

SAFETY SYSTEM

RELATED APPLICATIONS

The present invention claims priority from Australian Provisional Patent Application No. 2023904023 filed on 12 December 2023, the entire contents of which are incorporated herein by reference.

FIELD OF INVENTION

The present invention relates to a safety system, and in particular, to a safety system for use in relation to elevated work surfaces.

BACKGROUND OF THE INVENTION

Elevated work surfaces, such as vehicles in the form of flat bed trucks and the like, are common sites for accidents occurring when workers fall from the elevated work surface. Flat bed trucks and the like are commonly used in the mining and freighting industries for transporting equipment and goods. Such vehicles typically comprise a large open flat tray or bed upon which items are stored for transportation. The tray is typically elevated well above a ground surface, which can be 1 – 2 metres high, depending upon the vehicle being used, and the items to be transported.

One problem with the use of such open tray vehicles is that the items must be typically loaded and unloaded with the assistance of one or more operators. This typically requires the operator to access the tray to aid in cranes and other vehicles loading and unloading the goods and to secure/unsecure the goods at the commencement or completion of the journey.

Due to the elevated height of the vehicle tray and the requirement for the operators to traverse the vehicle tray whilst goods are being loaded/unloaded, there is a constant risk of the operators falling from the vehicle tray and becoming injured or losing their life. With the constant presence of cranes and forklifts and other machinery around the vehicle, even if the operators survive the fall, they may fall into the path of other machinery that can become a risk of further injury.

Whilst barriers and other safety devices have been proposed to minimise the risk of operators falling from a vehicle tray, such devices have a tendency to impede the operator's movements and access to the vehicle tray. As a result, such devices are often found by the operators to be more of a hindrance than a help and operators

are more likely to forgo installing the devices on the vehicles, defeating their very purpose.

Thus, there is a need to provide a fall prevention or arrest system for use on vehicles that is easy to install and does not overly impede movement of individual operators as they perform their tasks in a safe and efficient manner.

The above references to and descriptions of prior proposals or products are not intended to be, and are not to be construed as, statements or admissions of common general knowledge in the art. In particular, the above prior art discussion does not relate to what is commonly or well known by the person skilled in the art, but assists in the understanding of the inventive step of the present invention of which the identification of pertinent prior art proposals is but one part.

STATEMENT OF INVENTION

The invention according to one or more aspects is as defined in the independent claims. Some optional and/or preferred features of the invention are defined in the dependent claims.

Accordingly, in one aspect of the invention there is provided a safety system for use with a structure having an elevated work surface comprising:

a support pole configured to extend from a ground surface adjacent the structure to a position located above the elevated work surface of the structure, the support pole configured to function as a tether point to which an individual present on the elevated work surface is tethered;

a mount member configured to attach the support pole to the structure to retain the support pole in an elevated position with respect to the structure; and

at least one clamp member configured to securely mount the mount member to the structure.

The support pole may have a ring member located at a distal end thereof that is located above the work surface when the support pole is in the elevated position, the ring member may be configured to provide said point to which an individual present on the work surface is tethered.

The support pole may have a proximal end configured to engage the ground surface. The proximal end of the support pole may have an extension member extendible from the support pole to engage the ground surface. The extension member may be substantially co-axially mounted to the proximal end of the support pole to extend into and out of the support pole to provide a degree of height adaptability to accommodate work surfaces of variable heights.

The extension member may have a foot member mounted to the lowermost end thereof. The foot member may be formed from a rubber material to provide a degree of grip with the ground surface, to enhance the stability of the support pole during use.

- 5 The mount member may be attached to an intermediate portion of the support pole to extend substantially perpendicular to the intermediate portion of the support pole. The mount member may be configured to engage with the at least one clamp member to securely position the support pole against the structure.

10 The support pole may have an overhang portion that extends angularly to terminate in the ring member located above the work surface of the structure. The overhang portion may extend above the work surface such that the ring member is positioned above human height.

The individual present on the work surface may be tethered to the ring member by way of a harness and lanyard that is attached to the individual.

- 15 The mount member may be attached to the structure by way of a mount bracket. The mount bracket may comprise an open channel portion that is configured to be mounted to the structure. The open channel portion may have a stem member that extends from a central portion thereof to engage with an end of the mount member to securely support the support pole in the erected position. The stem member and
20 the mount member may be configured such that they fit over each other in a snug manner.

