

METHOD AND SYSTEM FOR SECURING HEAVY LOADS**TECHNICAL FIELD**

- 5 The invention pertains to the technical field of methods and systems for securing heavy loads in a container.

BACKGROUND

- 10 Cargo stowed in ocean shipping containers must be secured to prevent shifting in any direction, particularly towards the doors. Voids between individual cargo units and/or container walls must be filled and/or cargo can be secured against falling, tipping and sliding by using multiple lashing and anchor points provided on the top and bottom side rails and on the corner posts. These lashing points generally
- 15 comprise of rings (e.g. D-rings) which allow the passage of straps or ropes used for securing the load. Most ocean shipping containers, except for refrigerated containers ("reefers") provide multiple lashing and anchor points. US 6 666 635 describes an example of a load securement method for cargo making use of D-rings or other lashing points. US 7 841 815 also describes a cargo restraint system
- 20 comprising conventional tie down rings. During securing of cargo prior to transport, problems arise if the condition of the lashing points is compromised due to rust, wear and tear or deformation. Their strength restricts the weight of the cargo that can be secured: as per the ISO 1496-1:1990, the rated maximum Safe Working Load (SWL) or Lashing Capacity (LC) is only between 500 and 1,000 daN
- 25 per lashing point ("Each anchor point shall be designed and installed to provide a minimum rated load of 1000 kg applied in any direction, and each lashing point shall be designed and installed to provide a minimum rated load of 500 kg applied in any direction"). Exceeding the rated strength of the lashing points, either through forces of cargo in transit or using lashing materials with a higher strength
- 30 rating may lead to regulatory authorities rejecting the container for (ocean-) transportation, resulting in lost time and additional cost of re-loading and – securing. The latter implies a considerable loss in time and money for the cargo companies and/or the principal for the transport, not to mention the negative impact it has on the companies offering securing services to these cargo
- 35 companies.

US 5 020 948 describes a belt fitting engagement rail mounted to the side of a container for securing a belt fitting attached at the end of a belt. The system of US '948 is not suitable for securing heavy loads.

- 5 Containers should be packed and cargo secured in accordance with -the IMO/ILO/UN ECE Guidelines for packing of cargo transport units (CTUs). These CTU packing guidelines are published by the International Maritime Organization (IMO) and International Labor Organization (ILO).
- 10 Finally, securing cargo by use of lashing points is cumbersome. In general, cargo will be secured by straps which extend in vertical and horizontal directions. This may lead to a very complicated strapping situation with use of a substantial amount of material, which is preferably to be avoided.
- 15 There remains a need in the art for an alternative system to the currently known securing methods -making use of these lashing and anchor points. By preference, such alternative should be time-and money -saving, -easy to use and have the potential to be generally accepted by - International Regulatory Authorities. The present invention aims to provide a method and system for securing goods which - will - resolve at least some of the problems mentioned above.

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SUMMARY OF THE INVENTION

- 25 The current invention thereto describes a method for securing a load in a container according to claim 1 and a device according to claim 11. The method makes use of a device positioned in a corner profile of a container. The device is provided with at least two apertures for receiving securing means and which aid in adequate securing. The method allows easy and accurate securing of a load, and provides for a better alternative than the methods and devcie currently used for
- 30 securing loads in containers.

The present invention may thereto be described by the following embodiments:

- 35 1. A method for securing cargo load in a container whereby the container comprises 3 side walls, door leafs, a roof, floor and four corner posts, comprising-:

- providing a wall securement device comprising two or more apertures allowing the passage of securing means such as straps, which wall securement device is attached to an inner rigid structure of the wall;
 - lashing the cargo load with securing means by use of the wall securement device;
- 5 characterized in that said wall securement device is located at the corner post of said container.
2. Method according to embodiment 1, characterized in that said securing means run substantially perpendicular to said posts.
- 10 3. Method according to any of the previous embodiments, characterized in that said wall securement device is fixedly attached to said wall.
4. Method according to any of the previous embodiments, characterized in that said wall securement device is removably attached to said wall.
- 15 5. Method according to any of the preceding embodiments, characterized in that said wall securement device is adjustable in position, more specifically adjustable in height.
6. Method according to any of the preceding embodiments, characterized in that said one wall securement device is provided.
7. Method according to any of the preceding embodiments, characterized in that said two wall securement devices are provided per corner post.
- 20 8. The method according to any of the preceding embodiments, characterized in that during lashing of said load the securing means are passed through a first aperture of the wall securement device and subsequently through a second aperture of said same wall securement device in a direction opposite to the first path of said securing means.
- 25 9. The method according to any of the preceding embodiments, comprising joining the securing means by a buckle.
10. The method according to any of the preceding embodiments, characterized in that said wall securement device are located at the rear wall of the container, opposite to the door leafs of said container.
- 30 11. The method according to any of the preceding embodiments, wherein the container is located on transport means.
12. A wall securement device securing a cargo load in a container, attachable to an inner rigid structure of a container, said wall securement device has two or more apertures allowing the passage of securing means such as straps, characterized in that the apertures are separated by an intersection for supporting the securing means when passed through said apertures,
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whereby said intersection is placed in a plane reverse to the direction of strain of said securing means.

