

A Guide to Subsidence

Risk Assessment and Risk Management against Soil Shrinkage

1.0 Is subsidence a problem?

Welcome to our guide on Subsidence. Subsidence affects as many properties in the UK on an annual basis as floods – in fact in 2003 the number of recorded subsidence claims matched that of the properties affected by flood in 2007.

Over the last 10 years the adverse effects of subsidence caused by shrink-swell behaviour of soil have cost the economy an estimated £3bn, making it the most damaging geohazard in Britain today. As many as one in five homes in England and Wales are likely to be damaged by ground that swells when it gets wet and shrinks as it dries out (Jones 2006).

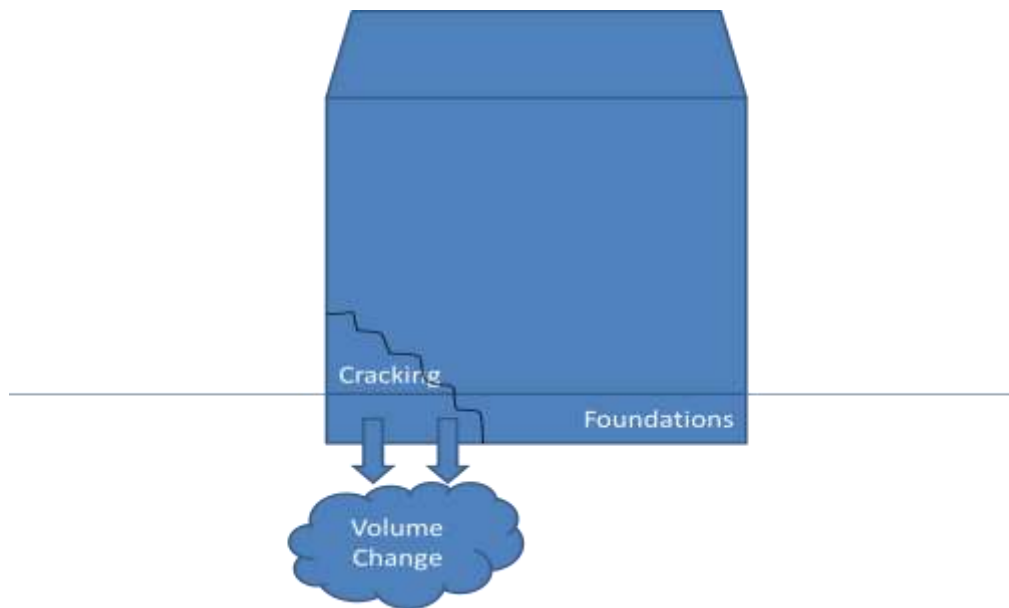
European research (undertaken by Swiss RE and the Swiss Institute of Technology) in July 2011 warned that climate change could magnify the already significant increase in property damage as a result of subsidence. The new model predicts subsidence will worsen and spread in Europe with some areas seeing more than a 50% increase in the next 25 years. This follows an actual 50% increase we see today compared with the period 1951-1970.

Although subsidence is usually covered by your insurance policy, a subsidence claim will have to be disclosed if you decide to sell the property and this may affect the ability of a potential buyer to secure a mortgage on the property. If you are looking to purchase a property it is advisable to make sure your conveyancer or solicitor checks the risk of subsidence included within their searches. They do have a Duty of Care to you to carry out any searches that may be appropriate to the particular property taking into account its locality and other features (including subsidence).

So it is better not to experience subsidence at all! The good news, however, is with some sensible and cost effective steps you can readily reduce the risk of subsidence. This guide is designed to provide you with an overview of subsidence and its main causes, practical steps to reduce subsidence risk, what to do if you do find cracking and how we can help.

2.0 What is Subsidence?

What is the definition of subsidence? Subsidence is the vertical downward movement of a building foundation caused by the loss of support of the ground beneath the foundations. Subsidence results in cracking and hence property damage. A more simple definition is 'Subsidence may be defined as a downward movement within the ground' (Anumba and Scott, 2001). This downward movement of the ground supporting the building causes damage when the movement is often uneven.



2.0 What is Subsidence?

2.2 What Are the Signs of Subsidence?

When a property subsides it can cause significant cracking and damage to the property. Here are some of the usual signs of subsidence:

- Vertical and diagonal cracking concentrated in specific areas and tapering in width between the top and bottom of the crack.
- Cracks extending through the damp proof course (DPC) down into the foundations.
- External cracking reflected internally in the same area of wall.
- Rucking of wallpaper at corners between walls and ceilings.
- Distortions of openings (which are weak points in the structure), causing doors and windows to stick.
- Cracks appearing after a prolonged period of dry weather.
- Seasonal opening and closing of cracks.



Some examples of cracking caused by subsidence



2.0 What is Subsidence?

2.3 Other Causes of Cracking

Cracking in properties can be caused by a range of issues other than subsidence – some cracks are related to normal wear and tear due to the age and construction of the property, the materials used in construction and other, non-foundation related structural issues. These are not traditionally covered by buildings insurance.

The main causes are:

- Settlement after construction
- Thermal expansion and contraction of materials
- Chemical attack
- Roof spread
- Wall tie failure

2.3.1 Settlement

The weight of a property when may cause the ground to consolidate and lose volume. If settlement occurs because the original ground was not strong enough to carry the proposed load of the property then this is not usually covered by insurance as it is a result of inappropriate design and/or construction.

There is a key case in law as initial settlement is generally excluded from policies whereas long term settlement may be considered as subsidence (Barker vs. Lynch and NEM 1990)

2.3.2 Thermal Movement

Modern rigid structures have less ability to expand and contract from changes in temperatures. Block work (which is used as the inner skin in most modern external cavity walls) is particularly prone to this effect and results in vertical cracking. Other materials prone to temperature shrinkage are modern mortars (cement based), re-constituted stonework, concrete lintels over windows and doors, metal and steel lintels and beams, timber and even plasterboard ceilings.

