

## SHEAR PLATE

The present invention relates to a shear plate for a cast-in ferrule.

Internally threaded ferrules may be incorporated into a concrete component, such as a wall panel or beam, during casting thereof to provide within the cast component a fixing point for subsequent attachment. The deep embedment of the ferrule within the concrete in conjunction with a transverse tie bar through the inner end of the ferrule and/or an enlarged base portion of the ferrule ensures that the ferrule is firmly anchored against axial loading. Provided the ferrule is sufficiently spaced from the edge of the component, the ferrule is also able to carry a substantial shear loading as a result of the inherent strength of the concrete between the ferrule and the edge of the component. That effect cannot, however, arise if the ferrule is situated relatively close to the edge of the component and in that case, ferrules have not conventionally been used in a situation where it will be subject to a shear loading in a direction towards the adjacent edge.

According to the present invention there is provided a shear plate for application to the outer end portion of a ferrule to be cast into a concrete component, the shear plate having an outer portion engageable with the ferrule and, beyond the outer portion, a portion shaped to incline away from the adjacent surface of the concrete component to which the outer end of the ferrule is to be exposed.

In a preferred embodiment the outer portion is itself of plate-like form to extend substantially parallel to the said surface of the component. The plate-like portion has an aperture within which the outer end portion of the ferrule is received. The plate-like portion may have a second such aperture longitudinally spaced from the first to receive a second ferrule.

Advantageously, beyond the inclined portion, the plate terminates in a pair of oppositely inclined leg portions to provide for increased anchorage. Alternatively the inclined portion can be formed with one or more apertures for this purpose.

The present invention also provides a cast concrete component having cast therein at least one internally threaded ferrule associated with a shear plate as defined above, the ferrule being installed close to an edge of the component and the shear plate extending away from that edge substantially at right angles thereto.

An embodiment of the invention will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a shear plate in accordance with a preferred embodiment of the invention;

Figure 2 is a perspective view similar to Figure 1 but showing a pair of ferrules installed to shear plate; and

Figure 3 is a side view.

There is shown in the accompanying drawings a shear plate for application to a ferrule in a situation where it is subject to a shear loading with the ferrule placed relatively close to an edge of a concrete component; a wall panel for example, with the ferrule extending at right angles to a panel surface at right angles to that edge so that the outer end of the ferrule is exposed to the panel surface and thereby the threaded bore of the ferrule opens onto that surface. The shear plate comprises an outer portion 2 adapted to extend parallel to that surface of the concrete component to which the outer end of the ferrule is to be exposed. This portion of the plate is apertured for application over the outer end portion of the ferrule. In the particular embodiment shown the outer portion of the plate is provided with two such apertures 4 longitudinally spaced for engagement over two laterally spaced ferrules 6 for use in situations where two closely spaced fixing points are required in the cast component. However, it will be understood that the shear plate can be used with only a single ferrule and in an alternative version the outer portion 2 of the plate may be formed just with a single aperture 4 and thereby for use with a single ferrule.

Beyond the outer portion 2, the plate is formed with a portion 8 inclined inwardly, that is in a direction away from the surface of the component, to thereby increase the depth of

embedment. Beyond the inclined portion 8 the plate is divided into two leg portions 10, one bent upwardly and the other downwardly, for increased anchorage. While the presence of the two divergent leg portions 10 at the remote end of the shear plate is preferred, nevertheless in an alternative version they could be omitted as for some applications the downwardly inclined portion of the shear plate may itself be sufficient to provide the required anchorage under the applied shear loading. In an alternative, the inclined portion could include one or more apertures possibly of elongate shape in which concrete is received during casting in order to increase the anchorage. The aperture(s) can be formed by a punching operation.

The portions 2, 8, 10 of the plate are integrally formed from a metal blank of required length by stamping/pressing, and the aperture(s) 4 is also formed in the same manner.

In use, the shear plate is applied to a ferrule 6 (or a pair of ferrules) located close to the edge of a wall panel or other component, with the shear plate extending away from that edge in a direction at right angles to the edge so that the plate is able to provide shear resistance to shear loading applied to the ferrule(s) in a direction towards that edge.

By the provision of the shear plate the range of possible applications of cast-in ferrules is able to be increased. By way of example only, a pair of ferrules can be installed close to the vertical edge of a wall panel to form anchorage points on the surface of the panel for a connection system for connecting that panel to an adjacent panel in an erected wall structure.

The embodiment has been described by way of example only and modifications are possible within the scope of the invention.

**CLAIMS:**

1. A shear plate for application to the outer end portion of an internally-threaded ferrule to be cast into a concrete component, the shear plate having an outer portion including an aperture to receive the ferrule and, beyond the outer portion, a portion shaped to incline away from the adjacent surface of the concrete component to which the outer end of the ferrule is to be exposed.
2. A shear plate according to claim 1, wherein the outer portion is of plate-like form to extend substantially parallel to the said surface of the component and having the said aperture within which the outer end portion of the ferrule is received so that the ferrule extends substantially at right angles to the outer portion.
3. A shear plate according to claim 2, wherein the outer portion has a second aperture longitudinally spaced from the first to receive a second ferrule.
4. A shear plate according to any one of claims 1 to 3, wherein the plate terminates beyond the inclined portion in a pair of oppositely inclined leg portions to provide increased anchorage for the plate.
5. A shear plate according to any one of claims 1 to 4, wherein the inclined portion is formed with at least one aperture for receipt of concrete during casting of the component whereby to provide increased anchorage.
6. A cast concrete panel, having cast therein at least one internally threaded ferrule associated with a shear plate according to any one of the preceding claims, the ferrule extending at right angles to a face of the panel close to an edge of the panel and the shear plate extending away, from that edge substantially at right angles thereto with the outer portion of the shear plate extending substantially parallel to that face.