



Concrete curing

A slab-on-grade foundation is constructed from concrete. Concrete is a composite material, consisting of coarse aggregate, sand, cement, and water. Curing is a process in which the cement and water in the concrete bond and harden through a chemical reaction called hydration. As they bond, the cement and water bind the aggregate and sand to form a strong foundation structure. Proper curing is critical to the strength and durability of concrete.

Hydration

Hydration is a chemical process that hardens concrete. When a slab-on-grade foundation is curing, it's very important to provide enough time for hydration to take place. Hot and dry conditions make water evaporate more quickly from the slab surface; they can cause concrete to harden more quickly, ultimately leading to a weaker material that's at a greater risk of curling and cracking. The surface of the slab must be kept moist in order to prevent water from evaporating too quickly. Inadequate hydration reduces the slab foundation's strength, durability, impermeability, resistance to abrasion, and resistance to freeze-thaw cycles.

There are several different ways to keep the slab surface moist during the curing process. One method is to apply curing blankets for a minimum of three days. Curing blankets are burlap sheets that cover the slab. The sheets should be wetted periodically to keep the concrete surface moist. However, they shouldn't be applied until the concrete has cured enough to resist surface damage.

Slab curling

If the slab cures unevenly, it can result in a phenomenon called slab curling, in which the slab surface cures faster, and therefore shrinks more quickly, than the slab core. When the slab surface shrinks and pulls inward, the slab tries to curl upward. In most cases, the slab doesn't actually curl. As the slab tries to curl, it usually cracks instead.

Often, when weather conditions are hot and dry, excess water is added to the mix to make it easier to work with and to extend the working time. However, the excess water can cause the slab to curl unevenly and increase the likelihood of slab curling. One effective way to reduce the water content while maintaining workability is to add a plasticizer to the mix. Plasticizers increase the strength, fluidity, and workability of the concrete mix without adding water.

A proper curing process leads to a slab-on-grade foundation that's stronger, durable, and wear-resistant. Curing helps concrete attain its optimum strength, maximizing the foundation's lifespan.

To learn more about concrete, visit:

Concrete Construction Online
Concrete Network
Portland Cement Association
