

Engineering Data

1. Testing

Helifix remedial ties have been independently and rigorously tested in most types of common wall materials, using low strength samples. The test programme followed the recommendations contained in B.S. DD140 for ties in new construction, which cannot, in practice, be site tested. The tests were carried out by the Civil Engineering Department of Oxford Polytechnic and the results are contained in Reports 177 and 185.

2. Lateral Deflection

The effects of repeated lateral deflections which result from the relative movement between the leaves of a cavity wall due to thermal and moisture content changes have been tested. Two series of tests were carried out using HRT60 ties driven 70mm into 4.5mm pilot holes in LBC Common bricks.

TABLE 4 – TEST RESULTS

Test	Max. Defl'n mm	Cycles	Cavity mm	Max. Load kN
A	2.3	390	50	3.16
B	1.8	5089	50	3.75

Helifix ties can also accommodate far greater occasional or non-reversible movements up to 25mm. This feature may be important if the ends of old ties are left in the inner leaf. These may corrode and expand over a long period of time causing "lift".

TABLE 5 – SUMMARY OF PERFORMANCE TESTS

Fixing Data			Material		Performance		
Tie Dia mm	Pilot Hole Dia mm	Insertion Depth mm	Type	Strength N/mm ²	Mean Pull-Out N	Std Dev'n N	Char. N
6	4.5	70	Soft Brick	13.4	1512	140	1389
			Mortar (IV) Light Agg. Concrete	2.6	1489	309	1297
6	4.3	45	Timber (SC3)	5.5	1524	370	1199
8	n/a	95	Aircrete	3.3	1140	60	1087
			Hollow block (35mm wall)	4.0	1570	190	1355
8	4.5	70		4.9	798	127	689

3. DoE/BRE

The Building Research Advisory Service has examined the test results and their Report BRE 9A/22/1, June 1988, contains the following comment:

Application The ties offer a versatile and adaptable solution to many of the requirements for replacement tying applications of the type covered in BRE Digest 329. By screwing the tie into wood, and the softer bricks and blocks using a pilot hole, screwing directly into MC and bedding in cement mortar or grouting with polymer mortars in other situations the product can cover most of the common walling situations. The tension pull out load can be varied by varying the embedment depth (allowing for any voids in perforated materials) and the product can cater for varying dimensions of cavity/wall by just selecting the appropriate length in modules of 25mm. In compression the performance is likely to be similar to the same product bedded into mortar, but when used in the other materials, with cavities up to 125mm wide, the data is insufficient to confirm this directly.

Data for ties tested in shear indicates that they are sufficiently flexible to accommodate the normal range of building movements to be expected over the life of the structure without generating any local overstressing.

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