2.3.3 Lintel Failure

Lintels support the walls above windows and doors. They used to be constructed of timber or brick arches but recently they are made from concrete or metal (which is concealed).

All methods used can deteriorate over time. This results in a weakening of the lintel which causes movement of the supported wall. Cracks usually appear above the window/door opening.

2.3.4 Chemical Attack

This happens in chimneys where the chemicals in the gases from the fire (sulphates) have a chemical reaction with the brickwork. This leads to expansion and vertical cracking of the chimney stack.

2.0 What is Subsidence?

2.3.5 Roof Spread

If the roof is poorly constructed, or if there has been structural deterioration, or has seen an increase in weight (such as the installation of Solar Panels) for which it was not designed to carry, then the roof may push the walls outwards resulting in cracking.

2.3.6 Cavity Wall Tie Failure

Cavity walls have two 'skins'. These are brick/block work with a cavity between them. These 'skins' are bound together using cavity wall ties – strips of metal (with a twist in the middle to create a fall point for any moisture). These ties can corrode and expand pushing out the external wall and resulting in horizontal cracking.



An extreme case of wall tie failure!

3.0 What Causes Subsidence?

There are a number of core causes and triggers for the occurrence of subsidence.

3.1 Core Causes

3.1.1 Soil Shrinkage - Clay

The predominant cause of subsidence in the UK is soil shrinkage (accounting for 75% of subsidence claims) and in particular clay soils (Freeman et al 1994).

Soils are either cohesive or non-cohesive and both types invariably contain water. Cohesive soils such as clay and silt vary in their ability to change their volume when wetted or dried (known as volumetric change), therefore when wet they will expand (swell) and when dry they will shrink.

Clay soils are highly responsive to volumetric change owing to their molecular structure. Clays have a repeating arrangement of atoms (known as a crystalline structure) with weak bonds that hold the clay crystals together (these allow water into the spaces between the crystal and push them apart causing swelling. Obviously the opposite is true and results in shrinkage. Clay is unique in containing water within the molecular structure as all other soil types the water simply occupies the voids between particles.

To complicate matters further there is more than one type of clay with different properties. Montmorillonite is the most highly expansive clay whilst kaolin is less expansive.

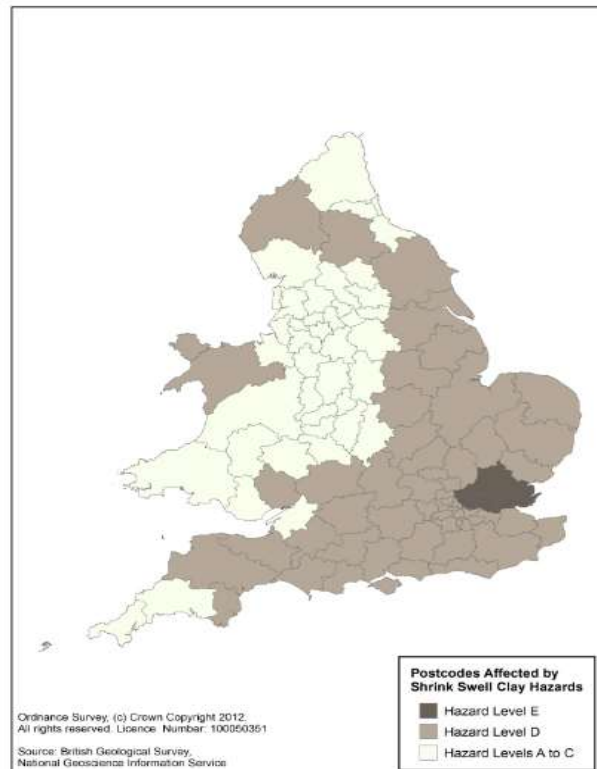
The shrinkage/swelling potential of clay is measured through the 'plasticity index' (the range of moisture content over which clay retains its plastic properties). An index of over 20 denotes a soil susceptible to medium shrinkage and swelling.

Clay is found extensively across England and Wales – there is limited clay in Scotland and, therefore, subsidence due to clay shrinkage and swelling is of a low magnitude.

The London Clay formation (which underlies most of the Greater London Area and Hampshire) is particularly susceptible to shrink-swell behaviour (Jones 2006). In a study of subsidence claims, related to shrink-swell clays, the London Clay is described as the most commonly encountered problem soil' (Crilly 2001).

3.0 What Causes Subsidence?

The following map outlines the distribution of clay and in particular the two highest hazard levels for clay content and shrink-swell risk. This represents some 6.5 million properties.



3.1.2 Non Cohesive Soil

Non cohesive soils, such as sand and gravel, do not experience volumetric change. They are susceptible for the fine particles in their composition to be washed away if subjected to water flow.

Sand that sits under the water table acts in a similar way to liquid and so will move into any void surrounding it.

In certain parts of the country (namely the Chilterns (Herts), Kent and Sussex) the soil is chalk and limestone. This can be dissolved over time by running water to create caves. These can sometimes collapse causing the ground to fall and create what is known as a swallow hole.

3.1.3 Natural decomposition

Organic soils - such as peat - can naturally decompose due to oxidation. This can lead to a reduction in its volume. Oxidation occurs when the organic material comes into contact with the air and this is usually when the water table falls.

3.0 What Causes Subsidence?

3.1.4 Man Made

Man-made ground instability issues include In-filled sites, mining and vibration.

In-filled sites are where pits and quarries have been filled in after excavation or mining with a variety of materials (sometimes including refuse) and covered over. The fill can consolidate or degrade over time (mainly due to decomposition of the materials) causing a reduction in the volume of the soil leading to subsidence.

Where buildings have been built on old land fill sites (which were not recorded as such) and the ground has dropped, they are invariably treated as subsidence (although in reality they are settlement – see section 2.3.1).

Mining is straightforward as the ground movement is caused by the collapse (full or partial) of the mine workings.

3.2 Key Influencers

The following represent the key influencers or ‘triggers’ of subsidence from soil shrinkage.