The mount bracket may be secured to the structure by way of the at least one clamp member. The at least one clamp member may be a scissor clamp comprising a pair of arms pivotally connected at a pivot point to clamp the mount bracket to the
25 structure. In another embodiment the at least one clamp member may be a screw clamp.

In a preferred embodiment the structure is a vehicle having the work surface provided on an elevated flat tray. The at least one clamp member is configured to securely mount the mount member to a rail of the vehicle.

30 BRIEF DESCRIPTION OF THE DRAWINGS

The invention may be better understood from the following non-limiting description of preferred embodiments, in which:

Fig. 1 is a perspective view of a vehicle having a tray with the safety system of the present invention installed thereto for use;

- 35 Fig. 2 is an end view of the vehicle of Fig. 1;

Fig. 3 is a side view of the vehicle of Fig. 1;

Fig. 4 is a perspective view of the support pole of the safety system according to an embodiment of the present invention;

5 Fig. 5 is a top view of mount bracket for mounting the support pole to the vehicle in accordance with the embodiment of Fig. 1;

Fig. 6 is a perspective view of the mount bracket of Fig. 5;

Fig. 7 is a perspective view of the clamping system for securing the safety device of the present invention to the vehicle of Fig. 1; and

Fig. 8 is a side view of the clamping system of Fig. 7.

10 DETAILED DESCRIPTION OF THE DRAWINGS

Preferred features of the present invention will now be described with particular reference to the accompanying drawings. However, it is to be understood that the features illustrated in and described with reference to the drawings are not to be construed as limiting on the scope of the invention.

15 The present invention will be described below in relation to its application for use with a flat bed/tray of a vehicle as a fall restraint system. However, it will be appreciated that the present invention could be adapted for use on a variety of different elevated platforms and structures, not limited to vehicles, and could be used to function as a fall arrest system as would be appreciated by those skilled in
20 the art.

Referring to Fig. 1, a tray or bed 10 of a vehicle is shown with the fall restraint system 20 attached thereto. The tray 10 of the vehicle may be provided on a trailer that is connected to a towing vehicle by an articulated connection or may be directly attached to vehicle. The tray generally comprises a substantially flat and
25 open work surface 12, having a rail assembly 14 extending along opposing sides of the work surface 12 to facilitate tying down of a load positioned on the work surface 12, as will be well appreciated by those skilled in the art. The rail assembly 14 projects slightly above the work surface 12 and forms an edge along opposing sides of the work surface 12.

30 In use the tray 10 is accessed from either side to load the work surface 12 with items for transportation. Depending on the type and weight of the items, the items are typically loaded by cranes or forklifts to be positioned on the work surface for

transportation. For lighter items, operators may access the work surface and position the items on the work surface in areas where they can be secured for transportation. In this regard, ropes or other apparatus may be used to secure the items to the work surface 12, which may be passed over the goods and tied in
5 position by individual operators. Typically, the work surface is elevated 1-2m above a ground surface, although heights may vary depending on the construction of the vehicle being used.

The fall restraint system 20 in accordance with an embodiment of the present invention is attached to one side of the tray 10 as depicted in Fig. 1. The fall
10 restraint system 20 generally comprises a support pole 22 mounted to the tray 10 by way of a clamping arrangement 40.

The support pole 22 is shown in isolation in Fig. 4 and comprises a base portion 23 that is substantially vertical so as to extend substantially perpendicular to the work surface 12 of the tray 10 when the fall restraint system 20 is installed to the
15 tray 10 as shown in Fig. 2. The base portion 23 has an extension member 24 formed at a lower region which is substantially co-axially mounted to the base portion 23 to extend into and out of the base portion 23. The extension member 24 provides a degree of height adaptability for the system 20 and can be extended/retracted as required to accommodate different height trays and uneven
20 ground surfaces. A foot member 25 is mounted to the lowermost end of the extension member 24 to provide stable contact with the ground surface. The foot member 25 may be formed from a rubber material or similar material to provide a degree of grip with the ground surface, to enhance the stability of the support pole 22 during use.

25 A mount member 26 is attached to the base portion 23 of the support pole 22 and extends substantially perpendicular to the base portion 23 as shown. As will be discussed in more detail below, the mount member 26 is configured to engage with the clamping arrangement 30 to securely position the support pole 22 against the vehicle as shown in Fig. 1 – 3. The mount member may be made from a metal and
30 may be welded or otherwise attached to the base portion 23 of the support pole 22.

