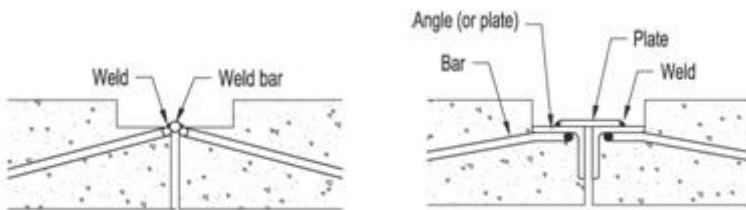


Weld Plates

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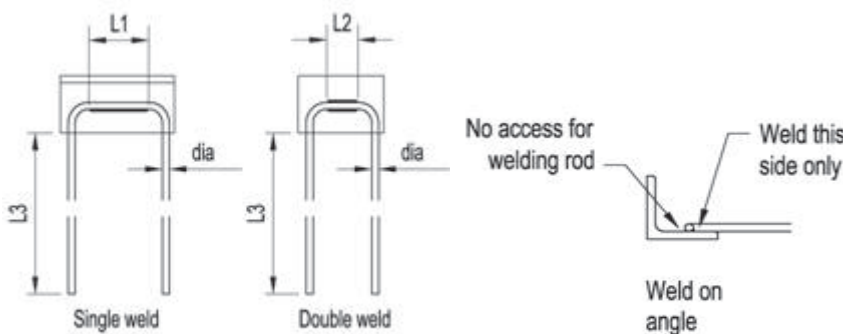
Welding is often used as a means of connecting elements together. The advantage of this over other means such as insitu 'stitching' or grouting is that an instant connection is made, often without the need to temporarily prop whilst the insitu cures.



It is possible to form the connection from two pieces of reinforcing bar cast in, with a third piece in between. However, the more usual way is to have a 'weld plate' on the surface with a bar or plate between them. This is often recessed to allow a smooth appearance in the final state.

Clearly such plates need to be anchored into the unit, and this is normally done via bars welded onto the plate, projecting into the body of the unit.

It is vital that these bars are correctly detailed with regard to size, weld, and also orientation if they are to function properly. Normally the size of the plate, the bar, and the weld will be determined by the load to be carried.



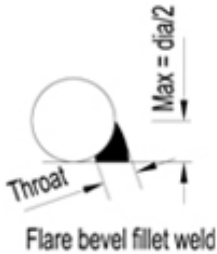
Welds may be single sided or double sided. However, with certain situations, as for instance on an angle, double sided may not be possible due to lack of access for a welding gun/rod. In this case a single weld must be used, and the length will increase. The type of weld used to attach a bar to a plate in this way is a 'flare bevel fillet weld'. It must be made clear when detailing whether the weld is single or double.

Bars must be anchored into the unit by a full bond length. This is measured from the edge of the plate, since this is the point at which the bar becomes surrounded by concrete. If the profile does not allow a full bond length, then hooks or bends may be used.

The following table gives approximate guidance on weld sizes etc for various bar sizes, to achieve the full capacity of the bar. The throat thickness is limited to 0.3 x bar dia. Lengths include a 'run-out' allowance of (dia / 2) at each end.

Weld Plates

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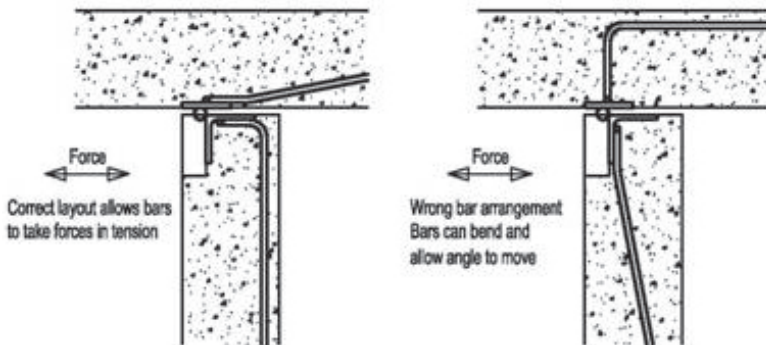


Single bars	Bar Dia	Throat thickness	Min length for single weld (L1)	Min length for double weld (L2)	Minimum bond length (L3)
	8 mm	2.4 mm	65 mm	37 mm	255 mm
10 mm	3.0 mm	82 mm	46 mm	320 mm	
12 mm	3.6 mm	98 mm	55 mm	380 mm	
16 mm	4.8 mm	131 mm	74 mm	510 mm	

