

**SEALING PLATE FOR RAILWAY RAIL CLIP ANCHORING DEVICE AND
SLEEPER MANUFACTURING METHOD**

The present invention relates to a sealing plate for a
5 railway rail clip anchoring device and a sleeper
manufacturing method.

In the documents WO93/12294, WO93/12295 and WO93/12296,
the present applicants disclosed a railway rail fastening
system in which a rail fastening clip is driven laterally
10 onto the rail and can be held in a clip anchoring device
(shoulder) in a "pre-assembly" or "parked" position in
which the toe portion of the clip does not bear on the
rail. This enables railway sleepers to be preloaded at the
factory with clips which are held in the pre-assembly
15 position such that when the sleepers are delivered to site
the clips can simply be driven home once the rail is in
place. In addition, when maintenance of the rail or
sidepost insulators (which lie between the rail and the
shoulder) is subsequently required, the clip can be driven
20 off the rail back into the pre-assembly position, or
further into an "insulator-change position" in which the
clip does not overlie the sidepost insulator, so complete
withdrawal of the clip from the shoulder is not necessary.
Such clips are sometimes known as "switch-on/switch-off"
25 clips. Such a fastening system has proved to be very
successful, but the applicant is desirous of making
improvements to some aspects of its manufacture and use.

In a co-pending PCT application the applicants disclose
a shoulder in which the clip-engaging features on the lower
30 part of the walls of the shoulder are absent.

According to a first aspect of the present invention,
there is provided a sealing plate, for use with a rail clip
anchoring device having a head and a stem which extends
from the head into a concrete sleeper when the anchoring

device is in use, the plate being adapted for extending over the underside of the head when the stem of the device is being set in a concrete sleeper, thereby to prevent ingress of concrete into the head of the device, and for being retained on the surface of the sleeper thereafter, wherein a major face of the plate, which is uppermost when the sleeper is in use, is provided with at least one clip seat portion for receiving part of a rail clip.

Thus the sealing plate can replace the clip engaging features omitted from the shoulder which is the subject of the applicant's co-pending PCT application, and, if made of plastics material, also allows weight and cost, to be taken out of the overall assembly. The plate is desirably made, for example, of nylon, glass-reinforced plastic or similar.

Preferably, the plate is formed such that a seal is created around the periphery of the said major face of the plate when pressure is applied to the other major face, and is desirably made of plastics material.

Preferably, the plate is substantially rectangular in outline.

Desirably, one edge of the plate has a cut-out portion shaped for receiving a portion of the head of the anchoring device adjacent to the stem thereof. The cut-out portion may have a bevelled edge which matches a bevelled edge of the said portion of the head of the anchoring device.

The plate preferably comprises locating means for locating the plate on the head of the anchoring device.

The locating means may comprise at least one tab protruding from a major face of the plate for engaging with a corresponding feature on the anchoring device.

The or each clip seat portion may be of greater resilience to wear than other parts of the plate. The clip seat portions (heel seats) of the plate may be reinforced

with stronger material or with small steel bearing plates, to cope with the loads on this part of the assembly imparted by the heel portions of the clip.

5 The clip seat portion may comprise a projection, which is preferably L-shaped in plan.

The clip seat portion may have a clip-receiving surface which is shaped so as to match the profile of that part of the clip which is to bear thereon. By shaping the heel contact areas so that they match the shape of the heel bearing areas of the clip, the pressure on the plastic plate will be reduced.

10 The major surfaces of the plate may be formed with one or more apertures therethrough for receiving respective a portion of the anchoring device which extends from the underside of the head of the anchoring device.

The major face of the plate which is lowermost when the sleeper is in use is preferably provided with strengthening ribs which intersect to define a plurality of rebates. Thus, the plate is effectively hollowed out underneath, where possible, to reduce section thickness and material. These voids (rebates) are filled with concrete during sleeper manufacture, which means that the plate is fully supported across its whole lower surface.

20 When a sealing plate embodying the first aspect of the present invention is used in combination with a concrete sleeper into which it has been set, the major face of the plate which is uppermost when the sleeper is in use may desirably be flush with the uppermost surface of the concrete sleeper.