3.2.1 Trees

The main cause of subsidence movement in the UK is the influence of tree roots in clay soil. Over 60% of all subsidence claims are triggered by trees.

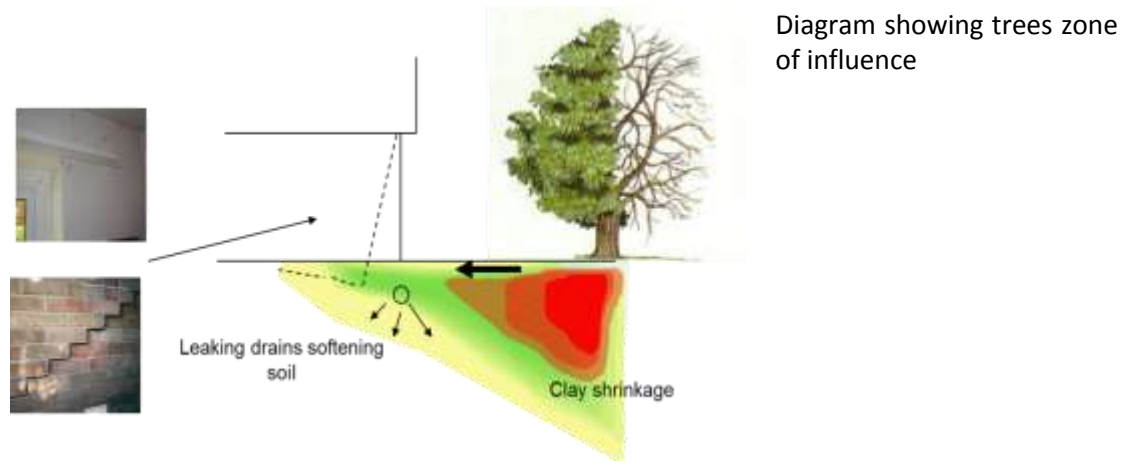
Tree roots absorb water for photosynthesis and moisture evaporates from the leaves through transpiration. The active period is predominantly in spring and early summer when tree growth is at its maximum. Larger trees in shrinkable clay soil can extract sufficient moisture to cause soil shrinkage. This may lead to subsidence. A mature deciduous tree can remove in excess of 50,000 litres of water a year.

Tree species vary considerably in their ability to cause clay soil shrinkage. Some species are not good at rooting to depth on clay soils while species like Oak, Willow, Poplar and Eucalyptus are able to maintain viable roots to a depth of several metres. In most soils, however, there tends to be a mixture of soil types and so many species will be able to grow roots to sufficient depth to influence buildings where the foundations are not deep enough. The age, health and past management of trees will also be an important factor. Trees of full maturity with little potential for future growth and have not caused damage to a building in the past may be less of a consideration as a risk than trees which are growing vigorously and increasing in size.

Depending on the species, the roots of a tree will extend to greater breadth and depth in search of moisture (indeed moisture removal of up to a depth of 6m can take place) in exceptionally dry summer periods and drought. Planting young trees also needs planning. Although they will not extract sufficient moisture initially to present a risk to the property, this may readily change as it grows.

3.0 What Causes Subsidence?

Each tree has a 'zone of influence' - the area from which a tree absorbs moisture. The potential impact on a property depends on whether a property sits within the zone of influence. The extent of the zone depends upon the type of tree and the location of other trees.



The Association of British Insurers (ABI) has produced a guide for tree types against recommended distance from the property, however it must be stated that this represents the maximum distance. It can be accessed through their website - www.abi.org.uk/Information/Consumers/General/49588.pdf. Below is an extract of the main species.

Species	Normal Mature Height (m)	Safe Distance (m)
Apple/pear	12	10
Ash	23	21
Beech	20	15
Cypress	25	20
Cherry	17	11
Elm	25	30
Hawthorn	10	12
Holly	14	6
Horse Chestnut	20	23
Laurel	8	6
Magnolia	9	5
Oak	24	30
Pine	29	8
Plum	12	11
Poplar	28	35
Sycamore	24	17
Spruce	18	7
Willow	24	40
Yew	12	5

3.0 What Causes Subsidence?

3.2.2 Leaking Drains and Water Mains

Leaking drains and pipes are the second highest cause of subsidence accounting for about 15-20% of subsidence incidents. There are two mechanisms how a leaking drain or water main can cause subsidence:

- Softening the ground and, therefore its load bearing capacity, results in the building dropping and/or;
- Washing away fine particles in a non-cohesive soil, thus reducing the volume of the soil.

It is rare for the drain to have its joints forced open by a tree root. Roots will grow into any open joints or cracked drains causing further damage to the drain and increase leakage.

In addition to the above drains are usually laid relatively shallow in the ground. The trenches are filled with excavated materials. As the drain trench acts like a sump, drawing in ground water, the trench can erode over time leading to consolidation of the infill which could movement of the adjacent ground towards the trench.

3.2.3 Man Made

Man-made triggers include removal of support around the foundations, vibration and changes in the water table.

Excavations around the foundations (e.g. extensions, new drainage or work on adjacent land) can cause a sideways collapse of the ground beneath the foundations.

Vibration can consolidate and settle the ground leading to a reduction in the volume of the soil and downward movement of the foundations. Vibration can be caused by heavy and constant traffic near properties or pile driving on an adjacent building site. The damage caused by the vibration alone is not subsidence; however consolidation of the ground causing subsidence would usually be covered.

Man-made water table changes are for example the sinking of a well, which removes water and, as such, dries out the surrounding soil causing it to shrink.

3.3 Issues Similar to Subsidence

Much less common, but causing damage of a similar nature to subsidence, are:

- Heave can be considered the opposite of subsidence as there is upward movement of the ground supporting the building. Cohesive soils, primarily clay, can heave and it is usually caused by the removal of trees. The moisture originally absorbed by the tree stays in the ground causing it to swell. It is not a quick process and can take many years for the ground to return to a normal condition.
- Landslip is the movement of a ground mass down an incline or slope to find a natural level. It is only usually covered inland (coastal erosion and river erosion are generally excluded from policies). It is usually bought on by an 8% increase in natural water or from leaking pipes.