- 5 13. Wall securement device according to any of the previous embodiments, characterized in that said apertures comprise between 10 and 80%, preferably between 25 and 60% of the total surface of said wall securement device.
14. Wall securement device according to the preceding embodiment characterized in that said each wall securement device has two apertures.
- 10 15. Wall securement device according to the preceding embodiment, characterized in that said each aperture is located in a plane of said wall securement device, whereby said planes form an inner angle of between 45° and 180°.
16. Wall securement device according to the previous embodiment, characterized in that said planes form an inner angle of between 90° and 15 180°, preferably of between 120° and 180°.
17. Wall securement device according to the preceding embodiments, characterized said wall securement device is provided with a peripheral roughening.
- 20 18. Wall securement device according to the preceding embodiment, characterized in that said peripheral roughening is located at the intersection.
19. Wall securement device according to any of the preceding embodiments, characterized in that said device is provided by means for attaching said device to a load surface such as a container.
- 25 20. Use of a wall securement device according to any of the embodiments 13 to 20 for securing a cargo load in a container according to any of the embodiments 1 to 11.
21. A container provided by one or more wall securement devices according to any of the embodiments 12 to 19.
- 30 22. A kit comprising a wall securement device according to any of the embodiments 12 to 19, securing means such as straps and a buckle for joining said securing means.
23. The kit according to the preceding embodiment, characterized in that said securing means are straps comprising polyester yarns.
- 35 24. The kit according to the preceding embodiment, characterized in that said strap comprises woven polyester yarns.

25. The kit according to the preceding embodiment, characterized in that said strap comprises composite polyester yarns embedded in a polymer coating, said polymer coating is preferably polypropylene.
- 5 26. The kit according to any of the preceding embodiments, characterized in that said buckle comprises a body having two side walls and bars extending between these side walls.
27. The kit according to the preceding embodiment, characterized in that said bars of buckle are provided with a peripheral roughening.
- 10 28. The kit according to the preceding embodiment, characterized in that said at least one of the bars is provided with a peripheral roughening comprising a serration that is oriented opposite the strap's direction of strain.
29. The kit according to any of the preceding embodiments, characterized in that said kit further comprises a tensioner for applying a tension on said securing means.

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DESCRIPTION OF FIGURES

Figure 1A shows an example of a cargo load lashed by an embodiment of the method and device according to the current invention. **Figure 1B** shows a schematic overview of a corner post profile of a container with indication of the preferred position of said device according to the current invention.

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Figures 2A to 2E show potential embodiments of a wall securement device according to the current invention.

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Figure 3A is a top side view of an example of a container for transporting loads to be used in conjunction with the current invention.

Figures 3B and 3C show a detail of a corner post/corner profile of a container, which is suitable for receiving an embodiment of the wall securement device according to the current invention, as well as examples of mounting different embodiments of these devices to the corner posts.

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Figure 3D shows a device according to a possible embodiment of the current invention, placed in a corner post of a container and provided by straps which secure a load.

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Figures 4A to 4C show attachment aids according to possible embodiments of the current invention.

5 **Figure 5A and 5B** shows a top view of two embodiments of a buckle, suitable for use in the current invention.

Figure 6 shows a cross-sectional view of the buckle shown in figure 5A and B.

10 **Figure 7** shows a view of bars of the buckle of figure 5A and B.

Figure 8 shows a detail of the surface of the bar shown in figure 5A and B.

DETAILED DESCRIPTION OF THE INVENTION

15 The present invention concerns a method for securing cargo load in a container as well as a wall securement device capable to be used in this method. The latter enables an easy and time-saving way to securing goods to a container, thereby ensuring that the latter are adequately secured. Moreover, it is the purpose of the current invention to provide an alternative for the well-known lashing and anchor
20 points of the prior art, such as D-rings. It is the aim of the current invention to provide a system which is thus reliable that it will pass all regulatory requirements and hence may be used for a variety of loads which are currently excluded by the prior art lashing points. Moreover, it is also the object of the current invention to provide a method and system which is cost-saving for the client.

