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Cracking Up

As France recorded record temperatures last summer many property owners started to notice cracks in their homes. Ian Morris, a chartered building surveyor who divides his time between the UK and France, is no newcomer to the problem

There are several reasons why cracks appear in buildings: Faulty design, faulty materials or workmanship, general deterioration, thermal movement or shrinkage, and ground movement.

The past couple of months has seen an increase in the number of calls I receive for advice on cracks, and as one immobilier told me when she asked me to have a look at the cracks that had appeared in her own house, "I expect they have been caused by the terrible draught". She was on the right track - but ours is an odd language and I had to politely point out to her that the word is "drought".

Anyone who was in France this summer, particularly in the south of France in August, will certainly remember the canicule (heatwave), when temperatures topped 40 degrees. And in parts of France, where there had been virtually no rain for five months, there was indeed a sécheresse (drought).

Older properties, where the masonry is built with lime mortar, seem to absorb a certain amount of stress without necessarily cracking up, but modern buildings are constructed more rigidly and tend to be susceptible to even small amounts of movement. Some of the cracks I have been asked to look at, mostly in fairly modern houses, have been "straight line" cracks that have occurred or opened up in the walls for the first time this year; these cracks have no doubt been caused by the canicule - but as a result of thermal expansion and contraction between dissimilar materials within the fabric of the building. In other cases, "straight line" cracks have occurred or opened up for the first time in plasterboard ceilings or partitions; again no doubt caused by the excessive heat this year - but as a result of shrinkage or twisting in the framing to which the plasterboard is fixed. In all such instances I have been able to advise that the problem is unlikely to be serious and only cosmetic repairs are required.

However, cracks appearing in the main walls - usually in a diagonal direction at window and door openings, with the tops of door openings becoming out of level, and doors and windows sticking in their frames, indicate the possibility of subsidence. Subsidence is the term used to describe the sinking effect of the ground under a building - as opposed to movement occurring solely above foundation level. The most common reason for subsidence is where a building has been constructed with fairly shallow foundations on a clay subsoil.

Clay tends to shrink when it dries out. And certain types of clay (those said to have a high shrinkage potential) shrink in volume dramatically when they dry out. Drying normally only occurs just below the surface of the ground but if clay with a high shrinkable potential dries out to a greater depth than your house foundations the ground under your foundations could subside.

The effect of trees

In dry weather tree roots will search out moisture and may get into your drains - with the possibility of damage to the pipes, or the nuisance of a blockage. Tree roots seldom cause impact damage to buildings but the amount of moisture they take out of the ground can be significant. Some deciduous species consume 10,000 gallons of

water a year and in very dry weather their fine roots will extract moisture from within the clay itself - causing the clay to dry out, and shrink, at greater depths than normal. It is in this way that the nearness of certain species of trees, or at least their roots, can contribute to subsidence.

Uprooting, or cutting down, the offending trees may not be the answer - or you run the risk of "heave". Heave occurs when clay that has been in a fairly dry state is subjected to higher levels of moisture - causing it to swell up: Enormous pressure is exerted, sometimes enough to lift, and damage, a building. Shrinkable clay is likely to swell up in wet weather if trees which previously absorbed much of the moisture are taken out. Once heave has occurred it can take many years for "swollen" clay to settle down again.

Taking action

If it is of any consolation I have never yet heard of a building collapsing as a result of subsidence caused by clay shrinkage, and I have seldom had reason to suggest urgent repairs - except in the case of wide cracks, when I do recommend the structure should be kept weathertight. There is often good reason not to undertake elaborate repairs too soon; a shrinkable clay might regain its former volume after a wet season, and I have had cases where it is virtually impossible to find cracks that have subsequently closed up. Sometimes it is appropriate to fix "tell-tales" (finely calibrated plastic strips, or metal studs) over cracks and to accurately monitor any subsequent movement on a regular basis over, say, 18 months before deciding on remedial action.

