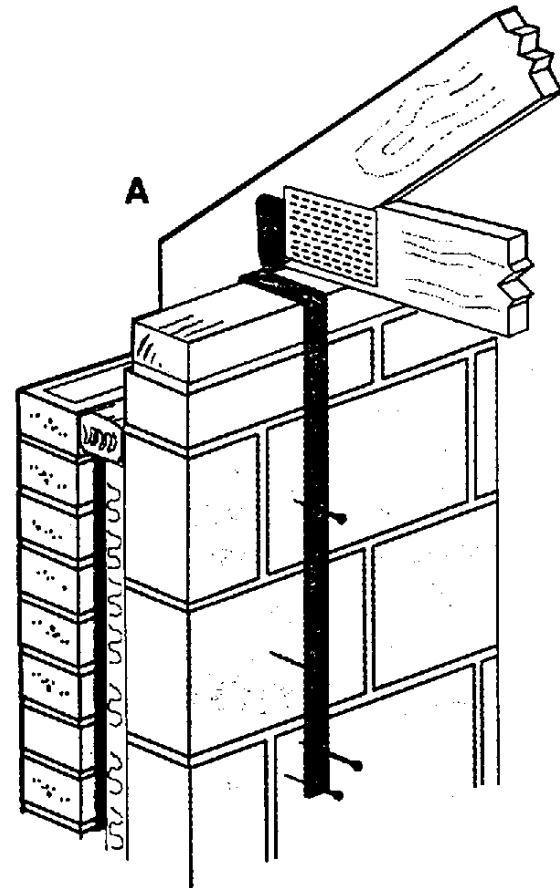
- the wall tie is suitable for the cavity width ensuring that the drip is formed in the centre of any intended clear cavity,
- the wall tie is long enough to ensure at least 50 mm embedment into each masonry leaf,
- stainless steel ties are used in exposure zones.