25 Unless otherwise defined, all terms used in disclosing the invention, including technical and scientific terms, have the meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. By means of further guidance, term definitions are included to better appreciate the teaching of the
30 present invention.

As used herein, the following terms have the following meanings:

35 "A", "an", and "the" as used herein refers to both singular and plural referents unless the context clearly dictates otherwise. By way of example, "a compartment" refers to one or more than one compartment.

"About" as used herein referring to a measurable value such as a parameter, an amount, a temporal duration, and the like, is meant to encompass variations of +/-20% or less, preferably +/-10% or less, more preferably +/-5% or less, even more preferably +/-1% or less, and still more preferably +/-0.1% or less of and from the specified value, in so far such variations are appropriate to perform in the disclosed invention. However, it is to be understood that the value to which the modifier "about" refers is itself also specifically disclosed.

"Comprise," "comprising," and "comprises" and "comprised of" as used herein are synonymous with "include", "including", "includes" or "contain", "containing", "contains" and are inclusive or open-ended terms that specifies the presence of what follows e.g. component and do not exclude or preclude the presence of additional, non-recited components, features, element, members, steps, known in the art or disclosed therein.

The recitation of numerical ranges by endpoints includes all numbers and fractions subsumed within that range, as well as the recited endpoints.

The expression "% by weight" (weight percent), here and throughout the description unless otherwise defined, refers to the relative weight of the respective component based on the overall weight of the formulation.

In a first aspect, the current invention provides for a method for securing cargo load in a container. In an embodiment of the invention, the method comprises the following steps:

- providing a wall securement device comprising two or more apertures allowing the passage of securing means such as straps, attached to an inner rigid structure of a load surface such as a container; and
- lashing the cargo load with securing means to the container by use of the wall securement device.

The method is specifically suited for lashing loads in heavy freight in containers which are located on transport means. By preference such transport means may be a waterborne vessel such as a container ship or alternatively, an airplane.

These wall securement devices are to be attached to the inner structure, being the inner wall of the container and will serve as anchoring or passage points for

securing means used for lashing the cargo load. In a preferred embodiment, said wall securement device is attached to the corner posts of the container. By preference, said device is attached to the corner profile of such corner posts. Containers comprise a steel framework, consisting of four corner posts. These corner posts serve as the load-carrying elements of containers. The steel framework furthermore comprises two bottom side rails, two top side rails, two bottom cross members, a front top end rail and a door header. The side and end walls and the roof are the components of a standard box container which are capable of bearing the least load. The corner posts provide enough strength for allowing the attachment of the wall securement device according to the current invention, thereby equally providing sufficient sturdy points to allow the anchorage of securing means and bearing the load. Attachment may be physical or mechanical. Attachment may include the physical clamping of the device to the corner profile of the corner post. This ensures also that the device does not hinder or interfere with the cargo within the container. In an embodiment of the current invention, the wall securement device may be removably attached to the container. With the term "removably attached" is meant the device is connected to the wall by means which allow easy attachment or detachment, without the use of tools such as screwdrivers, nails, screws and the like. Such removable attachment may comprise one or more attachment aids such as adhesive strips, glue or glue-like material or make use of magnetic force. In a preferred embodiment, said attachment aid comprises a clamp, a spring or a foam, which is positioned between the wall of the corner post and the device. Most preferably, said attachment aid is a foam element, connected to the rear of said device. Said foam element comprises preferably compressible foam.

Alternatively, said wall securement device may be permanently fixed to the container by conventional means such as welding.

The wall securement device may be adjustable in position, meaning that the position of the device may be adjusted in view of the top and bottom of the container, e.g. lowered or increased. For the latter purpose, a rail system may be provided at the corner posts, with fastening means for the device onto the rail which allows altering the position of the device with respect to top of bottom of the container.

