

Lateral Restraint Tie



Introduction

The cause of bowing walls in many old buildings may well be due to the fact that there was no mechanical connection between the floor and ceiling joists and the masonry. The traditional method of connection has been to rely on friction due to gravity. When this frictional resistance is released, due to movement over the years within the timbers or masonry, it can leave a freestanding wall of considerable height that is very susceptible to Bowing. The problem of bowing walls has been addressed in the past by the use of S or X ties bonded right through the building with bars to connect the front and rear walls or the two side walls together. The Bow Flex tie uses the same principles as this proven, but unsightly, method of restraint for bowing walls. The advantage of the Bow Flex is that it can be installed invisibly and externally and uses the existing structural members to provide the necessary Stability. The current method of standard repair is to introduce a galvanised strap tying the floor to the wall. Although the product is very cheap the distribution involved during the installation - removing furniture, Carpets, skirting and floorboards, the chasing out of plaster, The fixing with plugs and screws or nails and the subsequent making good - make this a very expensive in-place option which relies on the holding capacity of one plastic plug and a screw

The System

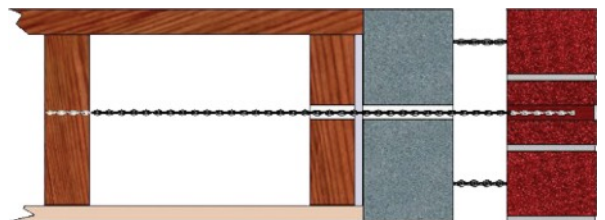
The Bow Flex system of wall restraint is available in 8 mm material. Installation is performed from outside the building through a 12 mm hole in the building fabric. It must be emphasised that a check must be made for any services that may run through the floor/ceiling cavity. It is quite common for wiring to be present and is certainly not unknown to have water pipes for the heating system or even a mains water pipe in this location. It is recommended that checks are made in this area with the use of a boroscope. The connection to the wall is either made into the second floor joist, if they run parallel with the wall, or into the ends of the floor joists if they run into the wall. A proof test of the connection into the timber can be made immediately after installation using a Target Load Test Unit.

Using Structural Elements

By utilising the existing structural elements of the building, the solution is simple, cost-effective, less disruptive and much quicker to install. If the Bow Flex tie is fitted into the side of the second floor joist, the strength and load sharing is achieved via the floor boards on top of the joists crossing from one joist to the next. The old X or S connecting bar is effectively replaced by the floor and ceiling boards already in place.

When the joists run into the wall and sit in pockets within the masonry, the fixing is achieved with a short Bow Flex tie being fixed into the end grain of each joist. If the joist is continuous through the property, a fixing at each end should produce the required effect.

Care must be taken to ensure that any unconnected overlaps, perhaps on a central load bearing wall, are structurally jointed to allow continuity through the full joists. A series of standard details are available. The full installation process is described overleaf.



Special Features

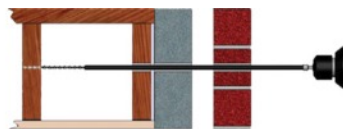
- One piece design - no moving parts to lose
- Easily tested after installation
- Quick and easy installation
- Minimal disruption to building occupants
- Fixes into end grain and side grain
- Virtually invisible and unobtrusive

Installation

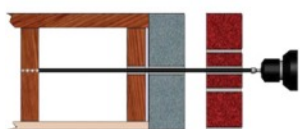
Before carrying out any works, check in floor and wall cavities 1 for any services.



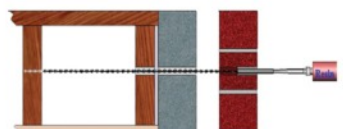
Drill a 12 mm hole through the wall and through the first floor joist



Remove the Bow Flex Power Support tool from the hole.
Note: At this stage a tensile Test may be performed to proof test the fixing of the tie



Insert the Bow Flex tie into the Power Support tool, push the tool and tie into the drilled hole and, using the SDS-plus hammer drill set on hammer, drive the Bow Flex tie into the second floor joist.



Target polyester resin is used To bond the Bow Flex tie to the wall to complete The installation.

Materials

Bow flex ties are manufactured from Grade 304 austenitic stainless steel. The 8 mm diameter Bow Flex has a tensile strength in excess of 11 kN. The manufacturing process produces very hard fins that are able to cut a thread into the timber and a soft and flexible core. The near leaf fixing is achieved by the use of Target polyester resin.

Testing

It is recommended that each Bow Flex tie is proof tested using a Target Load Test Unit. The actual tensile loading required for stabilising a bowed wall is surprisingly low. For example, considering a wall of 5 m of height and bowing outwards at it's mid point by 50 mm, it is straight forward to calculate, by using a triangle of forces, that a horizontal load of 1 kN is sufficient to withstand a vertical load of 50 kN or 5 tonnes! With Bow Flex ties fixed at 600 mm centres, a load resistance in excess of 80 kN per metre run is easily achieved.

Uses

The ability to test after installation makes this a versatile and effective repair method for stabilising bowed walls. It must be borne in mind that Bow Flex will NOT pull a bowed wall back to it's original position; it is designed to stabilise walls in their current positions. Bow Flex is recommended for use in bowed walls of two storey properties that have moved no more than 50 mm from the perpendicular. More severe conditions can be accommodated for but the opinion of the manufacturer or a suitably qualified engineer should be sought. Proof testing requirements have been discussed more fully under the "Testing" heading, but a loading of around 1 kN should be sufficient for most situations. It must be understood that this is a PROOF load and not a test to failure. If higher loading are required this can be achieved by introducing more Bow Flex ties.