If the cracks are significant (more than, say, 5mm wide), or if you are in any doubt about the reason for cracks appearing in your house, professional advice should be obtained. If subsidence is diagnosed, and if it is thought necessary to provide a firm base for the existing foundations, underpinning might be suggested. Traditional underpinning means excavating beneath the existing foundations, and constructing deeper concrete foundations, but more elaborate measures such as the provision of reinforced concrete beams and concrete piles might be needed to extend the foundations to a depth where the subsoil will remain stable and in this case the work would certainly have to be entrusted to a specialist contractor. In either case it can be a very expensive operation yet isn't always the right answer: I have in the past seen several disastrous examples of subsequent differential movement - between the part of a building where the foundations have been underpinned and the other parts where the foundations have not.

Where small amounts of cyclical movement are found to be occurring (in other words, movement occurring on a regular basis each year when a shrinkable clay soil expands and contracts through the wet and dry seasons) it is often much better to form expansion joints in the structure, filled with a polysulphide sealant that will remain flexible and thus accommodate future movement, rather than to embark on underpinning. This solution is very often appropriate where cracks have occurred between two parts of a building that have been constructed at different times - with foundations having different characteristics.

If you think nearby trees have caused, or contributed to, subsidence within your property seek advice from a qualified arboriculturist or from a qualified surveyor, engineer or architect who fully understands the relationship between trees and buildings.

Claiming on your house insurance

The bad news is that most home insurance policies in France do not provide cover for subsidence. However, the good news is that your insurer might entertain a claim if your departement has declared a zone sinstrée (disaster area): I understand this has happened in one or two parts of south west France this autumn following the sécheresse. If it looks as though you are going to be involved with expensive repairs find out from the Mairie whether a sinistre has been, or might be, declared.

When you buy an old house in France you half expect there to be cracks and bulges in the walls. It's all part of the character. Cracks in the plaster on walls and ceilings is more often than not simply the result of old age, where the plaster has deteriorated and lost its "key" to the structure behind: Sometimes the rate of deterioration has been accelerated over the years by moisture getting through the walls or the roof - and as well as repairing the plasterwork you need to ensure that kind of water penetration can no longer occur. Beware of loose ceiling plaster, and make sure it is repaired or renewed before it falls; in some cases you can leave cracked and loose plaster in place and securely fix plasterboard or timber boarding directly underneath.

Cracked plaster over windows and doors, particularly in newer properties, is very often the result of differential thermal movement between a concrete lintel over the opening and the surrounding structure and in this event is nothing to worry about. But in old buildings, where timber lintels were used to support the masonry over windows and doors, cracks in the plaster surface internally can be an indication of rot in a concealed lintel - especially if the outside face of the wall is porous.

Whereas cracked and loose mortar joints in the outside face of a masonry wall do not themselves necessarily indicate a structural problem it is important to ensure the joints are kept fully weathertight - particularly in the case of solid walls where moisture that is able to pass through the masonry can have an adverse effect on timber that is built into, or is in contact with, the inside face of the wall. A weak mix, or lime-based, mortar should be used when re-jointing or re-pointing old brickwork or soft stonework to avoid future damage to the masonry itself. Re-pointing is a laborious job that, done properly, requires a skilled artisan; it is therefore expensive, and is why the cheaper option of an external render or a spray-applied finish has been adopted so often in the past. It is especially important to keep such external finishes weathertight: Moisture that is able to get through cracks in the render will become trapped behind, and will soak into the wall; in very cold weather such moisture can freeze, and in doing so will expand, thus causing further damage to the surface.

Walls of "solid" stonework are invariably built with two faces of stone, with rubble infill: Cracks and bulges in one or other face can indicate that one side of the wall has become unstable and in this event the only sure remedy may be partial reconstruction. More commonly, especially where the building has one or two floors above ground level, the bulge seen in an external wall (sometimes accompanied by vertical cracks) may have resulted from a lack of "lateral restraint" - in other words the wall is too long, or too high, with inadequate support along its length or height. This is often found to occur where the floor joists, or main beams, run parallel to the wall - with little or nothing built in to give the wall lateral support.

Ian Morris is a Chartered Surveyor with over 35 years professional surveying experience undertaking pre-purchase surveys both in the UK and in France. He is the author of three books and numerous magazine articles on a variety of building topics and has been interviewed about building problems and home improvements on both radio and television.

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