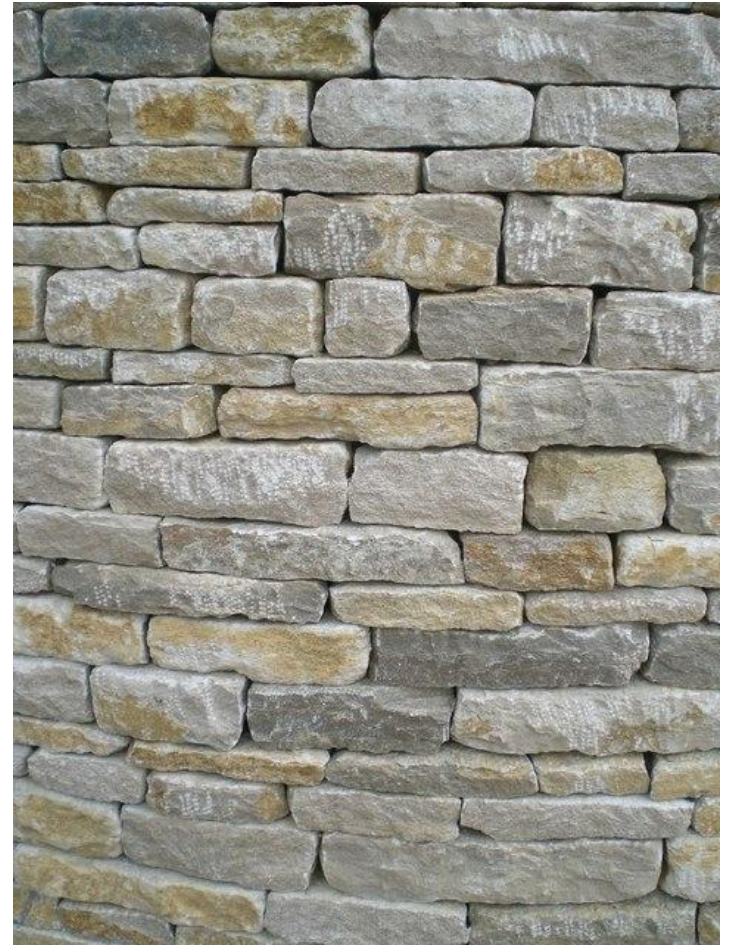
External walls



Closing the cavity at reveals



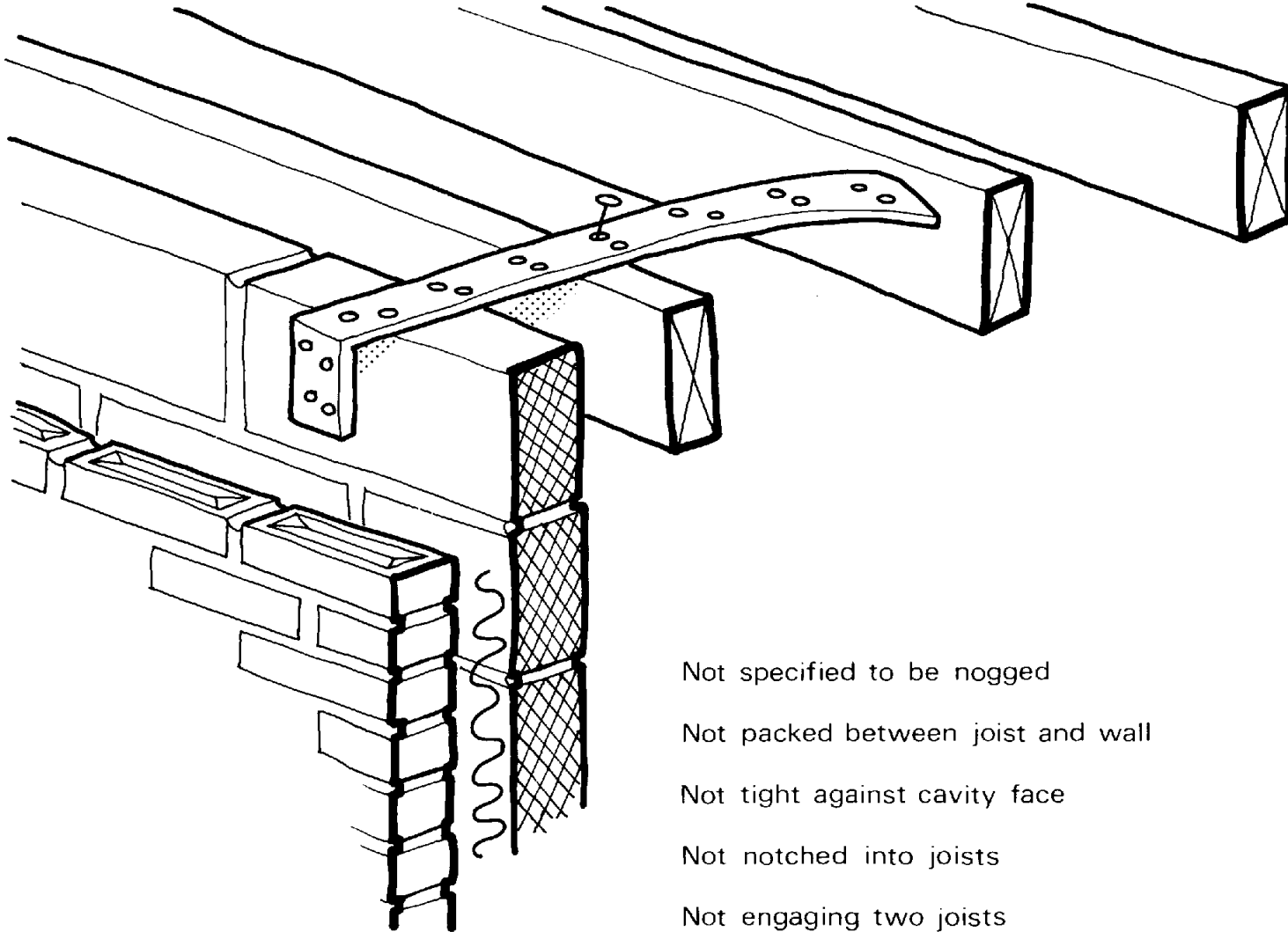
A: typical vertical strapping



Wall appearance



How not to install lateral restraint



30mm x 5mm galvanised
steel strap

If no stairwell : not more
than 2m
If stairwell : decrease spacing
and add one strap

