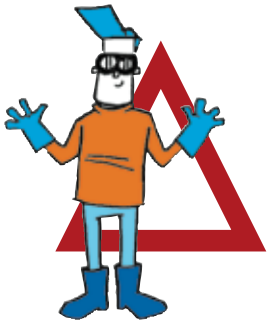
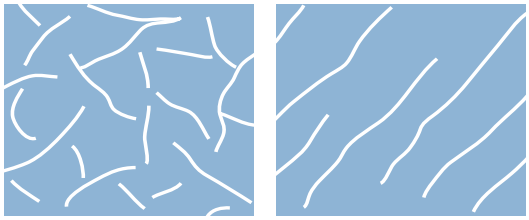
on site



Avoiding Surface Imperfections in Concrete: Plastic shrinkage cracks



WHAT ARE PLASTIC SHRINKAGE CRACKS?

These are cracks that start to form before the concrete has set (ie is still 'plastic'), but which may not become evident until the next day. The cracks may form a random pattern or be roughly parallel to each other. They are typically 300 to 600 mm long and up to 3 mm wide (tapering very quickly over their depth).

Although often quite small and shallow initially, subsequent movement can cause the cracks to increase in size and seriously impair the concrete's performance.

WHY DO PLASTIC SHRINKAGE CRACKS OCCUR?

During placement, moisture rises to the concrete surface (a process known as bleeding). If this surface water evaporates quicker than it is replaced by further bleeding, the surface layer of the slab dries prematurely and cracks.

The rate of evaporation of the bleed water is determined largely by environmental conditions, with high temperatures being an obvious contributor to rapid evaporation. However, humidity and wind speed are also major factors; a combination of low humidity and high wind can in fact provide the worst conditions.

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WHAT SITE PRACTICES CAN MINIMISE THE RISK OF PLASTIC SHRINKAGE CRACKING?

Controlling the rate of drying of the concrete surface is the key to minimising the occurrence of plastic shrinkage cracking.

Appropriate site practices to help achieve this are:

1. Dampen the subgrade and formwork prior to placing the concrete – but remove any surface water. *This reduces the risk of moisture loss from the bottom of the slab, leaving more available to 'do the job' at the top.*
2. Provide wind breaks to reduce the slab's exposure to wind. *This can be achieved most easily when walls or wall framing are in place before the slab.*
3. Spray evaporative retarders (eg aliphatic alcohols) over the surface immediately after screeding and whilst bleed water is still present. In severe conditions, repeat the application. *Note that this is not a substitute for curing.*
4. Commence curing regime promptly after finishing and continue for the specified period.

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