Movement Control - Design Considerations

INTRODUCTION

All buildings upon completion are subject to small dimensional changes, generically referred to as movement. The main movement in concrete masonry is caused by changes in temperature and moisture. As masonry dries to its equilibrium moisture content and the concrete carbonates, slight shrinkage can occur. Conversely bricks respond differently to temperature and moisture and tend to expand.

APPLICATION AND SCOPE

Movement is difficult to predict which means Architects and specifiers have to assume it will happen and design into buildings measures to accommodate it. The most common way to accommodate movement in masonry elevations is to install Movement Joints by separating areas of wall which may move in different ways.

TYPICAL SPACING OF MOVEMENT JOINTS

Unreinforced blockwork external	6 to 9m
Unreinforced blockwork internal	8 to 12m
Reinforced at 675mm vertical centres	12m
Reinforced at 450mm vertical centres	14m
Reinforced at 225mm vertical centres	16m

TABLE 1

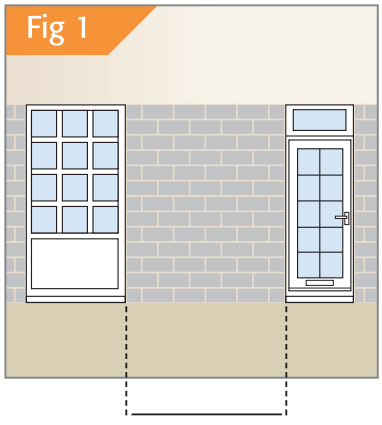
The spacing of joints is influenced by a number of factors

- **mortar type/strength (note: the weaker the mix, the increased ability to accommodate movement).**
- **the effects of end restraint (this will require closer spacing of movement joints).**
- **the panel height/length ratio.**
- **use of bed joint reinforcement.**
- **the moisture content of blocks when laid.**
- **the density of the block type specified - consult our Technical Helplines.**

PANELS AND MOVEMENT JOINT POSITIONING

Wherever possible, masonry elevations should be designed as a series of panels, separated by movement control joints.

Ideally panels should be square and generally, length should not exceed 3 x height of the panel, except where bedjoint reinforcement is introduced. Care therefore has to be taken when introducing wide window openings as the blockwork immediately above and below may exceed the 3:1 length / height ratio. Where possible storey-height openings should be designed, forming the masonry elevation into discrete panels and the movement joint placed at the junctions between the panels and the glazing without interfering with or compromising the overall design aspect (Fig 1).



Not to exceed recommended length/height ratio

NB: It is good practice to increase the number of wall ties on both sides of movement joints.

Consideration for the location of movement joints should be given:

Fig 2/3 At change of wall height and thickness

Fig 4 At changes of loading

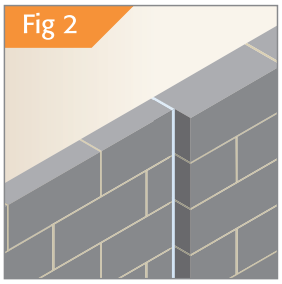
Fig 5 At abutments of walls

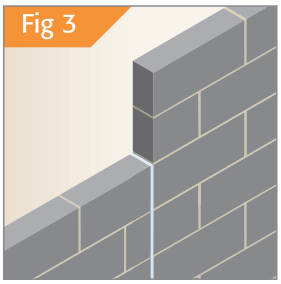
Fig 6 Where dissimilar materials abut, a movement joint/slip plane should be provided. Bed Joint Reinforcement could be appropriate here.

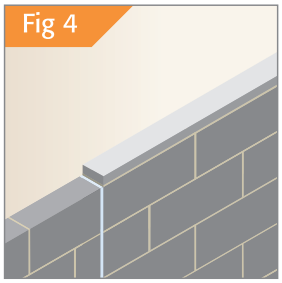
Fig 7 At movement joints in concrete foundations, floors and roofs.

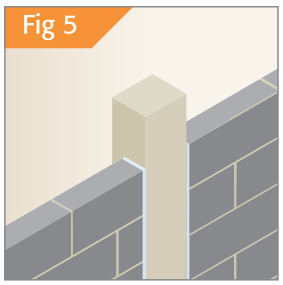
Fig 8 Between 1m and 3m from a corner.

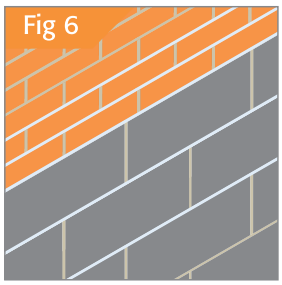
Fig 9 At chases, recesses for pipes and ducts or openings.