Restraint hangers
at not more than 2m

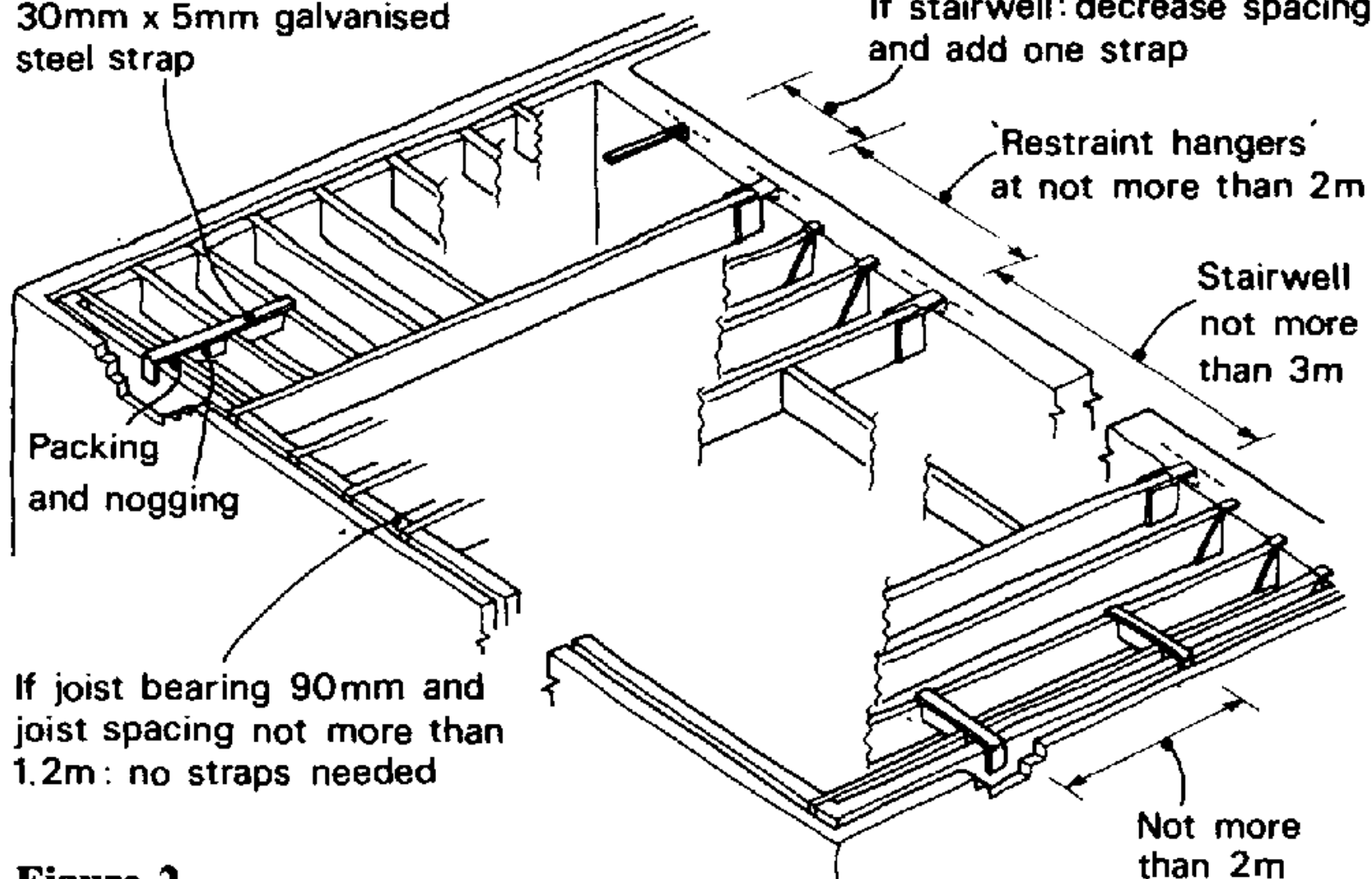
Stairwell
not more
than 3m

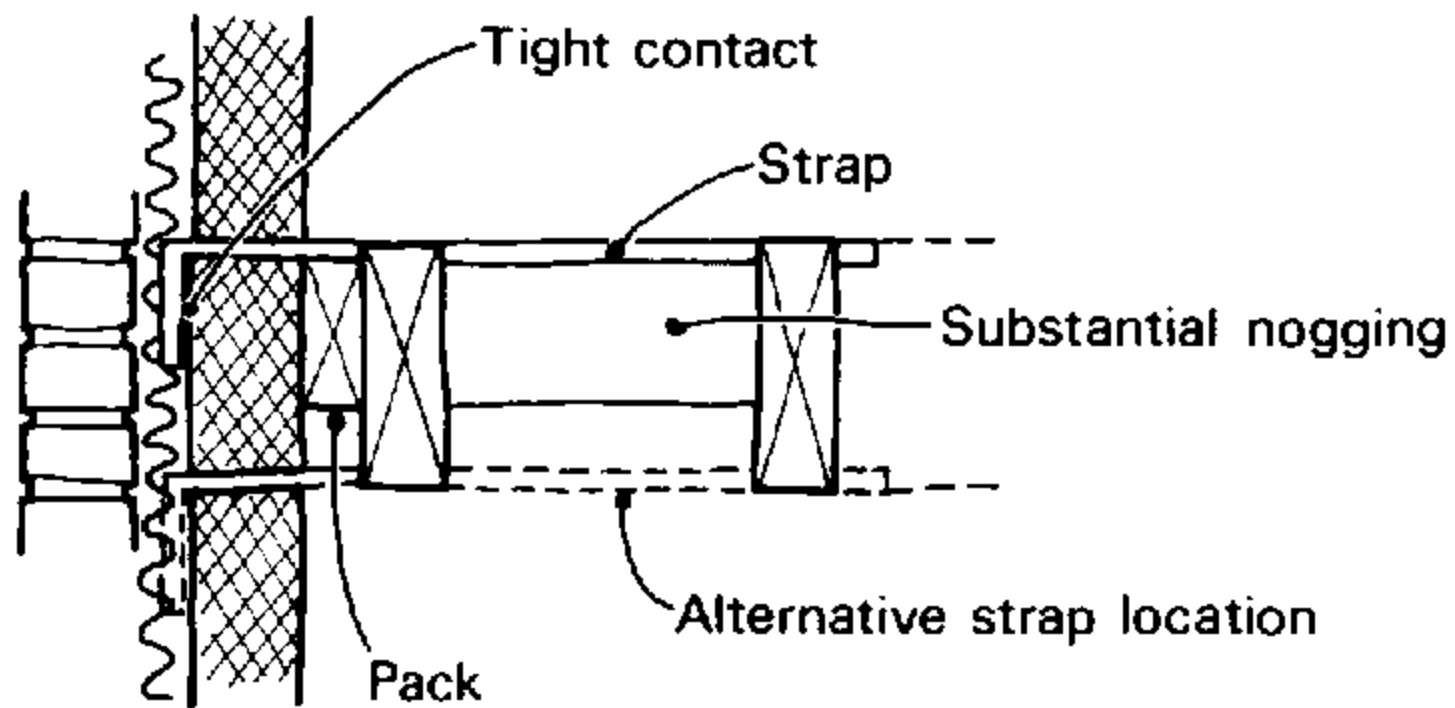