30 Typically, shoulders for retaining switch-on/switch-off clips are secured to concrete railway sleepers (ties) by embedding a stem of the shoulder in the concrete during manufacture of the sleeper. The sleepers are manufactured

upside down, so that the top of the finished sleeper is formed by the bottom of the mould pocket. During manufacture, the parts of the shoulder that stick up above the finished sleeper therefore stick down through apertures cut into the floor of the mould pockets at appropriate positions for this purpose. The stems of the shoulders that end up cast into the concrete sleeper stick up into the mould pocket before the concrete is poured. The first step in the manufacturing process is to turn the cast shoulder upside down and push it down from above through an aperture in the mould pocket to refusal. When the concrete has been poured and allowed to set, the sleepers are lifted out of the moulds and turned the right way up. A difficulty with the process is that if the apertures in the bottom of the mould pockets are not a very close fit around the edges of the cast shoulders, concrete will leak through the gap and it may then set on to parts of the shoulder above the finished concrete level and prevent the clip from engaging properly. On the other hand, if the aperture is too small, additional dressing off of the shoulder is required, which is very costly. Given that cast iron shoulders are subject to relatively wide tolerances - typically $\pm 0.8\text{mm}$ or more - and that the patterns used to produce them wear with time and so the physical size of the part reduces with time, it can be difficult to achieve a good compromise between the necessity of sealing and that of ensuring fit. This is especially the case if the shape of the aperture is relatively complex. Flexible rims fitted to the apertures may be a partial solution, but these wear and require maintenance.

According to a second aspect of the present invention, there is provided a sealing plate of the first aspect in

combination with an anchoring device for use in retaining a railway rail fastening clip, the anchoring device comprising two interconnected spaced-apart walls, between which a portion of the clip to be retained is held when the anchoring device is in use, and clip-engaging means, supported by the walls, for engaging a portion of the rail fastening clip to be retained, wherein the device does not have any feature or surface which engages the surface of that clip portion which faces downwardly when the clip is in use.

According to a third aspect of the present invention, there is provided a sealing plate of the first aspect in combination with an anchoring device for use in retaining a railway rail fastening clip, the device comprising two interconnected spaced-apart walls, between which a portion of the clip to be retained is held when the anchoring device is in use, and clip-engaging means, supported by the said walls, defining contact regions at which the device engages the rail clip to be retained when the clip bears on a railway rail, the device not engaging the clip at any other region of the device when the clip is bearing on the rail in normal operation, wherein none of the said contact regions of the device can be seen when the anchoring device is viewed from above when in its operative orientation in which it will be used when adjacent to a railway rail and wherein all of the said contact regions of the device can be seen when the anchoring device is viewed from below when in the said operative orientation.

According to a fourth aspect of the present invention, there is provided a sealing plate of the first aspect in combination with an anchoring device for use in retaining a railway rail fastening clip, the device comprising two

interconnected spaced-apart walls, between which a portion of the clip to be retained is held when the anchoring device is in use, and clip-engaging means, supported by the said walls, defining contact regions at which the device engages the rail clip to be retained when the clip bears on a railway rail, the device not engaging the clip at any other region of the device when the clip is bearing on the rail, wherein, when the device is in use, all the said contact regions of the device lie substantially at the same horizontal distance from the edge of the rail foot when measured perpendicularly to the axis of the rail and in the plane of the rail foot.

According to a fifth aspect of the present invention, there is provided a method of manufacturing a concrete sleeper with at least one embedded rail clip anchoring

device of the type having a head for retaining a rail clip and a stem extending from the underside of the head, in which method the floor of a mould, from which the sleeper is to be formed, is provided with an aperture, the head of an anchoring device is inserted through the aperture such
5 that the head of the device extends out of the mould and the stem of the device is located within the mould, and concrete is introduced into the mould, wherein before the concrete is introduced into the mould the aperture is
10 sealed off around its edges and around the underside of the head of the anchoring device by placing a sealing plate over the aperture on the floor of the mould, the plate overlapping and sealing around the edges of the aperture other than where the anchoring device is located and having
15 a mating interface with the anchoring device such that a seal is formed therewith.

Thus, the sealing plate may be used to seal the aperture in the mould pocket and prevent the ingress of concrete into the head of the shoulder. When in use the
20 sealing plate is effectively glued on to the top of the concrete sleeper, such that its top face is flush with the face of the top surface of the concrete on the sleeper top.

Preferably, before the sealing plate is introduced into the mould, it is connected to the anchoring device so
25 as to extend over the underside of the head, the sealing plate being introduced into the mould together with the anchoring device and located over the aperture when the head is inserted through the aperture. Thus, if designed to interlock with the shoulder, the sealing plate can be
30 accurately positioned with ease, and it cannot move up, forward or side-to-side. Nor can it move down or back because it is bonded to the concrete sleeper.