Both of the above are usually covered by buildings insurance.

4.0 Am I at Risk?

If you are concerned about the possibility of subsidence damage occurring to your property there are a number of steps that you can take.

4.1 Buying a House

When buying a property it is recommended that you review the potential subsidence risk, and as such understand the implications and actions you can undertake to reduce any potential risk. There are some specific lender requirements as specified in the Council for Mortgage Lender (CML) guidelines which you should be aware of:

- The Conveyancer must carry out any searches that may be appropriate to the particular property taking into account its locality and other features (including subsidence).
- The property requires an insurance policy in place that includes 'subsidence, heave and landslip'.
- There may be a defect which is not covered by the lender's valuation report. It is recommended that the borrower should not rely on the valuation report to proceed but should obtain more detailed reports on the condition and value of the property.

4.1.1 Previous Subsidence Claim

If the property owner has previously submitted a subsidence claim, or has any knowledge that the property has suffered historically from subsidence (or in the neighbourhood) then this must be disclosed to their conveyancer. A valuer inspecting a property on behalf of a lender is also required to confirm whether they have any knowledge of subsidence affecting the property or neighbouring dwellings.

Please note: If it can be established that the vendor or conveyancer concealed a known problem to a property by a statement (written or verbal) upon which the purchaser relies and that statement is knowingly incorrect, then the vendor or conveyancer could be held responsible as it constitutes misrepresentation.

Where a previous subsidence claim is disclosed, the lender may request detailed reports with a view to:

- Withdraw or not proceed with a mortgage offer
- Caveat the offer subject to further investigations

In addition to the traditional National House Building Council (NHBC) Guarantees, when all subsidence repairs are completed, there may be a Certificate of Structural Adequacy issued by the technical expert acting on behalf of the insurance company. This is issued under the guidance of the Institution of Structural Engineers and is undertaken by a qualified Surveyor or Engineer. It states that the repairs have been undertaken in keeping with the specification of works required. In addition, a repair that had required Building Regulations (such as underpinning the foundations) would have been approved by the Local Council Building Control and this documentation (including completion certificate) should also be available. Please ensure that your conveyancer obtains this information.

4.0 Am I at Risk?

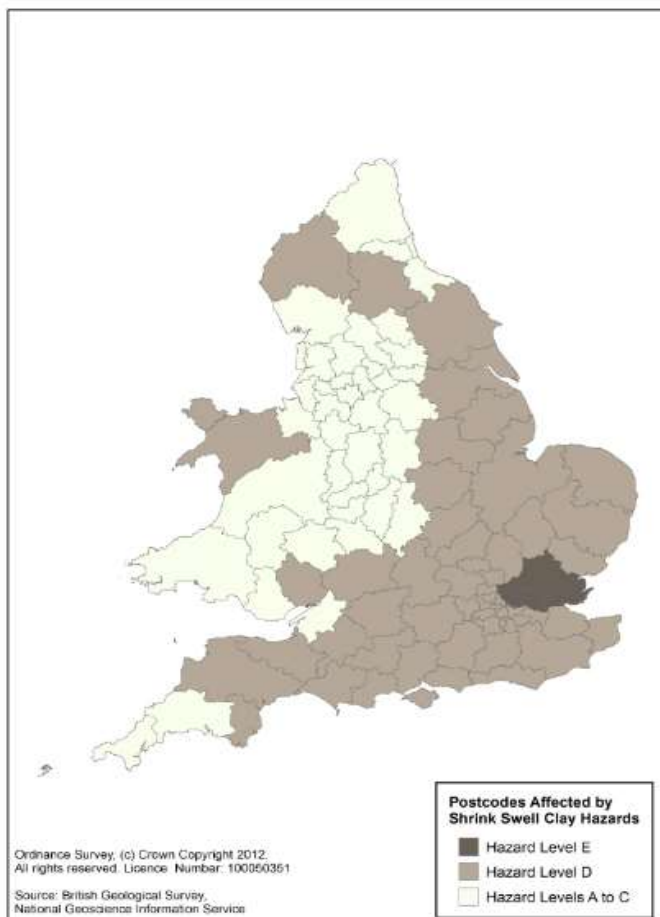
4.2 Home Owner

Find out whether subsidence is a common problem in the immediate area and whether your property is built on clay soil. These two factors alone will be a good starting point for assessing risk.

Distribution of shrink-swell soil

As per section 3.1.1, Clay soil characteristics, and the degree to which they will shrink or swell, vary greatly not only between regions but on a single site. London clay is generally the most shrinkable soil type but other clay formations and even silty soils can be shrinkable.

The map shows the distribution of the 2 highest hazard levels of clay across England and Wales.



4.0 Am I at Risk?

Property Type

The main issue of any property is not the type of property but the depth of foundations, the proximity of trees and the drainage system.

Building regulations and legislation has evolved with an increasing understanding of subsidence. The main change appeared in 1976 following a significant subsidence event. It states that 'the foundations of a building shall be taken to such a depth, or be so constructed, as to safeguard the building against damage by swelling, shrinking or freezing of the subsoil'.

The depth of foundation will influence the extent of potential subsidence. In some instances it may be prudent to contact the National House Building Council / Building Control department of the Local Council and review the details that they hold on their system. The Building Control department should be able to verify what type and depth of foundation were utilised in the house design. It will also highlight if the soil conditions dictated that a non-standard foundation detail was required. In this situation it may be possible for any pre-existing trees to be left in situ and allowed to grow to full maturity.

Conservatories /garages/ outbuildings / garden walls are a higher risk as they are usually built on shallow foundations and can move differentially against the deeper foundations of a main building.

Trees and Vegetation

Identify whether the property is within the zone of influence ([link](#)) of surrounding trees.

Drainage

Check that there are no blockages by lifting the manhole and inspecting the drainage (please take care when doing so).

