Why a solid sub-base and reinforcement matter for a lasting patio

Pouring concrete for patios is a job that looks straightforward: mix, pour, level, wait. But anyone who has watched a new slab crack or settle unevenly within a year knows that what happens before the pour matters more than the pour itself. The ground beneath the concrete and the steel or fibre running through it are what stop a patio from turning into a tilted, cracked disappointment.

A patio slab does not just sit on top of the soil. It has to carry foot traffic, garden furniture, planters, perhaps a barbecue or a fire pit, and in winter the weight of snow and frost heave. Soil alone cannot support that load evenly. Clay soils swell when wet and shrink when dry. Sandy soils shift under vibration. Topsoil contains organic matter that rots and leaves voids. Without a properly prepared base, the concrete has no uniform support and will crack along its weakest lines.

What sub-base preparation actually does

The sub-base is a layer of compacted granular material placed between the soil and the concrete slab. Its job is to spread the load from the concrete over a wider area so the soil underneath does not deform. Think of it as a bridge between the soft ground and the rigid slab. A typical sub-base is 100 to 150 millimetres of crushed stone or hardcore, compacted in layers. The material must be angular, not rounded, so the pieces lock together under compaction. Rounded gravel rolls and shifts; crushed rock bites into itself and stays put.

Compaction is the key step. Loose fill settles under its own weight and under the weight of the concrete, and the slab follows it down. A compaction plate or a vibrating roller driven over the sub-base in passes will get the density up. The rule of thumb is that you should not be able to see footprints after the compactor has passed. If you can, the material is too thick or the wrong type, and it will settle later.

Drainage matters too. Water trapped under a slab freezes and expands, lifting the concrete. A well-graded sub-base allows water to drain away laterally, reducing the risk of frost heave. In heavy clay soils, a layer of geotextile fabric between the soil and the sub-base stops fine particles from migrating upward into the stone, which would clog the drainage paths over time.



Reinforcement: stopping cracks before they start

Concrete is strong in compression but weak in tension. When a slab bends under a load, the underside stretches. If that stretch exceeds the concrete's tensile strength, a crack opens. Reinforcement takes the tensile load, holding the concrete together even when it tries to pull apart.

Steel reinforcement mesh is the traditional choice. Laid in the middle of the slab thickness, it turns a single brittle slab into a composite material that can handle some bending. The mesh must be supported on small plastic chairs or stones so it does not sit on the bottom of the pour. If it ends up on the sub-base, it does nothing useful because the tensile zone is in the middle and the lower part of the slab, not at the bottom.

Fibre reinforcement is a newer alternative. Tiny synthetic or steel fibres are mixed into the concrete before pouring. They spread throughout the slab and provide three-dimensional crack control. Fibres do not replace the structural strength of a steel mesh in thick slabs, but for a domestic patio they often give enough crack resistance and save the labour of placing and tying mesh.

Both types have a limit. Reinforcement does not make a slab indestructible. It controls cracking from normal loads and temperature changes, but it cannot fix a poor sub-base. If the ground settles, the reinforcement will stretch and eventually the concrete will crack anyway. The sub-base and the reinforcement work as a pair; one cannot compensate for the other being wrong.

Formwork and the pour itself

Formwork is the temporary frame that holds the concrete in place until it hardens. It defines the shape, level and edge of the patio. The formwork must be strong and well braced because wet concrete is heavy and pushes outward. A common mistake is using thin timber that bows under the pressure, giving a wavy edge. The top of the formwork also acts as a guide for levelling, so it must be set to the correct height and slope.

A patio needs a slight fall away from the house to shed rainwater. A fall of 1 in 80 (roughly 12.5 millimetres per metre) is typical. If the slab is flat or falls toward the building, water pools against the wall and can cause damp problems. The formwork should be checked with a level before any concrete arrives.



The concrete itself needs the right consistency. Too wet and the aggregate sinks, the surface weakens and the slab shrinks more as it dries, increasing crack risk. Too dry and it is hard to compact around reinforcement. A slump of around 75 to 100 millimetres is common for patio work, but the mix design should be chosen for the application. A supplier like staceyconcrete.co.uk can advise on a suitable mix for outdoor slabs, taking into account the local ground conditions and the planned use of the patio.

After the concrete is poured, it must be compacted to remove trapped air, then screeded to level and floated to close the surface. The timing of the finishing steps matters. If the surface is worked too early, water rises and weakens the top layer. Too late, and the concrete has set too much to be smoothed properly.

Curing: the step that is often skipped

Curing is the process of keeping the concrete moist while it gains strength. Concrete hardens by a chemical reaction that needs water. If the surface dries out too fast, the reaction stops and the top layer becomes weak, dusty and prone to cracking. A patio left to dry in sun or wind without protection can lose its surface integrity within hours.

The simplest cure is to cover the slab with wet hessian or plastic sheeting and leave it for at least three days, longer in cold weather. Spray-on curing compounds form a membrane that holds moisture in. Whatever method is used, the concrete should not be allowed to dry out for at least a week after pouring. The longer it cures, the stronger and more durable it becomes.

What can go wrong when preparation is skimped

Skipping or rushing the sub-base almost always leads to visible problems. Cracks that follow a line across the slab, often at the narrowest point, mean the ground has settled unevenly. A corner that drops means the sub-base was not compacted enough at the edge. A slab that lifts in winter means water got underneath and froze. None of these are caused by the concrete itself. They are all failures of what was underneath.

Reinforcement placed too low or omitted entirely leads to wider cracks that do not stay tight. A tight hairline crack is usually harmless. A crack that is several millimetres wide lets water in, and freeze-thaw cycles widen it further. Over a few winters, a serviceable patio becomes a hazard.



Formwork that is not level or not sloped correctly creates a surface that collects water. Algae grows, the surface becomes slippery and the standing water accelerates wear at the low points. A patio that looks good on day one but ponds water after the first rain is a job that will need redoing sooner than it should.

Getting the details right

For anyone planning concrete for patios, the takeaway is simple: the visible slab is only the last part of the construction. The work that disappears under the concrete determines how long the patio lasts. A deep, well-compacted sub-base of angular stone, a fall of at least 1 in 80 away from the house, reinforcement placed at the correct height, and a proper curing period are not optional extras. They are the difference between a patio that stays level and crack-free for years and one that needs patching or replacing within two seasons.

It is worth talking over the ground conditions with a supplier before ordering. For a Derbyshire project, a local supplier such as staceyconcrete.co.uk can discuss the mix and the reinforcement options that suit the soil type and the patio's expected use. Getting the ground prep right first saves a lot of trouble later.