It can easily be made so as to have a simple outline, which need not match the outline of the shoulder, such as rectangular, so the aperture can also have a simple outline. If formed as a plastic moulding, the sealing plate can also have a much tighter tolerance than a cast-iron part, typically $\pm 0.15\text{mm}$. However, if the sealing plate is made so as to be significantly larger than the aperture, neither the exact size nor exact shape of the aperture is critical any longer.

When the aperture in the mould is substantially rectangular and a first face of the head of the anchoring device abuts one side of the aperture, the sealing plate is preferably shaped so as to mate with a second face of the head of the anchoring device, opposite to said first face, and to overlap the edges of the aperture on the other three sides thereof. The edge of the sealing plate which mates with the second face of the head may be bevelled so as to match bevelling on the said second face. The sealing plate is preferably a plate embodying the first aspect of the present invention.

According to a sixth aspect of the present invention, there is provided a method of the fifth aspect, employing a sealing plate of the first aspect or a sealing plate and anchoring device combination of the second, third or fourth aspect.

Reference will now be made, by way of example, to the accompanying drawings in which:

Figure 1 shows a sealing plate embodying the first aspect of the present invention, Figure 1A showing a perspective view from above, Figure 1B showing a plan view of the top surface of the sealing plate, Figure 1C showing a plan view of the underside of the sealing plate, Figure

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1D showing a sectional view taken along the line Y-Y in Figure 1B, Figure 1E showing a front view of the sealing plate and Figure 1F showing a cross-sectional view taken along the line Z-Z in Figure 1B;

Figure 2 shows an anchoring device suitable for use with a sealing plate embodying the first aspect of the

present invention, Figure 2A showing a perspective view from above, Figure 2B showing a front view, Figure 2C showing a part sectional view taken on the line Z-Z in Figure 2B, Figure 2D showing a rear view, Figure 2E showing
5 a side view, Figure 2F showing a plan view from above, Figure 2G showing a plan view from below and Figure 2H showing a side view of another anchoring device suitable for use with a sealing plate embodying the first aspect of the present invention; and

10 Figure 3 shows a railway rail fastening assembly employing a sealing plate embodying the present invention, in which Figures 3A and 3B show the assembly in a side view in which a rail fastening clip is in a pre-assembly position with respect to the rail, Figure 3B being a part
15 cross-sectional view, Figures 3C and 3D show another side view of the assembly in which the clip is bearing on the rail, Figure 3D being a part cross-sectional view, Figure 3E shows a rear view of the assembly and Figure 3F shows a perspective view of the assembly.

20 A plastic sealing plate 2 embodying the first aspect of the present invention will now be described with reference to Figures 1A to 1F. The sealing plate 2 has a first major face 20 which is uppermost when the plate 2 is in use on the top of a sleeper and a second major face 21 opposite
25 to the first. The sealing plate 2 is substantially rectangular in outline, having a cut-out portion along one side 22, defining ears 23 which ensure a seal at the corners of a shoulder 1 located above the plate 2 within the cut-out 22. The cut-out 22 has a bevelled edge 22a
30 which mates with a corresponding bevelled edge on the rear face 15 of the shoulder 1. The cut-out 22 also has radiussed recesses 24 for mating with corresponding radiussed portions of the shoulder 1.

The first major face 20 of the sealing plate 2 is formed with two clip seat projections 25, which are substantially L-shaped and are located in respective corners of the first major face 20 adjacent to the side of the plate which is opposite to that having the cut-out 22. The clip seat projections 25 have respective top surfaces 25a, which are planar in Figs. 1A to 1F, but may have some form of profile (see Fig. 3F) to match that of the part of the clip which is to bear on the projections 25, with a view to reducing plastic flow and wear in these areas. The plate 2 may have reinforcement in the region of the clip seat projections 25, for example the projections may be formed of a stronger material or reinforced with small steel bearing plates.