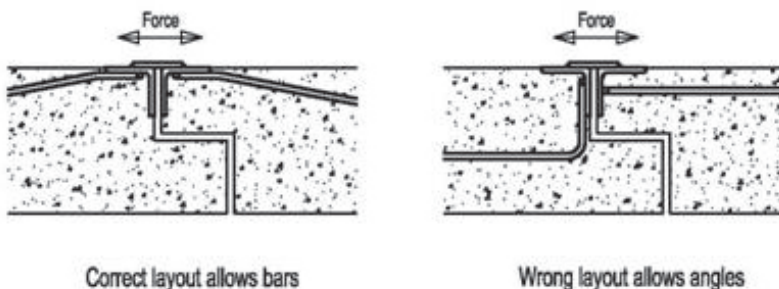
For simplicity, weld size is specified as half the dia of the bar

Double (U) bars	Bar Dia	Throat thickness	Min length for single weld (L1)	Min length for double weld (L2)	Minimum bond length (L3)
	8 mm	2.4 mm	123 mm	66 mm	255 mm
10 mm	3.0 mm	153 mm	82 mm	320 mm	
12 mm	3.6 mm	183 mm	98 mm	380 mm	
16 mm	4.8 mm	244 mm	130 mm	510 mm	

When detailing welds, plates etc, the direction of the force needs to be considered. Efforts should be made to ensure that the bar is acting in tension, and that 'out of balance' situations are avoided where possible.



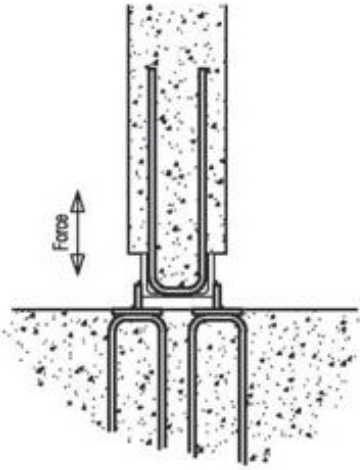
For a simple wall-to-wall connection, a plate and a recessed angle is efficient. The bars in the good detail run from the weld in a parallel direction to the force. In the bad detail the bars can bend, allowing movement.



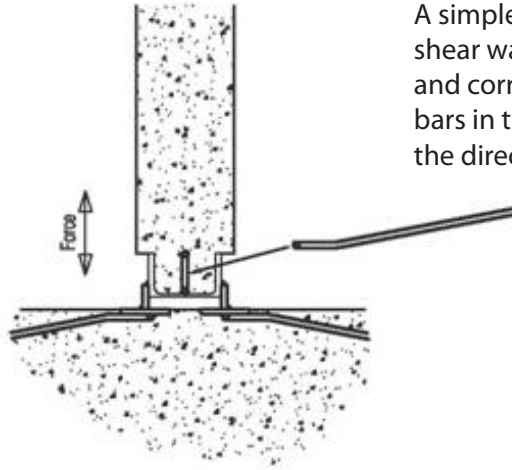
A beam-to-beam connection taking horizontal forces. In the bad detail the angles could rotate if the bars bend.

Weld Plates

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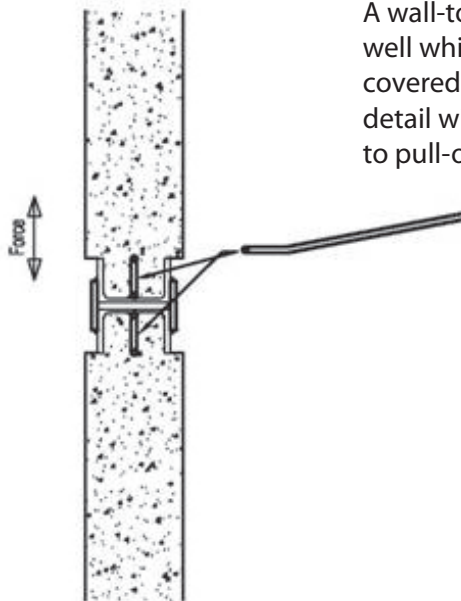
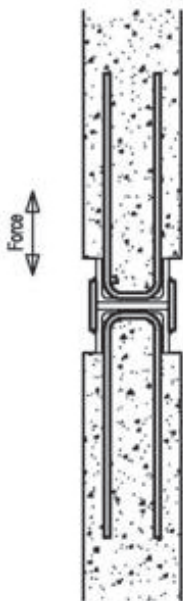


Correct layout allows bars to take forces in tension



Wrong layout allows plates to pull out or rotate

A simple wall-to-floor connection for a shear wall. The loads can be very high and correct detailing is important. The bars in the bad detail are very weak in the direction of the force.



A wall-to-wall connection for a stair well which allows the fixing to be covered over. The bars on the bad detail will provide almost no resistance to pull-out.