



USING CONCRETE IN COLD WEATHER

Special care must be taken when placing concrete in cold weather. If young concrete is allowed to cool too much below freezing point it will be damaged to such an extent that it will be unfit for use. It should also be noted that even if temperatures do not drop below zero the concrete will develop strength much more slowly than during warmer months.

The following advice on should help ensure your project is completed successfully in cold weather.

Two different temperatures must be considered when working with concrete in cold weather – ambient air temperature and concrete temperature.

If freshly placed concrete cools below 0°C the water in the mix will freeze and expand. This could damage the concrete making it weak and unfit for purpose.

If the concrete can reach a strength of approximately 2Mpa it can largely resist this disruptive expansion. For most concrete this can be achieved in 48 hours if the concrete temperature can be maintained above 5°C. However, even after the concrete has reached 2Mpa low temperature will slow down strength development.

The aim when placing during cold weather is to ensure that the concrete temperature is maintained above 5°C to avoid damage and to allow strength to develop albeit at a slower rate.

AMBIENT TEMPERATURE BELOW 5°C BUT NO FROST

When the temperature is low, but does not drop below freezing, there is no danger that the concrete will be permanently damaged. It will, however, take longer to develop strength.

It is important that formwork is not removed too soon. Corners and arrises may be knocked off and concrete in suspended slabs or beams may not have sufficient strength to carry their own weight.

Rate of strength gain can be increased using straight CEMI in lieu of GGBS or PFA in the mix.

SLIGHT FROST AT NIGHT

It is essential to protect concrete from freezing. All freshly placed concrete must be protected immediately. The concrete temperature should not be below 5°C when delivered. There will be occasions when the ready mixed concrete supplier cannot guarantee this temperature on delivery. If this happens, the customer must decide whether they can adequately protect the concrete once placed.

Protection of placed concrete may be in the form of frost blankets, insulated formwork. Timber formwork by itself usually offers sufficient insulation for beams, columns and walls. The only additional protection necessary is to cover exposed concrete surfaces with insulating material or erect temporary covers and provide heating with space heaters.

Prior to placing ensure that formwork, sub-bases, reinforcement and any transporting and placing equipment that will come into contact with concrete are free from ice and frost.

SEVERE FROST DAY AND NIGHT

If concrete cannot be delivered above 5°C, and the ambient temperature remains low, then it is advisable to delay concreting until the ambient temperature has risen.