With reference to Figures 2A to 2G an anchoring device (shoulder) suitable for use with a sealing plate embodying the first aspect of the invention will now be described. The anchoring device 1 shown in Figures 2A to 2G comprises a head 1A from the underside of which downwardly project a stem part 1B and two spaced-part tangs 1C. The stem part 1B comprises a substantially Y-shaped stem 100, connected to the underside of the head 1A at the ends of upper arms 101 of the Y, and a bent part 102 at the other end of the Y for resisting withdrawal of the stem from the concrete in which it is embedded when it is in use. As shown in Fig. 2H, which shows another shoulder suitable for use with a sealing plate embodying the first aspect of the present invention, the underside of the shoulder 1 may be provided with one or more webs 1D connecting the stem 100 of the shoulder 1 to its head 1A, instead or in addition to the tangs 1C (not shown in Fig. 2H), for assisting in preventing the shoulder 1 tipping forward when a clip is driven into it.

The head 1A of the anchoring device 1 comprises two spaced-part walls 10, connected together at one end of the head 1A, at the bottom of the walls 10, by a connection portion 14. The top surface of the connection portion 14 is downwardly inclined and forms a ramp 140, while the front surface of the connection portion 14 forms the front face 12 of the shoulder 1. The end of the walls 10 at the front end of the head 1A are connected to the front face 12 of the shoulder by curved portions 13.

The walls 10 extend outwardly at their tops to provide respective clip-engaging surfaces 11 provided with two clip-engaging projections 110A, 110B, which project downwardly and are connected by means of a ramped surface 111 which inclines downwardly from the rear of the shoulder 1 to the front of the shoulder 1, for deflecting the leg of a railway rail fastening clip. The front face 12 of the shoulder 1 is provided with projections 120 for engaging with the sleeper mould so as to set the shoulder at the correct height in the mould before the concrete is introduced. The shoulder 1 has a rear face 15 opposite to the front face 12.

Referring once again to Figs. 1A to 1F, apertures 26 are formed through the major faces 20/21 of plate 2 so as to receive portions of the shoulder 1, namely the tangs 1C, which extend through the apertures 26 in the plate 2 into the concrete of the sleeper. The major face 20 of the plate 2 is also formed with upstanding tabs 27 which are provided for cooperating with respective features on the underside of the shoulder 1 to retain the plate 2 on the shoulder 1 (and vice versa) before the plate 2 and shoulder 1 have been set into the concrete of the sleeper. If the plate is to be used with a shoulder 1 as shown in Fig. 2H, in which webs 1D are provided on the underside of the

shoulder 1 between the stem 100 and the head 1A, the radiussed recesses 24 on the plate 2 would have to be deeper. If the tangs 1C on the underside of the shoulder 1 were omitted, the apertures 26 in the plate 2 could be made smaller, but would still be present to allow formation of the underside of tabs 27 during moulding of the sealing plate 2.

The shoulder 1 is held in place and positioned in the mould by means of a mechanism which pulls on the head 1A that protrudes through the bottom of the mould. The projections 120 on the shoulder 1 serve to reduce the amount of this pulling force which is applied to the sealing plate, which might otherwise distort. The walls of the projections 25 serve to prevent sideways movement of the sealing plate and shoulder during sleeper manufacture by acting against the edges of the aperture in the mould pocket.

The second major face 21 of the plate 2, which forms the underside of the plate, is formed with a plurality of intersecting ribs 28 which define numerous rebates 29. When the plate is set into the top surface of a concrete sleeper, these rebates 29, and the underside of the projections 25 which are also hollow, are filled with concrete, providing additional strength to the plate 2, and thereby reducing the amount of material, and hence cost, required to make the plate 2.

A railway rail fastening assembly employing the elements described above will now be described with reference to Figures 3A to 3F. The railway rail fastening assembly of Figures 3A to 3F, for fastening a railway rail 5, comprises a shoulder 1 as described with reference to Figs. 2A to 2G, a rail fastening clip 3, a sealing plate 2 embodying the first aspect of the present invention and a

5 rail pad 4. It will be appreciated that, although not shown in Figures 3A to 3F, when in use the rail is fastened on both sides of the rail head by such an assembly and that the stem 1B and tangs 1C are embedded in the concrete sleeper 6. The sealing plate 2 is also embedded in the concrete sleeper 6, such that the top face of sealing plate 2 is flush with the upper surface of the sleeper 6. As shown in Figures 3A/3B the clip 3 may be driven into the shoulder 1 by introducing the chamfered free ends A, B of clip legs 31, 37 into the gaps between the top surfaces 25a of the clip seat projections 25 on the sealing plate 2 and the first projection 110A on the outer surface of the walls 10 of the shoulder 1, and inserting toe portion 34 of the clip 3, bearing a toe insulator 34a, into the space between 15 the inner surfaces of the walls 10 of the shoulder 1, such that the toe 34 of the clip 3, through the toe insulator 34a, bears on the ramp 140 of the shoulder 1 and the projections 110A are located within detents 38 in the clip legs 31, 37, with the projection 110A contacting the rear 20 face of the detent 38. This position is known as the "pre-assembly" or "parked" position, in which the clip does not bear on the rail 5, but overlies shelf 47 of side post insulator portion 46 of pad 4. Downwardly-facing parts of the legs 31, 37 rest on the top surfaces 25a of the clip seat projections 25.

