

Dry Pack – To ram forcibly a slightly moist Portland cement-aggregate mixture into a confined area, as into the space between the top of concrete pier underpinning and the bottom of the building being underpinned. Here the dry-pack serves as a low-shrinkage filler material that transmits the load of the building to the underpinning.

The term 'Dry Pack' is used in Construction & Building for stabilising and strengthening the foundation of an existing structure. Unless you are building on solid rock all buildings need foundations. Most post 1920 houses are built using standard concrete strip foundations. Prior to these simple spread foundations were normally used.

Basic information about foundations:

Concrete strip foundations - A trench typically 600mm wide by 1200mm deep (or often deeper) is excavated and then filled with a minimum of 600mm of mass poured concrete.

Spread foundations - Pre 1920 a shallow trench was excavated. In some cases this may be as little as 300mm deep. Brickwork was started straight from the soil however it was often started double the thickness of the wall for a few courses allowing the pressure of the completed wall to spread over more area. In many cases buildings constructed on poor sub soils like Clay have suffered from subsidence, as the clay is prone to high expansion and shrinkage especially in drought conditions. Generally buildings suffering from subsidence will develop cracks.

Traditional underpinning - Typically a series of pits are excavated 1m x 1m and deep enough to extend down past the existing foundations until a solid suitable base is found. The depth required, will usually be assessed by a structural engineer, who makes calculations based on drilled soil sampling or a series of trial holes. The soil directly under the existing foundations is also removed.

Traditional underpinning excavation of sequential pits – The pit is then filled with concrete to within 50mm of the underside of the existing foundation. The small gap left is dry packed with a dry mix of mortar that is rammed in under pressure once the concrete has set. Concrete is poured wet and will shrink when cured. **Dry packing**

doesn't shrink. The pits are excavated & filled in an approved series. If too many pits are excavated before filling the building will move and possibly fall down. When complete all the pits will form a complete new foundation under the existing foundation.

Piled and beam or knuckle underpinning - Piling is the process of forming deep concrete piles with a diameter of 150mm - 600mm, deep into the ground. In some cases where the soil condition is very poor or the underground water table is very high, piled underpinning may be required.

Pile and Knuckle system for domestic dwellings - This system is only suitable in some circumstances. First the holes are set out at precise pre-calculated spaces and depths are augured into the sub soil adjacent to the foundations. Steel reinforcement is placed into the hole. The hole is filled with high strength concrete. A metre wide trench is excavated to expose the existing foundations. Once the piles are formed, holes are broken out into the existing foundation. A Concrete knuckle reinforced with steel is cast into the hole which connects the Knuckle to the pile head. Once all of these are completed some of the existing brickwork is removed thus transferring the pressure onto the new piles (this brickwork is removed below the finished soil line so it is not visible). A trench like foundation is needed for underpinning.

Pile and beam underpinning - Same as above with the exception, Piles are formed on both the inside and outside of the walls in pairs – the piles pairs are connected using a cast in-situ reinforced concrete beam. This is considered to be a more stable system as the weight of the existing walls is distributed in a more vertical plane. (Causes massive disruption)

This is a guidance note. Where recommendations are made for specific tasks, these are intended to represent 'best practice', i.e. recommendations that in the opinion of the PCA meet an acceptable level of competence. Although members are not required to follow the recommendations contained in the note, they should take into account the content.

The information contained in this leaflet is given in good faith and believed to be correct. However, it must be stressed that of necessity it is of a general nature. The precise condition may alter in each individual case and the Association is therefore unable to accept responsibility for any loss howsoever arising from the use of the information contained herein.

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