The support pole 22 has an overhang portion 27 that extends angularly from the base portion 23. When the support pole 22 is correctly mounted to the vehicle as shown in Fig. 2, the overhang portion 27 extends in an angular manner such that its' distal end is positioned above the work surface 12 of the tray 10. The overhang
35 portion 27 is located above the work surface 12 so as to be above human height (typically over 2m). A ring portion 28 is located at the distal end of the overhang

portion and provides an attachment loop for a harness and lanyard that is attached to the operator working on the tray 10. In this regard, each operator present on the work surface 12 of the tray 10 is tethered to the support pole 22 via a harness and lanyard that attaches to the ring portion 28. In such a situation, should an operator
5 fall from the work surface 12, they will be prevented from falling to the ground due to being tethered to the support pole 22.

The support pole 22 is mounted to the tray 10 by way of mount bracket 30, as is depicted in Fig. 5 and Fig. 6. The mount bracket 30 comprises an open channel portion 32 that is configured to be mounted over the upper end of the rail assembly
10 14 of the vehicle. The open channel portion 32 is shaped to conform to the outer surface of the rail assembly and can slide along the rail assembly 14 to be positioned at a desired location therealong. A stem member 34 extends from a central portion of the open channel portion 32 and is configured to engage with the end of the mount member 26 to securely support the support pole 22 in the erected
15 position. The stem member 34 and the mount member 26 may be configured such that the fit over each other in a snug manner and a pin may be provided to extend in the hole 35 to lock the stem member 34 and the mount member 26 together.

The mount bracket 30 is secured to the rail assembly 14 of the tray 10 by way of clamping system 40, as depicted in Fig. 7 and Fig. 8. The clamping system 40
20 comprises a pair of scissor clamps 42 each comprising a pair of arms 43, 44 pivotally connected at a pivot point 45.

Each of the arms 43, 44 of the scissor clamps 42 are formed in a mirror image having a proximal end terminating in a buckle member 46 and a distal end terminating in a flat head portion 47. The scissor clamps 42 are configured such
25 that the spacing between the buckle members 46 at the proximal ends of the arms 43, 44 is greater than the spacing between the head portions 47 at the distal end of the arms 43, 44. Thus, by bringing the buckle members 46 at the proximal ends of the arms 43, 44 together, the head portions 47 at the distal end of the arms 43, 44 are also brought closer together. A ratchet 50 is attached between the buckle
30 members 46 of the arms 43, 44 and by tightening the ratchet 50 a clamping force is applied to the head portions 47 to clamp the mount bracket 30 against the rail assembly 14, as shown more clearly in Fig. 8. This causes the open channel portion 32 to be securely retained against the rail assembly 14 securely mounting the system 20 against the tray 10 of the vehicle. It will be appreciated that the clamping
35 system 40 may take a variety of different forms.

An alternative embodiment of the fall restraint system 20 of the present invention

is depicted in Fig. 9 and Fig. 10 and the same reference numerals will be used to refer to the same or similar features as per the embodiment depicted in Figs. 1 - 8. In this embodiment the support pole 22 has a more structurally integral form with the foot member 25 being extendible from the main body of the support pole 22 to
5 accommodate variations in heights of the work surface and variations in the level of the ground surface supporting the system. The support pole 22 has an overhang portion 27 that extends over the elevated work surface 22 and a ring portion 28 is provided to enable a worker to tether to the support pole, in the same manner as described above.

10 In the embodiment of the invention as depicted in Fig. 9 and Fig. 10, a mount member 26 is securely attached to the support pole 22. The mount member 26 is in the form of an elongate plate member that is welded or otherwise affixed to the support pole 22 and extends from the support pole 22 to engage with a clamping arrangement 60, that is mounted to a distal end of the mount member 26.

15 The clamping arrangement 60 functions in substantially the same way as the clamping arrangement 40 as depicted and described above in relation to Figs. 1 - 8. In this regard, rather than employing scissor clamps, the clamping arrangement 60 employs a pair of screw clamps 62 mounted between an open channel portion 32 that is shaped to conform to the outer surface of the rail assembly 14 of the
20 work surface 22 and can slide along the rail assembly 14 to be positioned at a desired location therealong.

The fall restraint system of the present invention is preferably formed from a lightweight metal, such as aluminium, or a composite material such that it can be readily carried around a work site and installed to trailers and vehicles as required.
25 To install the fall restraint system, a user simply employs the clamping system to mount the mount bracket to the rail assembly of the tray 10 to attach the support pole 22 in position. The operators working on the elevated working surface 12 of the tray 10 then attach their tethered restraints to the upper end of the support pole 22 to be tethered to the system 20 to avoid falling from the work surface 12.