4.3 Our Services

We provide a range of subsidence services to help you identify and manage the risk of subsidence.

The first stage is to quickly establish if you are located in an area where there is a risk of subsidence using our Subsidence Risk Rating - Postcode. This will provide you with the risk level (low, medium, high, very high) of your property at your detailed postcode level (eg PE15 9BZ). This is the first UK risk model built on actual subsidence claims' information (please note excludes Scotland and Northern Ireland).

Once you have identified the level of risk or that the soil type includes clay then there are a range of services to help.

4.0 Am I at Risk?

Subsidence Risk Rating – Property is a property assessment report that identifies and reviews the key triggers of subsidence and provides recommended actions and estimated costs. The survey includes:

- Data collection and extensive video record relating to the site, property, trees and vegetation
- The information is collated and reviewed by an industry-leading drainage and ground investigation company
- Tree and vegetation data is reviewed by a qualified Arboriculturist
- Property data and outputs compiled by a qualified Building Surveyor
- Site plan illustrating the footprint of the property, the location of vegetation and visible drainage features
- An overall risk rating with recommended remedial actions and estimated costs

Subsidence Risk Report - Specific Defect. This survey is required where the valuation report has identified cracking on the property, the property shows signs of historically suffering from foundation movement, or if the property has been previously repaired/ underpinned as a result of subsidence. The survey is undertaken by a qualified Building Surveyor or Engineer and includes:

- Where there are signs of cracking, this survey is a letter report describing concerns raised, site observation as to cracking cause, conclusions and specific investigations if required (soil samples, monitoring, etc.).
- For previous subsidence this will check the Certificate of Structural Adequacy and the current state of the repairs.

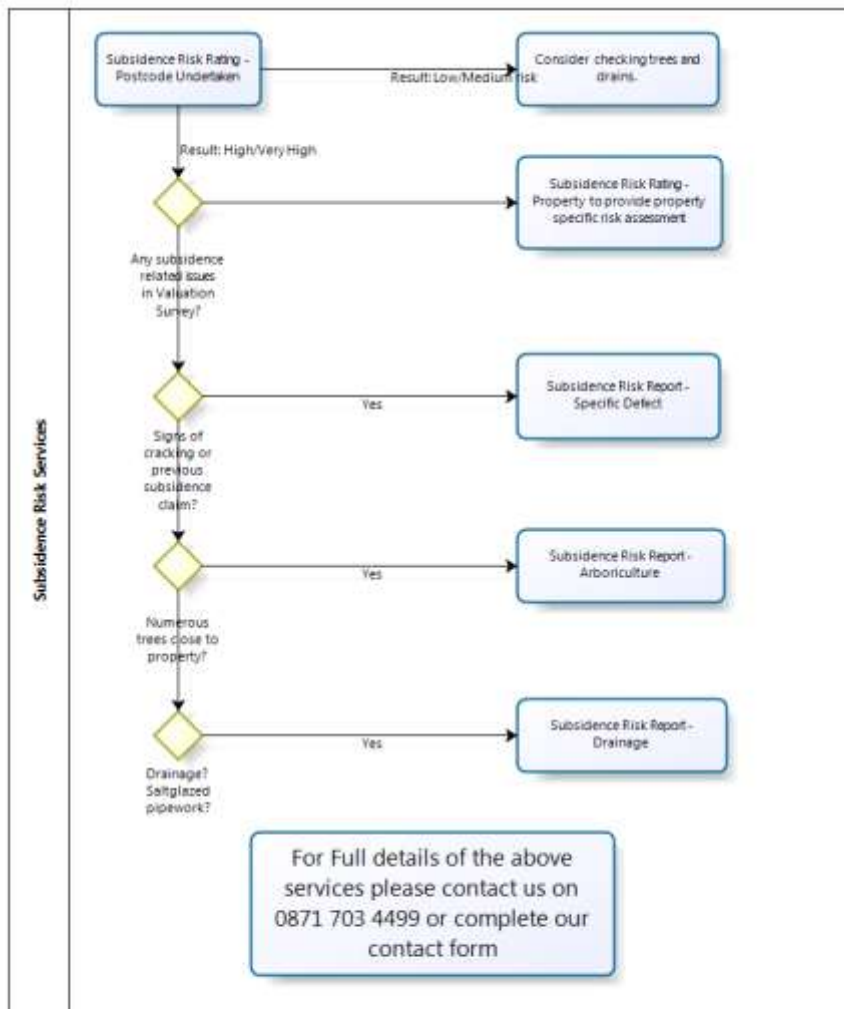
Subsidence Risk Report - Arboriculturist. Full site inspection of trees and shrubs against subsidence risk and with a full plan of works required and costs.

Subsidence Risk Report - Drainage. This survey reviews the drainage system on the property site and is particularly relevant where the property has glazed clayware drainage pipes. The survey includes:

- Camera survey (CCTV)
- Reports on waste and storm pipes and the drainage layout
- Underground survey, including the identification of shared sewers, any drainage defects and the relative positions of drains.
- This is an expert drainage survey supported by a site-specific professional review

In addition we can provide a range of services specific to your situation – such as assessment of legal constraints to tree work, standard letters to Local Authorities, Party Wall issues – we are here to help.

4.0 Am I at Risk?



The diagram shows how our services are linked to provide you with your most appropriate solution.

Calls cost 10p per minute for the call plus any standard network charges. Please seek bill payer's permission before calling.

5.0 What Can I Do?

5.1 Manage the Risk

The good news is that some relatively easy and cost effective steps can reduce the risk of subsidence. It is worthwhile bearing in mind that it is significantly better to not have a subsidence claim as:

- It will have to be disclosed if you wish to sell in the future and this may affect the ability of a potential buyer to secure a mortgage on the property.
- It affects the ability to obtain insurance
- The average subsidence claim excess is £1,000 (versus the average buildings excess of £250)

5.1.1 Trees and Vegetation

Where risk factors appear to be significant and trees are close to the property, reasonable vegetation management may be appropriate. However, the pruning of trees to reduce water absorption is not considered to be a particularly effective remedy and it may be necessary to consider removal of trees where other risk factors are high.

