

COMPONENTS FOR RAIL FASTENING ASSEMBLY

The present invention relates to components for a rail fastening assembly.

In the documents W093/12294, W093/12295 and W093/12296, the present applicants disclosed a railway rail fastening system in which a rail fastening clip is driven laterally 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 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 is subsequently required, the clip can be driven off the rail back into the pre-assembly position. Such clips are sometimes known as "switch-on/switch-off" 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In a previous application, unpublished at the date of filing the present application, the applicants disclose a shoulder in which clip-engaging features on the lower part of the walls of the shoulder are absent. Accordingly, it is necessary to provide an alternative clip bearing part for the heels of the clip.

According to a first aspect of the present invention, there is provided a component and anchoring device combination for use in a railway rail fastening assembly, the assembly comprising a railway rail fastening clip having a first part for bearing on a railway rail and a heel portion, which combination comprises:

a railway rail clip anchoring device for retaining such a railway rail clip, the anchoring device having a head comprising a substantially upright front face configured for location adjacent to the foot of a railway rail when the device is in use, and 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; and a component comprising a first portion, a second portion and a connection portion interconnecting and spacing apart the first and second portions, the first portion being adapted to receive a lateral load from a railway rail when located between the front face of the rail clip anchoring device and the side of the foot of the railway rail when the assembly is in use, and the second portion being located on the opposite side of the anchoring device to its front face when the first portion is located between that face and the rail, and serving as a heel seat portion of the anchoring device upon which the heel portion of the rail fastening clip bears when the device is in use; wherein the clip-engaging means comprise a downwardly-projecting projection.

Also disclosed is a component for use in a rail fastening assembly, the assembly comprising a railway rail fastening clip having a first part for bearing on a railway rail and a railway rail clip anchoring device for retaining the railway rail clip, which component comprises a first

portion adapted to receive a lateral load from the rail when located between a substantially upright face of the rail clip anchoring device and the side of the foot of an adjacent railway rail when the assembly is in use; wherein
5 the component further comprises a second portion for receiving a second bearing part of the railway rail clip; and the first portion and the second portion of the component are spaced apart and interconnected by a connection portion. Thus, the component can provide the
10 missing heel bearing parts of the anchoring device. In addition, if the heel bearing parts of the component require replacement because of wear or damage, this can be done quickly and easily. It is also easy to replace the component by one having a first portion of greater or
15 lesser thickness and/or a second portion of greater or smaller height, if adjustment of the characteristics of the assembly is required. Moreover, by interconnecting the first and second portions, the number of loose parts that need to be provided and assembled at the sleeper factory
20 and to make repairs in the field can be minimised.

The first portion is preferably adapted to transmit the lateral load received from the rail to the rail clip anchoring device. Thus, the first portion functions as a sidepost.

25 The connection portion desirably comprises at least one elongate member extending between the first and second portions. As the elongate member need not receive lateral load from the rail, relatively small and thin members can be used, reducing the cost of the materials required.

30 The connection portion preferably joins the first and second portions of the component such that, when the first portion is located between the anchoring device and the

rail foot, the connection portion extends outside the periphery of the anchoring device.

In a preferred embodiment, the connection portion comprises two elongate members, one elongate member
5 extending between respective first points on the first and second portions and the other elongate member extending between respective second points on the first and second portions. If a region bounded by the interconnected elongate members, first portion and second portion is
10 shaped so as to accommodate the rail clip anchoring device, the component may be installed in the rail fastening assembly simply by slipping the component over the top of the anchoring device. Desirably, the component fits closely around a base portion of the anchoring device.

15 The component may advantageously be integrally formed, preferably of material having a hardwearing surface which can cope with the demands placed on both the first and second portions. Alternatively, one part could be co-injected and two different materials used if required. If
20 the first portion of the component is to form an insulator, at least the first portion is formed of electrically-insulating material. In any case, the component is preferably formed of plastics material, for example nylon.