Packing
and nogging

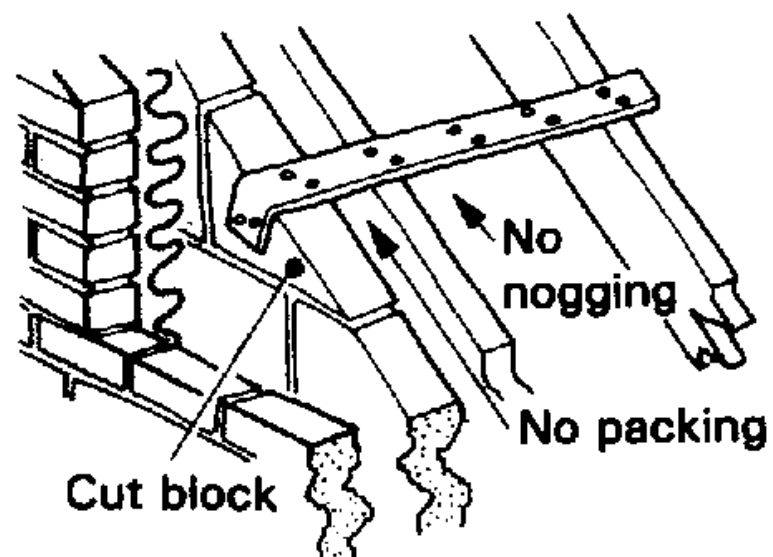
If joist bearing 90mm and
joist spacing not more than
1.2m : no straps needed

