

# CRACKS

Why do buildings crack and when should you become concerned?

Although it is difficult to appreciate, buildings move around for a variety of reasons and the majority of these are not serious at all. The Building Research Establishment undertook an extensive survey of building defects and found that less than 20% were related to strength or stability. So hopefully if you spot a crack, the chances are it's nothing to worry about.

When you do find a crack measure the width (don't be shy about using a ruler - I don't know anyone who can estimate crack widths accurately) also don't worry about how long the crack is or how many courses of brickwork it might pass through (the crack length is rarely of importance unless it is a very localised feature). The following table based upon BRE guidelines helps to classify the damage:

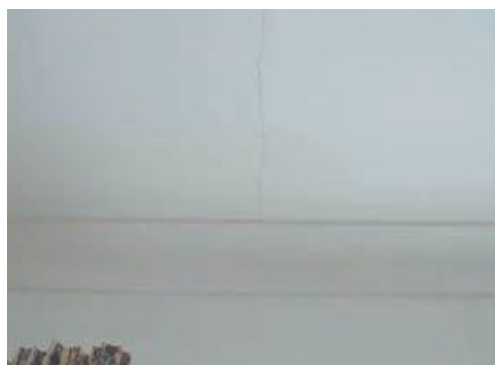
Crack Width (mm)	Category	Classification
Less than 2mm	Very slight	Aesthetic
2mm to 5mm	Slight	Aesthetic
5mm to 15mm	Moderate	Serviceability
15mm to 25mm	Severe	Serviceability
Over 25mm	Very severe	Stability

Cracking which is Aesthetic purely affects the appearance and whilst it might be unsightly it has no effect on the structural integrity. By contrast damage within the Serviceability category might affect the weathertightness or could result in damage to service pipes (e.g. gas or water mains may suffer damage). Only cracking beyond 25mm (or an inch for those non-metric people amongst us) would start to affect the stability. This is good news because it means that buildings can move an incredible amount before they start to become remotely dangerous.

So to try and give some advice about the more common forms of cracking:

## Thermal Movement

Thermal cracking, either expansion or shrinkage, is often characterised by vertical cracks with a relatively constant width, usually less than 2mm wide. The cracks often form at the junction of extensions or at the joint between different materials (for example solid walls and stud partitions). Externally, the cracks can form at the mid-point of the wall or more often near the end returns because wall ties tend to restrain cavity walls.



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### Disclaimer

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*Above Right: "Lintel failure allows a triangular section of brickwork above the window to drop down."  
Left: "Loading from beams or purlins without supporting padstones can cause cracking."*

### **Lintel failure**

Lintel failure allows a triangular section of brickwork above the window to drop down. Often it happens when old metal frame windows are replaced with new upvc windows.

### **Loading**

Loading from beams or purlins without supporting padstones can cause cracking because the loading creates additional shear stresses. Although unsightly it is seldom a serious problem.

### **Subsidence or Heave**

Buildings subside when the foundations lose support, this can happen when trees take moisture from clay soils causing the soil to shrink or leaking drains soften or erode the sub-soil.



From level monitoring exercises it is interesting to see that buildings do move around (often by up to 10mm) without cracking. Effectively the building can deflect without cracking even though brick buildings are relatively brittle. Timber frame buildings can tolerate much larger movements without damage, because timber has much better tensile strength.

To get back to the theme, subsidence cracks usually taper, often they extend below door or window openings and typically they will affect both leaves of the cavity wall together with the floors.

### **Sulphate Attack**

Sulphate attack is the name given to a chemical reaction between sulphate in solution and the cement paste (contained either in concrete or mortar). The reaction is expansive, so that in severe cases floors heave out of level and usually displace the brickwork beneath dpc level outwards.

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## Summary

The vast majority of cracks are no reason for concern, but if they taper or exceed 2mm in width then they might result from subsidence and it's worth taking professional advice. Equally, it can sometimes be difficult to establish the precise cause of cracking (even the professionals sometimes need to undertake detailed level surveys, site investigations or monitoring to confirm the cause) so again, if in doubt take advice.

As with most problems good early advice saves a great deal of time and cost in the long run.

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