The second portion preferably comprises at least one
25 structure which extends upwardly, when the component is in use, to define a clip-receiving surface. The second portion desirably comprises two spaced-apart clip seat regions, each having a clip-receiving surface. The clip seat regions may be formed by respective interconnected
30 structures. If the component is approximately rectangular in outline, the clip seat regions may be located respectively at adjacent corners of the component. Desirably, each clip seat region is substantially L-shaped

in cross-section when viewed substantially perpendicularly to the clip receiving surfaces.

The first portion may have at least one part which overlies part of the anchoring device. In this case, the part may be such that it is overlain by the rail fastening clip when the clip is retained by the anchoring device.

When a component embodying the present invention is in combination with a railway rail clip anchoring device, the first portion of the component is located adjacent to a substantially upright face of the anchoring device which is to face the foot of a railway rail when the device is in use and the second portion is located on the opposite side of the anchoring device to the said substantially upright face. The second portion serves as a heel seat portion of the anchoring device upon which the heel portion of the rail fastening clip bears when the device is in use.

According to a second aspect of the present invention, there is provided a sealing plate, for use with the combination according to the first aspect, where the rail clip anchoring device of the combination has a stem extending from the head thereof for retaining the anchoring device in a concrete sleeper when the anchoring device is in use, wherein the plate comprises locating means for locating the plate on the head of the anchoring device whereby the plate is positioned so as to extend 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 the plate is adapted so as to be retained on the surface of the sleeper thereafter and provide a flat bearing surface for receiving the said component of the combination.

Also disclosed is 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 designed to extend 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 to be retained on the surface of the sleeper thereafter.

The plate is desirably made, for example, of plastics material, for example polypropylene.

The sealing plate may be used to seal the aperture in the mould pocket during sleeper manufacture and prevent the ingress of concrete into the head of the shoulder. When in use the 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.

According to a third aspect of the present invention, there is provided a sealing plate according to the second aspect, 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. Also disclosed is a rail fastening assembly comprising a sealing plate embodying the second aspect of the present invention, a rail clip anchoring device, and a component embodying the first aspect of the present invention. The sealing plate hooks onto the shoulder and thereafter provides a flat bearing surface for the heel seat/side-post component.

According to a fourth aspect, there is provided a sleeper assembly comprising a sealing plate according to the second aspect and a concrete sleeper into which the sealing plate 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.

According to a fifth aspect, there is provided a rail fastening assembly comprising the combination of a component and anchoring device combination according to the first aspect, and further comprising a sealing plate according to the second aspect.

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

Figure 1 shows a component plate embodying the first aspect of the present invention, Figure 1A showing a perspective view from above, Figure 1B showing a perspective view from below, Figure 1C showing a plan view from above, Figure 1D showing a part sectional view taken on line V-V in Figure 1C, Figure 1E showing a sectional view taken on line Y-Y in Figure 1D, Figure 1F showing a part sectional view taken on line W-W in Figure 1E, Figure 1G showing a front view of the component, Figure 1H showing a sectional view taken on line Z-Z in Figure 1G, Figure 1J showing a plan view from below, Figure 1K showing a sectional view taken on line X-X in Figure 1C, Figure 1L showing a detail C from Figure 1J, Figure 1M showing a detail A from Figure 1E, and Figure 1N showing a detail B from Figure 1H;

Figure 2 shows a sealing plate embodying the second aspect of the present invention, Figure 2A showing a perspective view from above, Figure 2B showing a perspective view from below, Figure 2C showing a plan view of the top surface of the sealing plate, Figures 2D and 2E showing respective side views, Figure 2F showing a plan

view of the underside of the sealing plate, Figure 2G showing a sectional view taken along the line T-T in Figure 2C, Figure 2H showing a sectional view taken along the line W-W in Figure 2F, Figure 2J showing a sectional view taken
5 along the line Z-Z in Figure 2C, Figure 2K showing a detail C from Figure 2J, Figure 2L showing a detail D from Figure 2G, Figure 2M showing a detail B from Figure 2G, Figure 2N showing a sectional view taken along the line U-U in Figure 2F, and Figure 2P showing a detail A from Figure 2H;

10 Figure 3 shows an anchoring device suitable for use with a component embodying the first aspect of the present invention and a sealing plate embodying the second aspect of the present invention, Figure 3A showing a perspective view from above and Figure 3B showing a side view; and

15 Figure 4 shows a railway rail fastening assembly employing a component embodying the first aspect of the present invention and a sealing plate embodying the second aspect of the present invention, in which Figure 4A shows the assembly in a side view in which a rail fastening clip
20 is bearing on the rail, Figure 4B shows a perspective view of the assembly, and Figure 4C is a plan view from above.