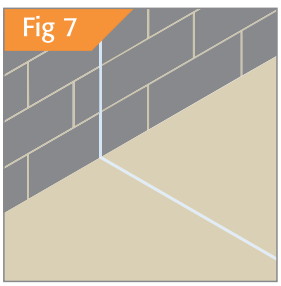


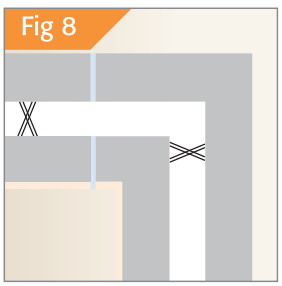


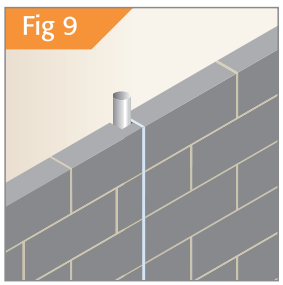












BEDJOINT REINFORCEMENT

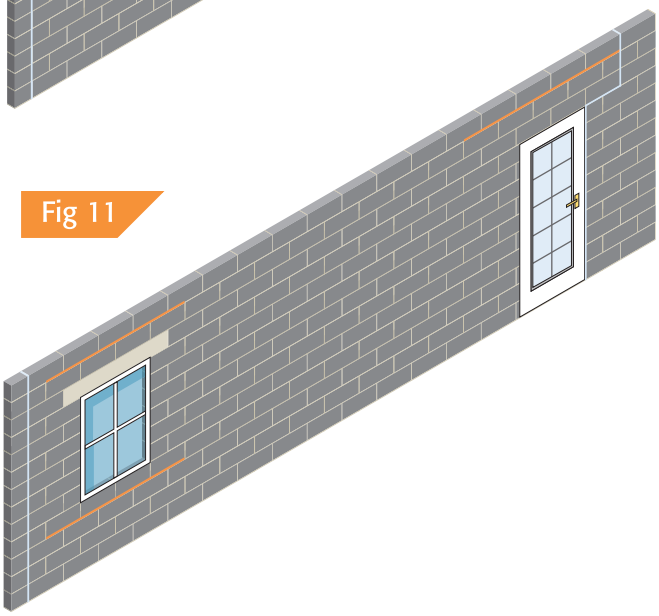
In certain areas of masonry elevations concentrated stresses can occur, which if un-accommodated for, can cause cracking. This is particularly prevalent above and below openings such as windows and doors. To dissipate the extra stresses created around openings the inclusion of ladder type bedjoint reinforcement is recommended in two courses, one above and one below openings (Fig 10 & Fig 11).

Bedjoint reinforcement can also be used to reduce the incidence of movement joints and at the same time improve the lateral stability of masonry walls (table 1).

NOTE: Bedjoint reinforcement should never bridge a movement joint.

Fig 10

Fig 11



JOINTS

Joints should normally be 10mm wide and filled with a compressible filler such as a 13mm polyethylene foam strip, with a bond breaker and finished with a suitable sealant, such as a 2 part polysulphide when used externally (Fig 12). Where masonry has an applied finish such as render/plaster or tiling, the joint should be continuous through the finishes (Fig 13). Where the movement control joint is bridged by flat ties to improve lateral stability, one end of the tie should be debonded by the use of a PVC sleeve. Consideration should be given to the effects of fire, sound and stability when introducing a movement control joint.

Fig 12

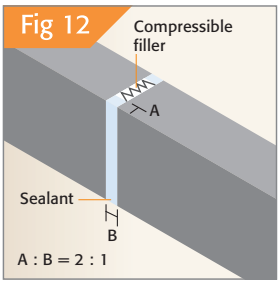
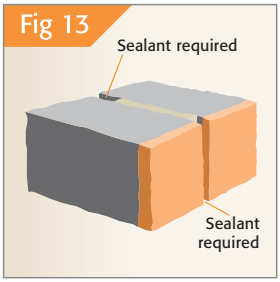


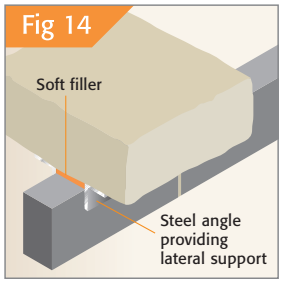
Fig 13



DEFLECTION

It is important that any deflection from a floor or a roof is not transmitted to a non-loadbearing wall. If the anticipated deflection is not excessive, the joint may be packed with a compressible filler, such as mineral wool or a fire resistant foam (Fig 14). This joint can be hidden from view by fixing a coving which should be fixed to the soffit only.

Fig 14



Shrinkage can also occur vertically. In tall panels, which are non-loadbearing, any lateral restraint employed should not prevent the wall from moving vertically.

GENERAL

Shrinkage of blockwork can be minimised by laying dry blocks and by protecting work as it proceeds.