- In a preferred embodiment, the securement devices are located in one vertical plane in view of the roof or floor wall of the container, meaning that they are all provided at one side of the container. By preference, they are provided at the corner posts at the end wall of the container opposite to the door leafs. In the most preferred configuration, each corner post of this end wall will be provided by at least one wall securement device. By preference, 2 devices are provided at each corner post, whereby one of the devices is preferably located towards the top of the container and one located towards the floor of the container.
- During lashing of the load, securing means are passed through a first aperture of the wall securement device and subsequently through a second aperture of said same wall securement device in a direction opposite to the first path of said securing means. Such securing means are by preference straps, such as steel straps, polypropylene straps or polyester straps with or without a polymer coating.
- By preference, the system and method is used in conjunction with polyester straps, comprising polyester yarns, either woven or composite yarns. Straps produced of composite yarns will be preference be coated in a polymer coating such as polypropylene or polyethylene. The loose ends of the securing means are joined by means of a buckle. By preference, such a buckle is manufactured from high quality steel and is provided by measures that avoid or entirely prevent slipping.

- In a preferred embodiment, said wall securement device can bear a load of at least 6 ton (absolute value) when provided with securing means. The applied force on the securing means will run opposite to the direction of the first path of the securing means and parallel to the second path.

- In a second aspect, the current invention provides for a wall securement device for use in above-mentioned method. The wall securement device is specifically designed to be attached to a corner post and to fit in the corner profile of said post. The wall securement device may be manufactured from metals such as high quality steel, stainless steel, aluminium or plastic. In a preferred embodiment, the wall securement device has two or more apertures allowing the passage of securing means such as straps. These apertures are separated by an intersection, used as support for the straps when passed through these apertures. Said apertures are part of separate leafs of the device. Said intersection may comprise a flat, a rounded or rugged element. In a preferred embodiment, said intersection

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comprises a cylindrical element such as a bar or rod. In an embodiment, this intersection is located in a plane reverse to the direction of strain of said securing means. As such, the device provides both for an anchorage point for the strap as well as for a load bearing point. The position of the intersection in view of the strain direction is chosen such that the straps are given an adequate support by the intersection during lashing.

The device and preferably the region of the intersection may be provided by a peripheral roughening. Such peripheral roughening or abrasive surface may comprise for instance a specific pattern (e.g. grid), embossed in the material of the intersection or by coating the intersection or entire device by a grit material coating. Such peripheral roughening will prevent slipping of the strap when lashing cargo load. The device may furthermore also be provided by means for attachment to a load surface. Attachment to the container may be removable or permanent.

As pointed out, the wall securement device is provided by apertures for passage of the straps. By preference, each of the wall securement devices has two apertures. In one embodiment, the apertures comprise between 10 and 80%, of the total surface of said wall securement device. By preference, said apertures comprise between 25 and 60% of the total surface of the device. The latter ensures easy passage and even multiple passages of the straps through the apertures, meanwhile ensuring that the device still withstands the forces applied onto the device when cargo is secured by aid of the devices.

In a further embodiment, each aperture is located in a plane of said wall securement device, said planes are virtual planes formed by the separate leafs of the device, whereby said planes form an inner angle α of between 45° and 180° , preferably between 90° and 180° , more preferably between 100° and 180° , more preferably between 100° and 150° , more preferably between 100° and 120° , even more preferably between 100° and 110° . Hence, the latter allows for a specific configuration of the device allowing attachment of the device to the wall of the corner posts of the container.

By preference, said device comprises two leafs, which are connected to each other at the level of the intersection. Said leafs preferably form an angle of between 45° and 180° , preferably between 90° and 180° , more preferably between 100° and

180°, more preferably between 100° and 150°, more preferably between 100° and 120°, even more preferably between 100° and 110°. In a most preferred embodiment, said angle comprises between 100° and 105°, such as 100°, 101°, 102°, 103° or 105°. It was found by the inventors that an angle in this range
5 allows adequate positioning of the device to the corner post, as well as ensures passing of the securing means through the apertures.

In an embodiment, said leaf of the device comprises a substantially rectangular form. In another embodiment, said leaf comprises a polygon form. In a preferred
10 embodiment, said leaf comprises at least two sides, which intersect and form an obuse angle at the intersection. As a consequence, said leafs comprise a beveled edge. Said obuse angle comprises between 91° and 178°, preferably between 95° and 150°, more preferably between 100° and 130°, most preferably between 105° and 120°, such as 118°. By preference, one of said sides forming the angle will
15 run parallel to the intersection of said device. The latter has been found advantageous for the positioning of the device to the corner profile.

A second side, equally forming an intersection with said side running parallel to said intersection, will be positioned substantially perpendicular to said parallel
20 side.

Said device will be provided with two leafs, whereby said obuse angles are placed crosswise or opposite of a virtual symmetric axis formed by the intersection.

25 When arranging the device to the corner profile, the device may in a first instance be inserted in the corner profile, after which it can be correctly positioned by means of a quarter of a turn or more.