As shown in Figures 1A to 1N, a component 7 embodying the first aspect of the present invention comprises a first portion 71 and a second portion 72. Respective ends of the
25 first and second portions are connected together by means of two elongate members 73.

The first portion 71 is shaped so as to function as a sidepost insulator, having a substantially upright bearing face 78 which receives lateral loads from the rail and
30 transmits them to an adjacent rail clip anchoring device 1 (see Figure 3) and a shelf 77 which overlies part of the anchoring device 1.

The second portion 72 comprises two spaced-apart clip seat regions 75, joined together by an elongate member 74. The clip seat regions 75 have respective L-shaped clip receiving surfaces 75a. The rear edge of each surface 75a is provided with a recess 75b shaped to ease installation of the clip.

The elongate members 73, 74 and clip seat regions 75 are substantially hollow structures, having strengthening ribs as required.

A plastic sealing plate 2 embodying the second aspect of the present invention will now be described with reference to Figures 2A to 2P. 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 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 which mates with a corresponding bevelled edge on a rear face 15 of the shoulder 1. The cut-out 22 also has recesses 24 for receiving twin stems of the shoulder 1 (see Figure 3).

An example of an anchoring device (shoulder), suitable for use with a component embodying the first aspect of the present invention and a sealing plate embodying the second aspect of the invention, will now be described with reference to Figures 3A and 3B. The anchoring device 1 shown in Figure 3 comprises a head 1A from the underside of which downwardly project two stems 1B for embedding in the concrete sleeper during its manufacture. Alternatively, a Y-shaped stem may be used.

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 a clip-engaging projection 110, which projects downwardly. The clip-engaging surfaces 11 are inclined 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. Alternatively, a single shelf could be provided instead of the two projections 120. The shoulder 1 has a rear face 15 opposite to the front face 12.

Referring once again to Figs. 1A to 1N, the major face 20 of the plate 2 is formed with upstanding tabs 27 which are provided for cooperating with respective features 127 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. Apertures 26 are also provided in the major face of the plate 2 to allow formation of the underside of tabs 27 during manufacture 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.

5 The first major face 20 of the plate 2 is also formed with an elongate upstand 25 along part of the rear edge of the plate 2 which assists in retaining the component 7, the elongate member 74 of the component 7 being positioned between the upstand 25 and the tabs 27 when the component
10 is in use.

 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
15 sleeper, these rebates 29 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
20 elements described above will now be described with reference to Figures 4A to 4C. The railway rail fastening assembly of Figures 4A to 4C, for fastening a railway rail 5, comprises a shoulder 1 as described with reference to Fig. 3, a rail fastening clip 3, a component 7 embodying
25 the first aspect of the present invention as described with reference to Fig. 1, a sealing plate 2 embodying the second aspect of the present invention as described with reference to Fig. 2 and a rail pad 4. It will be appreciated that, although not shown in Figures 4A to 4C, when in use the
30 stems 1B of the shoulder 1 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. The

clip 3 may be driven into the shoulder 1 by introducing the chamfered free ends of clip legs 31, 37 into the gaps between the top surfaces 75a of the clip seat regions 75 on the component 7 and the clip-engaging surfaces 11 on the
5 outer surface of the walls 10 of the shoulder 1, and inserting a toe portion of the clip 3, bearing a toe insulator 34a, into the space between the inner surfaces of the walls 10 of the shoulder 1, such that the toe of the clip 3, through the toe insulator 34a, bears on the ramp
10 140 of the shoulder 1. 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 77 of component 7. Interlocking features on the toe insulator 34a and ramp 140 prevent the clip 1 "backing off" out of the shoulder 1.
15 Downwardly-facing parts of the legs 31, 37 rest on the top surfaces 75a of the clip seat regions 75.

