



Forest Lodge
The Ridgeway
Cuffley
Hertfordshire

Survey of cracking in garage
and recommendation for amelioration

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Instruction:

1. To prepare drawings of the building including a record of the significant cracking patterns visible in the blockwork walls internally at the time of the inspection.
2. To review the proximity of trees
3. To give an opinion on the cause of the damage and
4. To propose a course of action to reduce further damage to the building.

No ground excavation took place to reveal the nature of the ground or the type and detail of the garage foundations. However it is noted that highly shrinkable clay is present in this area of Cuffley.

Weather:

On the day of the site visit the weather was fine and surfaces were dry.

Overview:

The building is a two storey garage block approximately 14 metres long and 6.5 metres wide. It has garaging on the lower storey with rooms contained within the roof above. It lies on the residential property known as Forest Lodge and is positioned within 1 metre of the flank boundary.

The land on the opposite side of the boundary contains an open woodland mainly comprising beech trees. Of the large number of trees in this woodland there are only ten which are in close proximity to the garage.

It is understood that the subsoil in this area of Cuffley is of highly shrinkable London clay.

Drawings:

Measurements were taken so as to prepare floor plans and elevations together with elevations of internal walls which showed signs of significant cracking.

Drawings at a scale of 1:100 were prepared and cracking patterns recorded.

A site plan was also prepared showing the building and the trees within approximately 10 metres of the garage.

Observations:

There are two significant cracks in the internal skin of the rear wall which run continuously for the almost entire length of the building. There is also some horizontal cracking in an internal wall and a vertical crack in the flank wall.

It is apparent that the foundation at the rear of the building has moved downwards in relation to the front and flank walls leaving blockwork arching between points of support.

Monitoring:

No recording was made for evidence of continuing movement in the cracking.

Tree survey:

To the rear of the building is a wooded area which contains many mature trees, mainly believed to be beech. Additionally there is Leylandii hedging at both ends of the building and extending away from the building and along the boundary. There is a variety of further hedging and shrubs along the roadside boundary.

A limited survey was undertaken of the significant trees in the immediate vicinity of the building and these are marked on the site plan drawing.

Tree Roots and Buildings

Dr Giles Biddle O.B.E. has provided expert advice and guidance on all aspects of tree root damage, based upon his research commencing in 1978 for Milton Keynes Development Corporation which was further extended when he was commissioned by The National House-Building Council. His work provided all the technical input for the 1985 revision of Practice Note 3 "Building near Trees" and its subsequent revision as NHBC Standards, Chapter 4.2. These have become the industry standards for foundation design near trees.

It is with the benefit of this document that conclusions have been drawn on the suitability of the tree type and the effect of their proximity to the garage has been drawn.

NHBC STANDARDS 4.2 - Building near trees

This document recognises that trees take moisture from the ground over an area which is greater than the root system. The species and height of the tree both have a bearing on the extent of the root system and therefore the distance within which the effects of the tree on the removal of water from the ground may be noticed.

The extent of this moisture removal will depend upon the type of soil, whether it is made up of cohesive or granular particles in particular. Cohesive soils more readily permit the movement of water in the soil by capillary action or soil pressures. Furthermore, the soil may shrink on removal of this moisture, dependent upon the type of soil.

At this property the soil present near the surface is clay. The clay in the south east of Britain contains some of the greatest shrinkage potential and this is referred to as 'soil with a high volume change potential'.

There are ten beech trees within approximately 11 metres of the building, which as a group can be expected to contribute to a greater effect on the subsoil than would a single tree. There are additional trees at a greater distance.

Beech trees are noted to have a moderate water demand and to reach a potential mature height of 20 metres. This may result in the shrinkage of soils at a foundation depth of 1 metre within a circle of 16 metres or so from the base of the tree.

In addition there is a row of Leylandii trees at each end of the building. Coniferous trees have a lesser effect on water removal and subsequent soil shrinkage than do deciduous trees. However these trees are in close proximity to the building. NHBC Standards 4.2 shows these trees to have lesser impact upon foundations than the beech trees. However the close proximity of these Leylandii will place the building at risk should they be allowed to grow into small trees.

Conclusions:

The extent and distribution of the cracking within the rear wall of the garage demonstrates that the removal of moisture from the clay subsoil is causing shrinking of that clay subsoil along the entire rear wall foundation.

The absence of cracking in the two end walls other than at the junction with the rear wall is as may be expected from a wide distribution of beech trees to the rear.

The absence of cracking in the two end walls, other than close to the junction with the rear wall confirms that the shrinkage of the clay is not caused by the smaller Leylandii hedging plants. These would be more likely to result in cracking of the rear wall close to the ends only with a lesser effect near to its centre. This pattern is not evidenced; therefore it may be considered that the Leylandii hedging is not a significant cause of the damage.

Recommendation:

The close proximity of large wooded areas to housing is not recommended in areas with high shrinkage potential subsoil due to the risk of heave or shrinkage. The shrinkage of the clay subsoil at this site is considered to be due to the large beech trees at the rear of the garage.

It is therefore recommended that

1. the beech trees within approximately 11 metres be removed and
2. the Leylandii be kept as a trimmed hedging plant at the boundary.
3. the subsoil be allowed to recover over several years following tree removal during which time the cracks in the building may close up.
4. remedial works to the garage be undertaken only after recovery has ended.

This report contains
5 pages of text
2 drawings
1 photograph