

## Starter Bars

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As the name suggests, starter bars are reinforcing bars cast into a member to give a lapped connection to further reinforcement in another concrete element to be cast against it.



The easiest, and normally the cheapest method of creating starter bars is to simply have them projecting from the surface of the concrete. This is relatively easy when projecting from the top surface as shown. However, if the bars need to project through the formwork then difficulties arise. Timber formwork needs to be either slotted or have holes in the correct locations. Both options damage the formwork and can cause difficulties when stripping. Steel formwork creates even greater problems.

Projecting reinforcement can cause a safety hazard for both trips and falls. The bars should have protective caps to minimise these risks.



Projecting bars in precast concrete cause additional problems with storage and transport, and as a result are not commonly used.



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Where starter bars are needed from a previously cast surface, they may be embedded in resin. Holes are drilled into the concrete in the required positions and the bars are fixed in with resin. There are many suitable resins available, and most suppliers have software or other design aids for checking the design of such a connection.

The resin may be introduced via a gun, or in a glass capsule that is broken by the bar, allowing mixing to occur. Care must be taken to treat the drilled hole as recommended by the resin supplier to ensure adequate anchorage. The resin method is particularly useful for fixing of items such as posts or barriers where accurate location is needed.

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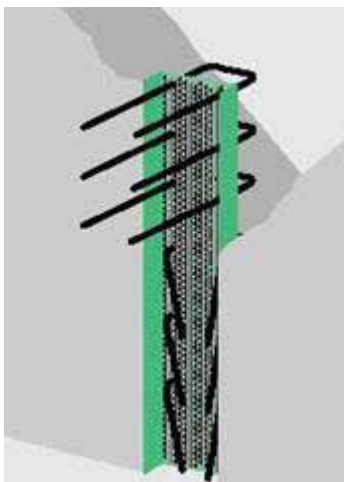
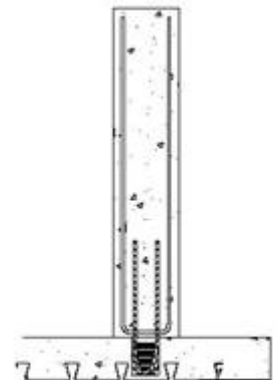
The easiest way to avoid having to have bars projecting through the formwork is to use a mechanical system that is in two parts. The simplest such system for starter bars is the screwed bar. An extension with a female thread is swaged onto a bar, which is then cast-in the concrete. A corresponding male thread is cut into the second bar. To avoid loss of cross section, the end of the bar is 'thickened' before the thread is cut.



These simple couplers can only be used with straight or nearly straight bars. However, by using a pair of female bars and a double ended male couple with a left-handed and right-handed thread, it is possible to connect bars with bends which could not otherwise be screwed-in due to clashing with each other.



A simple variation on single threaded bars uses metal formers to create voids in the concrete. Special bars then click into these before the second pour takes place. This system has the advantage of being able to work in shallow members such as floor slabs with metal decking to form upstands etc.



The mechanical systems above rely on the second bars being introduced after the formwork is stripped. An alternative system has the starter bars contained within a 'box' that is cast into the first element. After stripping, the bars are bent out of the box to form projecting bars.

This system is supplied by a number of companies, and many variations are available in both size and number of bars.