The removal of trees, however, requires consideration as trees in the urban environment make a very significant contribution to people's quality of life and research has found that the majority of people who live close to trees value the benefits that they bring.

Apart from their aesthetic qualities, trees provide a number of practical benefits in the built up areas. They improve air quality, reduce wind speed, save energy and reduce the urban heat island effect caused by the build-up of temperatures in hot summers. It is the intention that tree cover in urban areas should be increased and in many cases this has been written into government or local policy. In London, it is the intention that tree cover should be increased from about 20% to 30% of land cover.

Tree management strategies are considered to mitigate any future risk due to growth and that advice is sought in relation to future plantation schemes – it is advisable to consult an arboriculturist. There are some key considerations:

- If the trees are too close and were planted after the property was built they might be relocated if of a suitable size. If it is impractical to move the vegetation, ensure it is regularly managed to control the moisture uptake. This can be achieved by crown reduction and crown thinning.
- If the trees are too close and were planted before the property was built – manage them by crown reduction and crown thinning. They should not be removed without specialist advice as this could cause uplift of the ground (i.e. heave) which can result in structural damage.

5.0 What Can I Do?

There are two standard arboricultural pruning techniques used to reduce the crown size of mature trees. The first, crown reduction, reduces crown size but allows the 'natural' shape of the tree to be preserved. This involves an overall reduction of both height and spread by removing the outer portions of all major branches. The second technique, crown thinning, reduces the number of side lateral branches coming off all the major branches not affecting the original volume of the crown but reducing its density. For both techniques the normal industry standard is to aim to reduce the canopy leaf area by up to 30% depending upon the species.

The following definitions of tree management techniques have been produced by the European Arboricultural Council.

1. Crown Thin

Crown thinning is the removal of a small portion of secondary and small live branches to produce a uniform density of foliage around an evenly spaced branch structure. It is usually confined to broad-leaves species. Crown thinning includes crown cleaning and does not alter the overall size or shape of the tree. Common reasons for crown thinning are to allow more light to pass through the tree, reduce wind resistance or to lessen the weight of heavy branches.

2. Crown Lift (or Crown Raise)

Crown lifting is the removal of the lowest branches and preparing of lower branches for future removal. Good practice dictates crown lifting should not normally include the removal of large branches growing directly from the trunk as this causes large wounds which may jeopardise the long term future of the tree. Common reasons for crown lifting are to bring more light and give access for traffic. In the UK common practice dictates clearance for vehicles is 5.2 metres (17 feet), and for pedestrians 2.5 m (8 feet).

3. Crown Reduction

Crown reduction is used to reduce the height and/or spread of the crown of a tree by the removal of the ends of branches whilst maintaining the tree's natural shape as far as practicable.

5.1.1.1 Tree Preservation Orders and Conservation Areas

Before undertaking any tree works it is important to investigate any legal constraints. If the trees are protected by a Tree Preservation Order, or your property is located within a Conservation Area, they can only be pruned or felled with permission from the Local Planning Authority.

5.0 What Can I Do?

5.1.1.2 What if the trees are not on my property?

Neighbours

If the tree is in a neighbour's garden (owned or rented), a sensible and non-confrontational approach is advised, and endeavour to get them to seek and take appropriate action. Only if your neighbour is uncooperative should you then write to them by recorded delivery (we have a prepared letter if you wish) and keep a copy of the letter.

Council or Commercial Property

In the event that the tree is owned by the Local Authority or a business, the first stage will be to write to the relevant department or the Company Secretary of the business. The letters should remind the legal owners of the duty of care to ensure that the vegetation is maintained - we do have a prepared letter for use if required, and can provide individual support if you so wish.

Local Authorities are usually considered (through a number of legal case law precedents) to have the technical knowledge of the impact of tree roots on buildings. Immediate action by the Local Authority can be problematic as trees have played a large part in the street scene for many years and provide a range of benefits. To this end local authorities are reluctant to take them down as the removal of trees is contentious and residents regularly challenge their removal. They require a considered response with an amount of information to be provided. The Joint Mitigation Protocol (JMP) has been established with insurers working together with Council representatives to produce a guide and structure as to the process of tree migration activities. The JMP is readily available and can be found on the London Tree Officers Association website: www.ltoa.org.uk.

5.1.2 Drainage

General maintenance checks should be carried out. Checks should be made for blocked or leaking drains; dirt and leaves cleared from gutters; and pipes checked to make sure there are no splits.

It is particularly important to carry out these inspections on older properties where the drains comprise of salt glazed clayware pipework. With this type of construction, roots entering at the pipe joints are not uncommon. Over time this can cause blockages and hence leakage in the system (i.e. water backs up and leaks through the pipe joints)

As a minimum it is recommended that manholes are lifted and inspected on an annual basis. If there are concerns over the integrity of the drainage system a specialised CCTV survey can be undertaken to assess its condition.

5.0 What Can I Do?

5.2 I Have Cracking!

As per section 2.2 cracking can be caused by a number of reasons. As a reminder here are some of the usual signs of subsidence:

- Vertical and diagonal cracking concentrated in specific areas and tapering in width between the top and bottom of the crack.
- Cracks extending through the damp proof course (dpc) down into the foundations.
- External cracking reflected internally in the same area of wall.
- Rucking of wallpaper at corners between walls and ceilings.
- Misaligned/distortions of openings in the structure (windows and door frames which are weak points in the structure of the property), causing doors and windows to stick.
- Cracks appearing after a prolonged period of dry weather.
- Seasonal opening and closing of cracks

If the cracks are as described above, or you suspect it is subsidence, then the sooner it is diagnosed the better. Firstly check that your buildings insurance covers subsidence. Most insurers will be helpful in dealing with a claim – they will recommend specialist advice.

A Chartered Structural Engineer or Building Surveyor (see Subsidence Risk Survey – Specific Defect section 3.2) will be able to work out whether or not there is subsidence and what the likely cause is.