Not more
than 2m

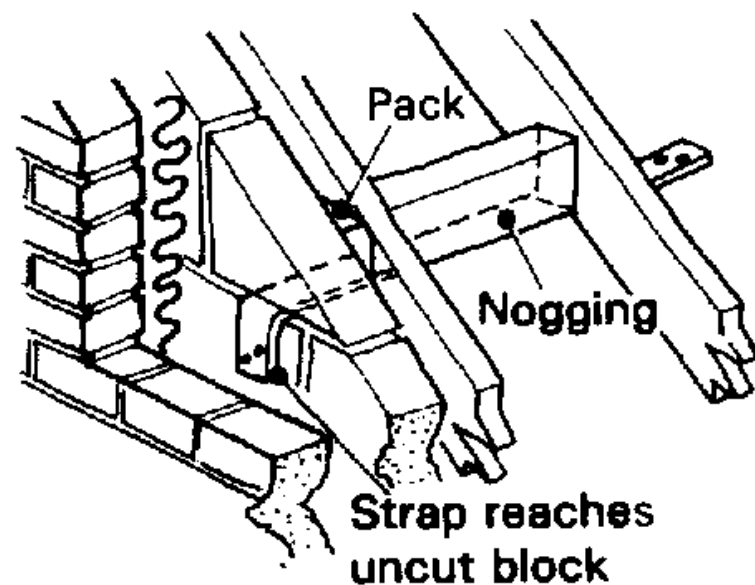
FIGURE 2







(a) Inadequate strapping



(b) Effective strapping

**30 × 5 mm galvanised
mild steel strap**

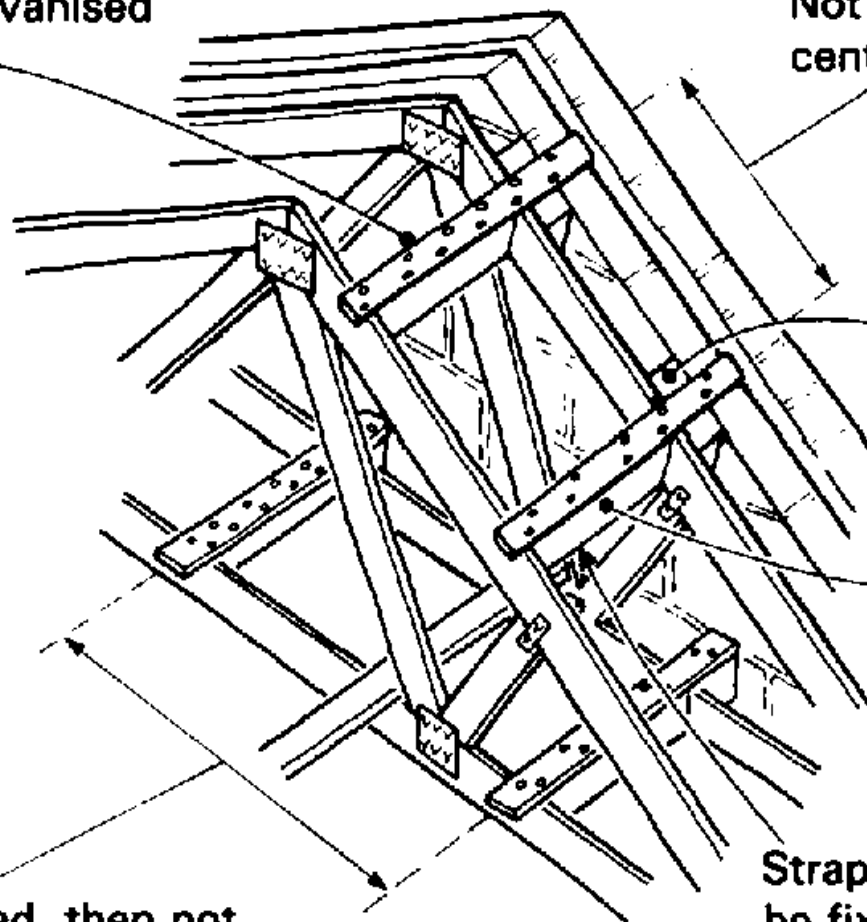