As shown in Figures 3C and 3D, the clip 3 can be driven from the pre-assembly position (first operative position) into a second operative position in which the toe portion 34 of the clip 3 bears on the foot of the rail 5, the 30 second projections 110B on the walls 10 engage the detents 38 of legs 31, 37 of the clip 3 and second and sixth portions 32, 36 (heel portions) of the clip 3 bear on the top surfaces 25a of the clip seat projections 25. The clip

overlies the shelf 47 of the side post insulator portion 46 of the rail pad 4. The clip can be withdrawn from this position back into the pre-assembly position, if required in order to remove or work on the rail, or further back into the "insulator-change" position in which the front face of the detent 38 contacts the projection 110A and the clip 3 does not overlie the shelf 47 of the sidepost insulator portion 46 of pad 4.

As the clip 3 is installed, the toe 34 of the clip 3 is driven upwards by the ramp 140 in the centre of the shoulder 1, and the legs 31, 37 are driven down, thereby splitting the clip open. This makes it possible to make the assembly a little lower than would otherwise be possible.

CLAIMS

1. A sealing plate , for use with a rail clip anchoring device having a head and a stem which extends from the head into a concrete sleeper when the anchoring device is in use, characterised in that plate is adapted for extending over the underside of the head when the stem of the device is being set in a concrete sleeper, thereby to prevent ingress of concrete into the head of the device and for being retained on the surface of the sleeper thereafter, wherein a major face of the plate , which is uppermost when the sleeper is in use, is provided with at least one clip seat portion for receiving part of a rail clip .

2. A sealing plate as claimed in claim 1, wherein the plate is formed such that a seal is created around the periphery of the said major face of the plate when pressure is applied to the other major face .

3. A sealing plate as claimed in claim 1 or 2, wherein the plate is formed of plastics material.

4. A sealing plate as claimed in claim 1, 2 or 3, wherein the plate is substantially rectangular in outline.

5. A sealing plate as claimed in claim 4, wherein one edge of the plate has a cut-out portion shaped for receiving a portion of the head of the anchoring device adjacent to the stem thereof.

6. A sealing plate as claimed in claim 5, wherein the said cut-out portion has a bevelled edge which

matches a bevelled edge of the said portion of the head of the anchoring device.

7. A sealing plate as claimed in any one of claims 1 to 6, wherein the plate comprises locating means for locating the plate on the head of the anchoring device.

8. A sealing plate as claimed in claim 7, wherein the said locating means comprise at least one tab protruding from a major face of the plate for engaging with a corresponding feature on the anchoring device.

9. A sealing plate as claimed in any preceding claim, wherein the or each clip seat portion is of greater resilience to wear than other parts of the plate .

10. A sealing plate as claimed in any preceding claim, wherein the or each clip seat portion comprises a projection.

11. A sealing plate as claimed in claim 10, wherein the said projection is L-shaped in plan.

12. A sealing plate as claimed in any preceding claim, wherein the or each clip seat portion has a clip-receiving surface which is shaped so as to match the profile of that part of the clip which is to bear thereon.

13. A sealing plate as claimed in any preceding claim, wherein the major surfaces of the plate are formed with one or more apertures therethrough for

receiving respective portions of the anchoring device which extend from the underside of the head of the anchoring device.

14. A sealing plate as claimed in any preceding claim, wherein the major face of the plate which is lowermost when the sleeper is in use is provided with strengthening ribs which intersect to define a plurality of rebates.

15. A sealing plate as claimed in any preceding claim, in combination with a concrete sleeper into which it has been set, wherein the major face of the plate which is uppermost when the sleeper is in use is flush with the uppermost surface of the concrete sleeper.

16. A sealing plate as claimed in claim 15, when read as appended to claim 14, wherein the said rebates are filled with concrete.

