

Load Testing of Fixings

Fixing manufacturers often publish values for working pullout loads for their ranges of fixings in product data sheets. These figures, however, are generally based upon a number of assumptions, such as concrete strength and edge distance. In many instances, pullout values are not provided by manufacturers.

The *actual* in situ performance of fixings will depend on a number of factors, including the type and properties of the material into which they are fixed and the quality of workmanship employed in their installation. Poor pullout performance is particularly common in resin based fixing and anchor installations where strict adherence to manufacturers' installation procedures is not always followed. Important considerations include: -

- Correct hole diameter
- Correct hole depth
- Adequate cleaning out of hole
- Attempting to Install in carried out in damp or wet conditions
- Adequate mixing of the resin components
- Curing period allowed prior to disturbance or loading

STATS has extensive experience in carrying out independent in situ load testing of all types of fixings. Typically, this involves applying a proof tensile load to a representative number of fixings. The magnitude of the proof load applied is usually the manufacturers quoted value, plus an additional agreed factor of safety. In the absence of published values, the project design figure, plus a factor of safety is adopted.

Testing of masonry fixings is carried out in general accordance with BS 5080:Part 1:1993, 'Structural fixings in concrete and masonry – Part 1. Method of test for tensile loading'.

The applied load in STATS equipment is measured using electronic load cells and digital load indicators. These are considered more accurate than pressure gauge based load measuring devices. Prior to each use, a calibration check is carried out on the equipment at our comprehensive UKAS Accredited materials laboratory facility based in St Albans.

In our experience, fixing applications and configurations vary widely. We are often, therefore, required to design purpose-made testing rigs to deal with any given situation. This may include the application of non-axial force or testing in shear.

Additionally, we undertake laboratory based load testing of fixings proposed for use in projects, using mock-ups to simulate site conditions. We also carry out testing for manufacturers during product development of new fixing systems.



Pullout tests on M48 railway gantry anchor studs, including movement measurement. A proof load of 103kN was applied.



In situ pullout test on M12 self-tapping screw fixed into concrete column.



Laboratory tests on stone dowel fixings

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