

TECHNICAL GUIDE

Underpinning Existing Foundations

In each edition of our newsletter, we'll provide you with some words of wisdom from our technical services team. In this edition, John Gilbert outlines some issues to consider when underpinning existing foundations.

Underpinning of foundations involves increasing the depth of the existing foundations in order to transfer the building loads to a new deeper formation level, usually containing more competent soils.

Our involvement with the conversion or refurbishment of existing buildings will occasionally bring us into contact with underpinning schemes. When assessing such schemes, it is important to first establish the reasons for undertaking such action. Where previous foundation movement has resulted in damage to the building, we must be confident that the correct cause of the movement has been identified and that it will be adequately stabilised by the underpinning.

The most common method of underpinning foundations is traditional mass concrete underpinning. This is a simple technique that involves excavating a segment of ground below the existing building foundation in controlled stages, to a depth where suitable bearing strata exists. The excavation is then filled with concrete and allowed to cure before the next 'pin' is excavated. To transfer the building load safely to the new pin, a dry sand/cement packing mortar is rammed in between the new and old foundation. This underpinning method has a number of advantages. It is low cost and suitable for shallow depth underpinning. Work can be carried out from one side of the wall and in areas of difficult and restricted access. It is suitable for heavy foundation loads and massive structures, and for the formation of new cellars and basements beneath existing buildings.

However, the mass concrete technique cannot be adopted as a solution for all foundation failures. For instance, other techniques are required to overcome difficulties with groundwater, loose ground or fill. It is therefore important to ensure that the decision to use traditional mass concrete underpinning has been made by a competent person, such as an experienced Structural Engineer.

Where foundation movement has been caused by ground heave, (such as moisture recovery of clay soils following removal or decay of a tree) the underpinning scheme should incorporate appropriate anti-heave protection. If piles are used special design consideration must be made and should incorporate reinforcement over their entire length.

Other common underpinning techniques you might consider include base and beam, piled raft and cantilevered beams and piles.

There are several methods available for installing piles on underpinning schemes. The choice of piling system may be dependent on several factors including the type of ground conditions, presence of groundwater, access and headroom restrictions, amount of vibration, the proximity of adjoining buildings, and cost of mobilisation.

Whatever method you use, underpinning works are required to comply with the Construction, Design & Management Regulations (CDM). The developer and appointed contractor are therefore required to enforce a suitable Health and Safety policy for the underpinning operations. The measures required to comply with the CDM Regulations may determine the nature of the proposed underpinning works.

For further information on our technical advice and standards, contact our Technical Services Team on 08444 120 888 or email technicalservices@premierguarantee.co.uk.



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