5.2.1 Insurer approach

5.2.1.1 Standard Policy Exclusions

All policies for subsidence have exclusions and these are often points of dispute. Whilst they will vary from insurer to insurer the following are the most common:

- Policy excess is usually £1000 of each and every incident of damage (residential)
- Occurring whilst the buildings are undergoing demolition, structural alteration or structural repair. In these circumstances the building is in the care and control of the contractor and so if subsidence occurs this indicates some failure on behalf of the contractor to take adequate safeguards.
- Caused by settlement, shrinkage or expansion. The purpose of this clause is to avoid claims early in a building's life due to bedding down in constructional faults. Shrinkage or expansion happens when elements of the building react to environmental or thermal changes.
- Caused by compaction of infill.
- Caused by river or coastal erosion.
- Arise from defective design, materials or faulty workmanship. This is a difficult exclusion to apply in a building other than one recently constructed or within any period of warranty such as provided by the NHBC 10 year warranty.

5.2.2.2 The Claims Process

The insurance company will advise you on the next steps to be taken. In the most serious cases, the investigation can take a considerable period of time in order that a proper and lasting repair is made to the property. Where monitoring of this nature is required the time taken by the investigation work may well exceed 12 months.

5.0 What Can I Do?

There are many players involved in a subsidence claim. Many claims turn out to be due to other causes and the repudiation rate varies from 40% to 60% (depending on climate conditions).

There is a general move towards immediate repair, however if this is not applicable there may be a detailed investigation followed by a monitoring period. The critical element is the accurate identification of the most appropriate approach to each subsidence incident.

The most common claims method is a project managed approach. This involves the use of the insurer's own surveyors and engineers or outsourced surveyors and engineers through delegated authority.

Investigation

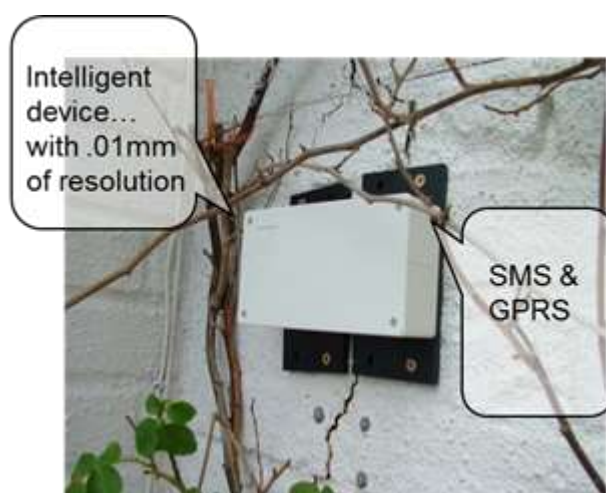
If the damage is minor or the cause is obvious there is not always the necessity to undertake intrusive site investigations.

On more complex cases the nature, depth and bearing of the foundations may need to be established. This is normally achieved by the excavation of trial holes in those positions suspected to have subsided. The holes must go to a minimum of the base of the foundation. The trial pit should be extended beyond the depth of the foundation using an auger and samples of the soil are taken at various depths for soil analysis.

Monitoring

With subsidence damage the critical issue is whether the movement is on-going and the building is no longer acceptably stable. This determines the most appropriate repair. The reason for monitoring is threefold – to confirm the cause of damage is/is not subsidence, the extent of ongoing movement and to establish the effectiveness of the remedial works.

Crack monitoring is traditionally undertaken by fitting studs on each side of the crack, however this has been revolutionised by the introduction of remote monitoring systems that allow 24/7 monitoring via secure internet.



New remote monitoring technology
(courtesy of Moniteye)

5.0 What Can I Do?

Repairs

The Building Research Establishment (BRE) has published a classification system for subsidence and the type of repair required.

Damage Category	Approx crack width (mm)	Definition of Crack and Description of Damage	Definition of Crack and Repair type/considerations
0	Up to 0.1mm	Hairline: Negligible structural implications and expected to occur on almost all buildings at any location. Not generally related to subsidence	Can be filled or covered by wall covering and redecorated
1	Up to 1mm	Fine: Generally have some structural significance. Often these are more visible inside building than outside. Generally located at points of structural weakness (doors/windows). Indicates slight foundation movement.	Can be filled or covered by wall covering and redecorated
2	Up to 5mm	Moderate: These cracks are most likely to have some structural significance and will almost always occur at points of weakness or hinge points. Generally cracks will be visible internally and externally, and will indicate foundation movement enough to distort door and window frames and make doors and windows stick	Internal cracks are likely to be raked out and repaired to a recognised specification. May need to be chopped back and repaired with expanded metal/plaster, then redecorated – if not cracking is likely to return. External walls require raking out and repointing – any cracked bricks replaced.
3	5 to 15mm	Serious: There will be some severe compromise of the structural integrity and weather tightness will be impaired.	Internal cracks repaired as per Moderate , with reconstruction if required. Rebonding is required. External cracks will also require reconstruction perhaps of panels of brickwork. Specialist resin bonding techniques may be required
4	15 to 25mm	Severe: Structural integrity severely compromised – floors, sloping walls, leaning or bulging, lintels suspect. Pipe fracture inevitable – windows broken.	Major reconstruction works to internal and external wall skins. Realignment of windows and doors
5	Greater than 25	Very Severe: Potential Danger from failed or fractured structural elements and for instability. Safety issues must be considered.	Major reconstruction works, plus possible structural lifting or sectional demolition and rebuild. Window and door replacement. CDM will probably apply.

The above, coupled with the findings of the investigation, determine the repair approach - leaking drains or water mains are fixed, trees removed or managed – and repairs undertaken. Usually repairs are straightforward building repairs, however in certain instances sub-structural stabilisation techniques are required.

The main sub-structural stabilisation techniques are Underpinning or Micropiling - the purpose of which is to transfer the load of the building to a new depth, unaffected by what caused the subsidence in the first place. These are undertaken by specialist contractors.