17. A sealing plate as claimed in any one of claims 1 to 16 in combination with an anchoring device for use in retaining a railway rail fastening clip, the anchoring device comprising two interconnected spaced-apart walls, between which a portion of the clip to be retained is held when the anchoring device is in use, and clip-engaging means, supported by the walls, for engaging a portion of the rail fastening clip to be retained, wherein the device does not have any feature or surface which engages the surface of that clip portion which faces downwardly when the clip is in use.

18. A sealing plate as claimed in any one of claims 1 to 16 in combination with an anchoring device for use in retaining a railway rail fastening clip, the device comprising two interconnected spaced-apart walls, between which a portion of the clip to be retained is held when the anchoring device is in use, and clip-engaging means, supported by the said walls, defining contact regions at which the device engages the rail clip to be retained when the clip bears on a railway rail, the device not engaging the clip at any other region of the device when the clip is bearing on the rail in normal operation, wherein none of the said contact regions of the device can be seen when the anchoring device is viewed from above when in its operative orientation in which it will be used when adjacent to a railway rail and wherein all of the said contact regions of the device can be seen when the anchoring device is viewed from below when in the said operative orientation.

19. A sealing plate as claimed in any one of claims 1 to 16 in combination with an anchoring device for use in retaining a railway rail fastening clip, the device comprising two interconnected spaced-apart walls, between which a portion of the clip to be retained is held when the anchoring device is in use, and clip-engaging means, supported by the said walls, defining contact regions at which the device engages the rail clip to be retained when the clip bears on a railway rail, the device not engaging the clip at any other region of the device when the clip is bearing on the rail, wherein, when the device is in use, all the said contact regions of

the device lie substantially at the same horizontal distance from the edge of the rail foot when measured perpendicularly to the axis of the rail and in the plane of the rail foot.

20. A sealing plate and anchoring device combination as claimed in any one of claims 17 to 19, wherein the walls of the anchoring device are interconnected by a connection portion which has a part which extends between the said walls from the one end thereof, which will be closest to the railway rail when the device is in use, towards the other end thereof and has a top surface which extends in a downwardly-inclined direction so as to form a ramp for deflecting a portion of the said railway rail fastening clip to be retained as it is driven into the anchoring device, and the or each tab on the sealing plate is operable to engage with the said ramp of the anchoring device.

21. A sealing plate and anchoring device combination as claimed in claim 20, wherein the said connection portion of the anchoring device has another part which extends between the said one end of the walls below the said top surface to form a bearing face.

22. A sealing plate and anchoring device combination as claimed in claim 21, wherein the height of the said bearing face is less than that of the said walls.

23. A sealing plate and anchoring device combination as claimed in claim 22, wherein the height of the said connection portion at the said one end of the head is approximately half that of the said walls.

24. A sealing plate and anchoring device combination as claimed in any one of claims 20 to 23, wherein the said part of the connection portion forming a ramp is connected to the said walls along its side edges.

25. A method of manufacturing a concrete sleeper with at least one embedded rail clip anchoring device of the type having a head for retaining a rail clip and a stem extending from the underside of the head , in which method the floor of a mould, from which the sleeper is to be formed, is provided with an aperture, the head of an anchoring device is inserted through the aperture such that the head of the device extends out of the mould and the stem of the device is located within the mould, and concrete is introduced into the mould, characterised in that before the concrete is introduced into the mould the aperture is sealed off around its edges and around the underside of the head of the anchoring device by placing a sealing plate over the aperture on the floor of the mould, the plate overlapping and sealing around the edges of the aperture other than where the anchoring device is located and having a mating interface with the anchoring device such that a seal is formed therewith.

26. A method as claimed in claim 25, wherein before the sealing plate is introduced into the mould it is connected to the anchoring device so as to extend over the underside of the head , the sealing plate being introduced into the mould together with the anchoring device and located over the aperture when the head is inserted through the aperture.

27. A method as claimed in claim 25 or 26, wherein, when the aperture is substantially rectangular and a first face of the head of the anchoring device abuts one side of the aperture, the sealing plate is shaped so as to mate with a second face of the head of the anchoring device, opposite to said first face, and to overlap the edges of the aperture on the other three sides thereof.

28. A method as claimed in claim 27, wherein the edge of the sealing plate which mates with the second face of the head is bevelled so as to match bevelling on the said second face.

29. A method as claimed in claim 25, 26, 27 or 28, employing a sealing plate as claimed in any one of claims 1 to 16 or a sealing plate and anchoring device combination as claimed in any one of claims 17 to 24.