30 It will be appreciated that with the system of the present invention, should the operators working on the elevated working surface fall, the tether attached to a harness worn by the operator is attached to the support pole of the system thereby preventing the operator from falling any distance from the elevated work surface. The system has no requirement for the operators to install any additional barriers
35 around the vehicle that may prevent access to the working surface of the tray and create a further hazard in performing their tasks.

Throughout the specification and claims the word “comprise” and its derivatives are intended to have an inclusive rather than exclusive meaning unless the contrary is expressly stated or the context requires otherwise. That is, the word “comprise” and its derivatives will be taken to indicate the inclusion of not only the listed
5 components, steps or features that it directly references, but also other components, steps or features not specifically listed, unless the contrary is expressly stated or the context requires otherwise.

Orientational terms used in the specification and claims such as vertical, horizontal, top, bottom, upper and lower are to be interpreted as relational and are
10 based on the premise that the component, item, article, apparatus, device or instrument will usually be considered in a particular orientation, typically with the system uppermost.

It will be appreciated by those skilled in the art that many modifications and variations may be made to the methods of the invention described herein without
15 departing from the spirit and scope of the invention.

The claims defining the invention are as follows:

1. A safety system for use with a structure having an elevated work surface comprising:
 - a support pole configured to extend from a ground surface adjacent
 - 5 the structure to a position located above the elevated work surface of the structure, the support pole configured to function as a tether point to which an individual present on the elevated work surface is tethered;
 - a mount member configured to attach the support pole to the structure to retain the support pole in an elevated position with respect to
 - 10 the structure; and
 - at least one clamp member configured to securely mount the mount member to the structure.
2. A safety system according to claim 1, wherein the support pole has a ring
- 15 member located at a distal end thereof that is located above the work surface when the support pole is in the elevated position, the ring member is configured to provide said point to which the individual present on the work surface is tethered.
3. A safety system according to claim 2, wherein the support pole has a proximal end configured to engage the ground surface.
- 20 4. A safety system according to claim 3, wherein the proximal end of the support pole has an extension member extendible from the support pole to engage the ground surface.
5. A safety system according to claim 4, wherein the extension member is substantially co-axially mounted to the proximal end of the support pole to
- 25 extend into and out of the support pole to provide a degree of height adaptability to accommodate work surfaces of variable heights.
6. A safety system according to claim 5, wherein the extension member has a foot member is mounted to the lowermost end thereof.
7. A safety system according to claim 6, wherein the foot member is formed
- 30 from a rubber material to provide a degree of grip with the ground surface, to enhance the stability of the support pole during use.
8. A safety system according to claim 4, wherein the extension member is a foot member that screwingly engages with the support pole to adjust a height of the support pole with respect to the ground surface.
- 35 9. A safety system according to claim 1, wherein the mount member is attached to an intermediate portion of the support pole and extends

substantially perpendicular to the intermediate portion of the support pole.

10. A safety system according to claim 9, wherein the mount member is configured to engage with the at least one clamp member to securely position the support pole against the structure.
- 5 11. A safety system according to claim 2, wherein the support pole has an overhang portion that extends angularly to terminate in the ring member located above the work surface of the structure.
12. A safety system according to claim 11, wherein the overhang portion extends above the work surface such that the ring member is positioned
10 above human height.
13. A safety system according to claim 11, wherein the individual present on the work surface is tethered to the ring member by way of a harness and lanyard that is attached to the individual.
14. A safety system according to claim 9, wherein the mount member is
15 attached to the structure by way of a mount bracket.
15. A safety system according to claim 14, wherein the mount bracket comprises an open channel portion that is configured to be mounted to the structure.
16. A safety system according to claim 15, wherein the open channel portion
20 has a stem member that extends from a central portion thereof to engage with an end of the mount member to securely support the support pole in the erected position.
17. A safety system according to claim 16, wherein the stem member and the mount member are configured such that they fit over each other in a snug
25 manner.
18. A safety system according to claim 14, wherein the mount bracket is secured to the structure by way of the at least one clamp member.
19. A safety system according to claim 18, wherein the at least one clamp member is a scissor clamp comprising a pair of arms pivotally connected at
30 a pivot point to clamp the mount bracket to the structure.
20. A safety system according to claim 10 wherein the at least one claim member is a screw clamp member.
21. A safety system according to any one of the preceding claims, wherein the
35 structure is a vehicle having the work surface provided on an elevated flat tray.