5.0 What Can I Do?

5.3 Recovering Costs

The following provides some guidelines as to the recovery of the costs of the subsidence incident from a third party. This may be readily undertaken by your insurer if you are making a claim, however there may be circumstances where this is not applicable or not available.

5.3.1 Vendor

If it can be established that the vendor concealed a known problem to a property by a statement (written or verbal) upon which the purchaser relies and that statement is knowingly incorrect, then the vendor can be held responsible as it constitutes misrepresentation.

A vendor can also be liable under the statute of Defective Premises Act 1972 if they have commissioned work to the property that is the cause of subsidence.

5.3.2 Surveyors, Architects and Engineers

If the work is negligent and the owner suffers a loss, either for new buildings or repairs to existing buildings which are under their design or administration, a claim can be made against such professionals. This will be subject to limitation.

Pre-purchase surveys or mortgage valuation reports that are negligent can give rise to claims against the surveyor, architect or engineer. These are subject to limitation.

Liabilities of surveyors in respect to pre-purchase surveys, as per numerous court cases, is not to be the cost of the relevant repair but the diminution in market value attributable to the need for the repairs.

5.3.3 Builder

The original builder or developer of a property, or a builder undertaking repairs that were not fit for purpose or suitable, giving rise to a loss can be pursued.

A statutory liability can also be attached under the Defective Premises Act 1972.

5.3.4 Local Authorities

If a local authority has negligently approved defective plans/drawings under the Building Regulations, or approved defective work on site, they can have liability if, in consequence of their negligence, there is a present or imminent danger to the health and safety of the property.

Tree root encroachment from Local Authority trees can place a liability on the authority (particularly if they have a Parks Department) and is therefore deemed knowledgeable of tree roots and their propensities. There are a number of legal precedents established in this area.

5.0 What Can I Do?

5.3.5 Adjoining Owners

Adjoining owners can be considered for recoveries in several situations:

- Removal of support. If the adjoining owner undertakes some work that removes support to the adjacent land and the building consequently suffers, then a liability can attach.
- Party walls. If a party wall has suffered subsidence damage and need underpinning it is clearly in the mutual benefit of both the wall owners. Under the Party Wall Act 1996, in such circumstances both owners can jointly be called to meet the cost in a 50:50 split (although a different apportionment is possible depending on the degree of the benefit to each owner). This apportionment will be covered in the Party Wall Act and creates a statute liability on the adjoining owner and recovery can be sought. It is normal for a party wall to be underpinned from one side only and the work included in the contract of the property from which the underpinning is being undertaken. The insurer concerned can seek contribution from the adjoining owner so long as the apportionment is included in the Party Wall award.
- Failure to maintain. If the property owner is aware of a defect to their property, for example leaking drains, and fails to take remedial action and subsequently there is damage to the adjoining property then a nuisance has arisen which is actionable.
- Non-natural user. If something that is non-natural and dangerous is brought onto the land and escapes then strict liability occurs. In the context of subsidence this could be an oil storage tank that leaks into the ground, softens the soil and causes subsidence.
- Employer of contractor. If a property owner engages a contractor to undertake work to his property (or land) which causes damage to the adjoining property then a liability may arise. Usually this can be passed to the contractor, however if undertaken negligently then the employer can take liability. This can include damage from piling.
- Tree root trespass and nuisance. For a potential claim to arise against a private tree owner there must first be encroachment of the tree roots onto the neighbouring land and secondly damage to the neighbour's property. Thirdly it must be demonstrated that the tree owner knew or ought to have known that the encroachment would cause damage and fourthly that he failed to take precautions to prevent or reduce the risk.

As most house owners are not technically skilled to determine whether the trees can or will cause damage and are therefore unable to take preventative actions, claims against neighbours are unlikely to be successful. If the owner has previously been advised that the tree is causing damage and has failed to take action and the problem continues then a claim can be made for the subsequent damage. If the adjoining owner is a professional with appropriate qualifications etc. (arboriculturist, surveyor), they will most likely have the knowledge regarding tree roots and buildings and so a claim could possibly be pursued. (usually this has to be over £5,000 to make it worthwhile for a solicitor)

In the light of various court cases on private tree root nuisance, insurers have collectively reached an agreement known as the **ABI Domestic Subsidence Tree Root Claims Agreement Third Party Liability (1997)**.

5.0 What Can I Do?

The aim of the agreement was to simplify the many claims of tree root encroachment where the Courts would hold that private individuals would not have the appropriate technical knowledge.

Where a claim arises from a neighbour's tree, the Agreement requires the building insurer to place the adjoining occupier of the property on 'notice' of the nuisance, with the request to take appropriate mitigating action. The adjoining occupier is required to identify their contents insurers who would cover such liabilities.

If the adjoining owner fails to take such action to mitigate the position then in the event of continuing or recurrent movement to the property from the same cause, and with knowledge deemed to be held on the propensities of tree roots, a recovery action can be taken against the adjoining occupier.

It should be noted that the courts have held liability for tree root nuisance as an occupier's liability. It must be remembered that the liability cover is actually provided under the contents section of the insurance policy.

5.3.6 Previous Insurers

You cannot pursue previous insurers of the property when the property owner changes. If the owner has not changed insurers (i.e. when the lending company transfers under block insurance) then there may be a contribution applicable. To simplify the issue insurers implemented the ABI Domestic Subsidence Agreement:

- It only applies to domestic properties where there has been a change of insurer but not policyholder.
- If there is a claim in the first 8 weeks of the new insurance policy then the previous insurers would handle the claim.
- If the claim is made from 8 weeks to one year then the claim is split 50:50.

6.0 Contacting us

If you have any questions or concerns regarding subsidence or you have discovered some cracking already then please:

- Call us on 0871 703 4499, or
- E-mail us at enquiries@propertyassure.co.uk. Or
- Write to us Property Assure, Glaston Hall, Spring Lane, Glaston, LE15 9BZ

We are here to help.