**Not more than 2 metre
centres**

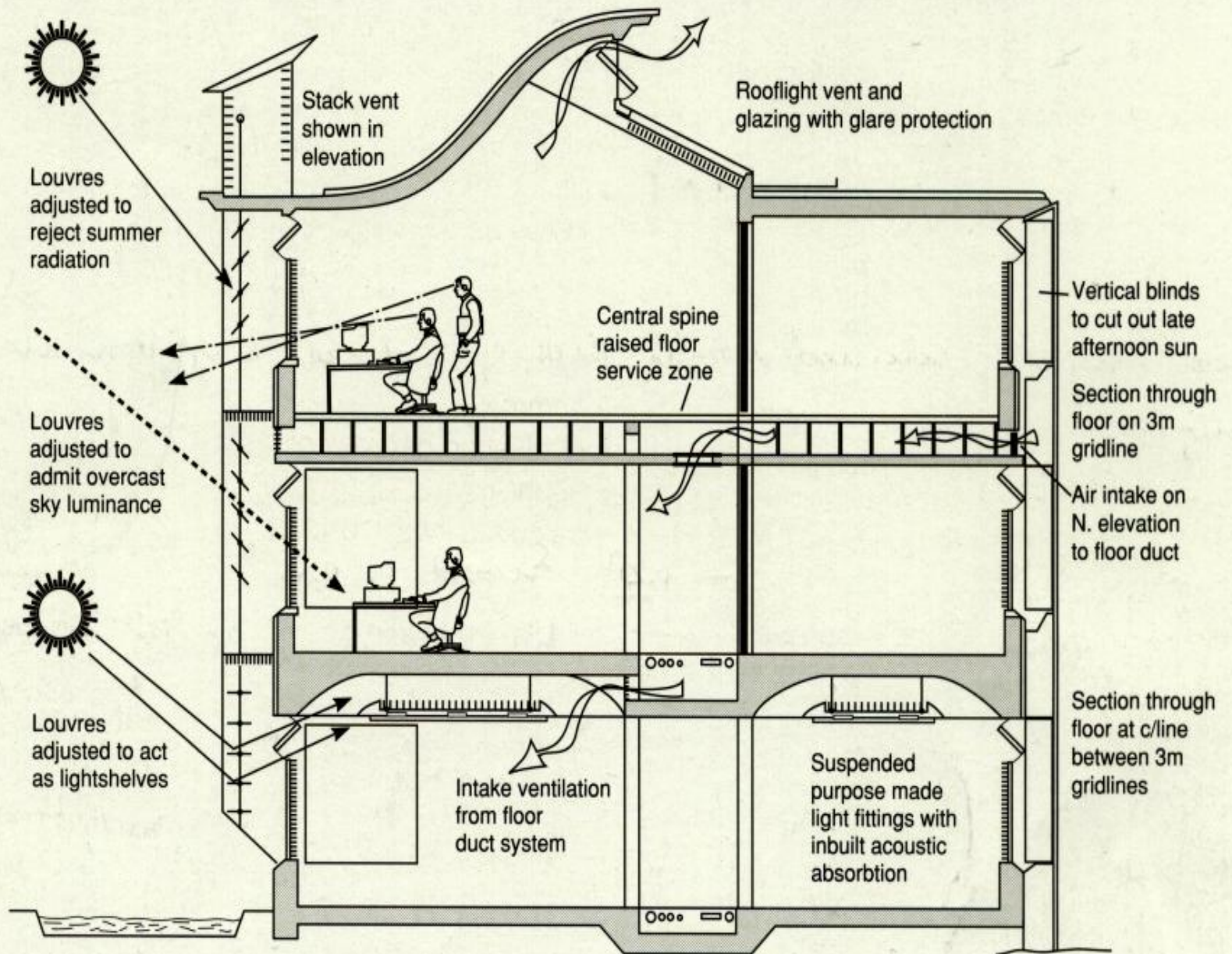
Packing

Nogging

**If straps specified, then not
more than 2 metre centres**

**Straps may alternatively
be fixed to secure