The clip 3 can be driven from the pre-assembly position (first operative position) into a second operative position in which the toe portion of the clip 3 bears on the foot of
20 the rail 5, the projections 110 on the walls 10 engage detents in the 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 75a of the clip seat regions 75. The clip 3 overlies the shelf 77 of the side post insulator portion
25 of the component 7. 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.

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

CLAIMS

1. A component and anchoring device combination for use in a railway rail fastening assembly, the assembly
5 comprising a railway rail fastening clip having a first part for bearing on a railway rail and a heel portion, which combination comprises:

a railway rail clip anchoring device for retaining such a railway rail clip, the anchoring device having a
10 head comprising a substantially upright front face configured for location adjacent to the foot of a railway rail when the device is in use, and two interconnected spaced-apart walls, between which a portion of the clip to be retained is held when the anchoring device is in use,
15 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; and

20 a component comprising a first portion, a second portion and a connection portion interconnecting and spacing apart the first and second portions, the first portion being adapted to receive a lateral load from a railway rail when located between the front face of the
25 rail clip anchoring device and the side of the foot of the railway rail when the assembly is in use, and the second portion being located on the opposite side of the anchoring device to its front face when the first portion is located between that face and the rail, and serving as
30 a heel seat portion of the anchoring device upon which the heel portion of the rail fastening clip bears when the device is in use;

wherein

the clip-engaging means comprise a downwardly-projecting projection .

2. The combination as claimed in claim 1, wherein the
5 walls of the anchoring device are interconnected by an anchoring device 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
10 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 said ramp of the anchoring device is operable to engage with a tab on an
15 associated sealing plate.

3. The combination as claimed in claim 2, wherein the said part of the anchoring device connection portion forming a ramp is connected to the said walls along its
20 side edges.

4. The combination as claimed in any preceding claim, wherein the connection portion of the component comprises at least one elongate member extending between the first
25 and second portions thereof, which elongate member is not adapted to receive lateral load from the rail.

5. The combination as claimed in any preceding claim, wherein the connection portion of the component joins the
30 first and second portions of the component such that, when the first portion is located between the anchoring device and the rail foot, the connection portion extends outside the periphery of the anchoring device.

6. A sealing plate, for use with the combination as claimed in any preceding claim, where the rail clip anchoring device of the combination has a stem extending from the head thereof for retaining the anchoring device
5 in a concrete sleeper when the anchoring device is in use, wherein the plate comprises locating means for locating the plate on the head of the anchoring device whereby the plate is positioned so as to extend over the underside of the head when the stem of the device is being set in a
10 concrete sleeper, thereby to prevent ingress of concrete into the head of the device, and the plate is adapted so as to be retained on the surface of the sleeper thereafter and provide a flat bearing surface for receiving the said component of the combination.

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7. A sealing plate as claimed in claim 6, wherein the plate is formed such that a seal is created around the periphery of a major face of the plate when pressure is applied to the other major face.

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8. A sealing plate as claimed in claim 6 or 7, wherein the plate is formed of plastics material.

9. A sealing plate as claimed in claim 6, 7 or 8,
25 wherein the plate is substantially rectangular in outline and 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.

30 10. A sealing plate as claimed in claim 9, 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.

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11. A sealing plate as claimed in any one of claims 6 to 10, 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.

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12. A sealing plate as claimed in any one of claims 6 to 11, 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
10 from the underside of the head of the anchoring device.

13. A sealing plate as claimed in any one of claims 6 to 12, wherein the major face of the plate which is lowermost when the sleeper is in use is provided with strengthening
15 ribs which intersect to define a plurality of rebates.

14. A sleeper assembly comprising a sealing plate as claimed in any one of claims 6 to 13 and a concrete sleeper into which the sealing plate has been set, wherein
20 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.

15. A rail fastening assembly comprising the combination
25 as claimed in any one of claims 1 to 5, and further comprising a sealing plate as claimed in any one of claims 6 to 13.