noggings UNDER rafters**







Walls from reused materials
Earthship Brighton





Earthship Brighton



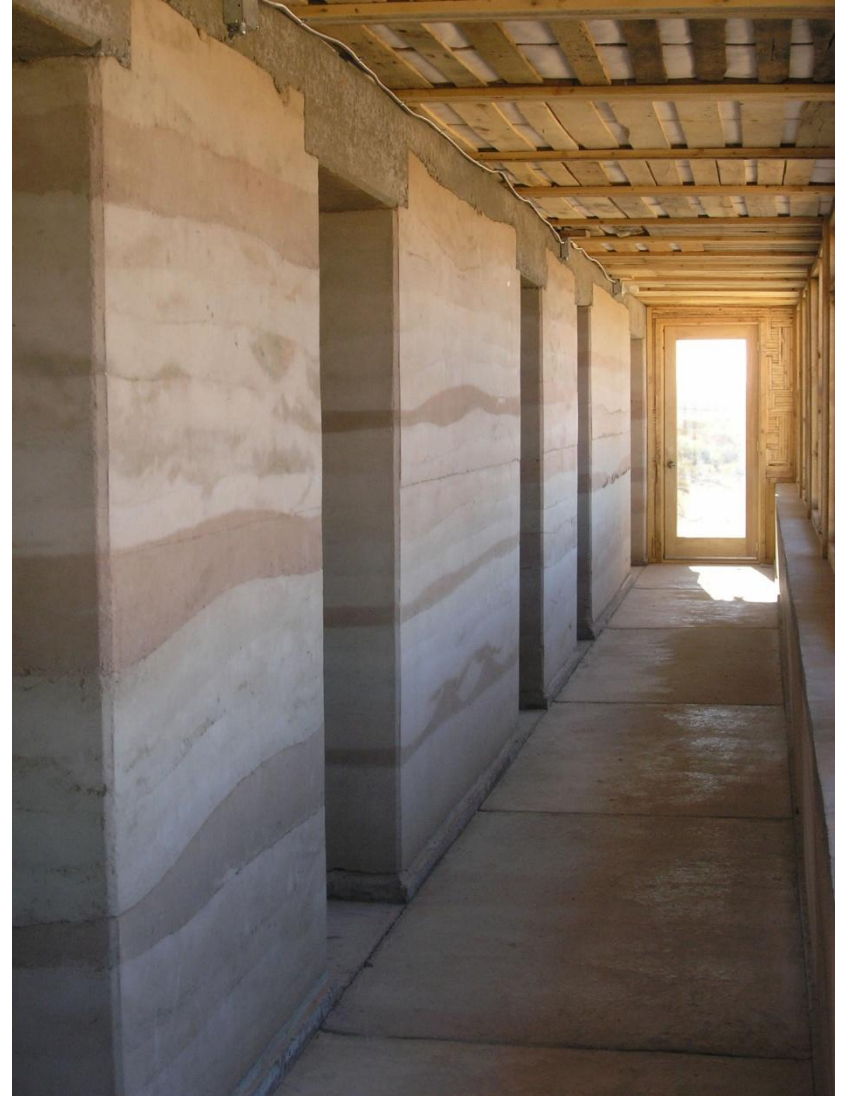
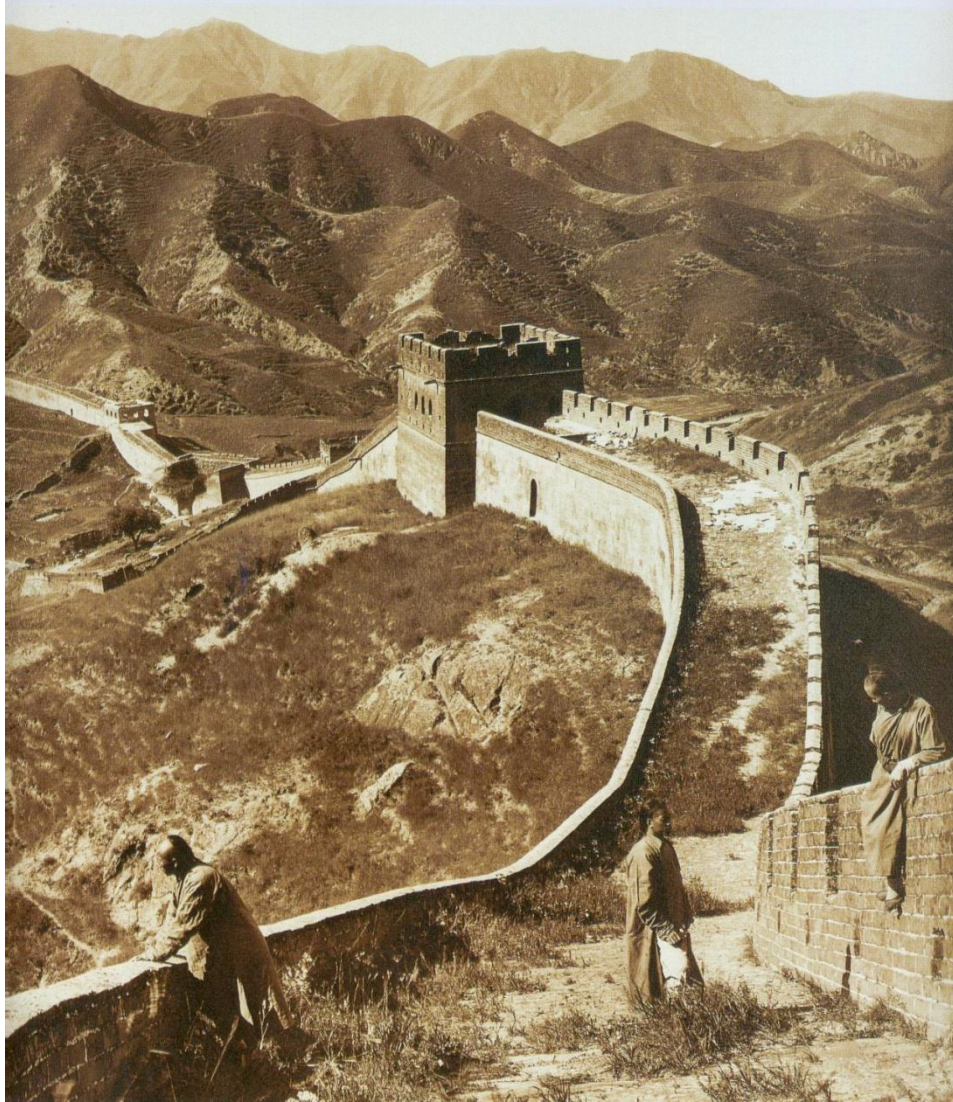
Tyre bale use in embankments

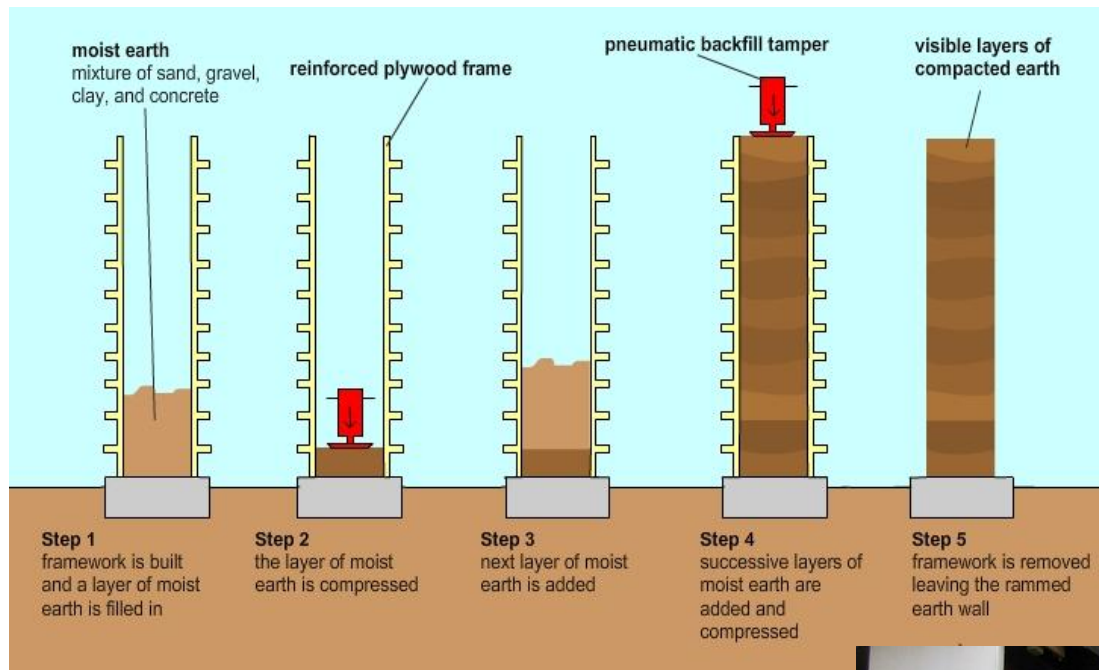


- First UK use
- Alternative to concrete
- Improved drainage and slope stabilisation
- Environmental impact reduced
- Cost and environmental benefits

Earth walls







External walls

Workshop

Consider the performance requirement strength and stability and write notes on the factors that will affect its satisfactory inclusion into building design