Thickness of the leafs is preferably between 5 and 15 mm, preferably between 8
30 and 12 mm, more preferably 10 mm. The length of the leaf will preferably be between 100 and 130 mm, more preferably between 105 and 125 mm. Said length of the leafs of the device may vary. This can be necessary in view of the dimensions of a corner profile of a container.

35 Preferably the intersection will be thicker than said leafs. In a preferred embodiment, said ratio between the thickness of the intersection and the

thickness of the leafs will be between 3:1 and 2:1. Said Thickness of the intersection lies preferably between 20 and 30 mm.

Said device will be preferably provided with attachment aids on the rear of said
5 device. Preferably said attachment aids are present on the rear of both leafs. Such attachment aids provide additional assistance for attachment of the device to the corner profile and may comprise a spring or clamping element, magnets or magnetic strips, glue elements. In another embodiment, said attachment aid is a foam element. Said foam element will cover at least partially the rear of said leaf.
10 By preference said, foam element will cover at least 5%, more preferably at least 10 %, more preferably 20% of said rear. In another embodiment, said element covers between 1 to 100% of said rear, between 5to 90%, more preferably between 10 to 90%. Said element may have any conventional shape, such as round, rectangular, square, polygonal...

15 In a preferred embodiment, said foam element comprises of a closed cell foam, preferably said closed cell foam has ellipsoid or round cells, most preferably round cells. In a further preferred embodiment, said foam element is a cross-linked polyolefin, such as LDPE or PP. Preferred density of the foam will be between 50
20 and 100 kg/m³. Said thickness of the foam lies preferably between 10 and 30 mm, more preferably between 15 and 25 mm.

Use of foam as attachment aid was found to be particularly useful because of the compressible nature of said foam. This is important, as the space between the
25 device when positioned and the container wall will vary from point to point. Especially the use of foam with round or substantially round cells was found to be extremely advantageous, as these provide sufficient back pressure, even after considerable time of use. Due to its specific nature, said foam element will also resist dimensional changes due to e.g. temperature differences. Said foam
30 element may be attached to the device by conventional methods, such as gluing, or may simply be placed behind said device when being positioned in the corner post.

In a preferred embodiment, said wall securement device can bear a load of at
35 least 6 ton (absolute value) when provided with securing means.

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In another aspect, the current invention provides for a container provided by one or more wall securement devices according above-mentioned embodiments.

- In a final aspect, the current invention equally provides a kit for securing load in a container. By preference, such kit comprises a wall securement device according to the current invention, securing means such as straps and a buckle for securing said securing means. As outlined above, the straps will by preference comprise polyester yarns, which may be woven polyester yarns or composite polyester yarns embedded in a polymer coating, whereby the polymer coating is polypropylene; polyolefins such as LDPE, HDPE, PP, EVA, EMA, EBA, EEA, etc. Preferably said coating is polypropylene. Other possible straps that can be used in accordance with the current invention comprise polyaramid fibers;; nylon; natural fibers such as sisal; flax; and metal fibers.
- 15 In general, said straps used in accordance with the current invention are preferably comprised of a material such as polymers with a Young's Modulus lower than 1400 MPa, preferably lower than 1000 MPa, even more preferably lower than 500 MPa.
- 20 The kit provides for a buckle for securing the loose ends of the strap, thereby equally securing the load. By preference, such buckle comprises a body having two side walls and bars extending between these side walls. In a preferred embodiment, the bars of the buckle are provided with a peripheral roughening. The buckle is characterized in that at least at one tensioning side of the body the bar or bars are provided with a profile which allows the strap to pass through, and that the least strain on the strap causes the profile to bite into the strap. Due to the two side walls in the body of the buckle the strap is prevented from pulling out of alignment, which may also prevent slipping.
- 25 The sought functionality and effectiveness of the buckle according to the invention is in particular facilitated by the fact that at the tensioning side of the buckle, the profile of the bar or bars comprise a serration, and in particular a serration that is oriented opposite to the strap's direction of strain. Advantageously therefore the profile comprises a serration extending over substantially the entire length of the bar or bars.
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- 35 In a further embodiment, the kit may further comprise a tensioner for applying a tension on said securing means.

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The aspects of the current invention will further be elucidated by means of examples and figures, without being limited to these examples or figures.

Fig. 1A shows a cross-sectional view of a container carrying a cargo load (11) whereby the cargo load is secured by the method and wall securement device according to the current invention. In particular the container is provided by a total four wall securement devices (1), two by two mounted at the level of the corner posts (4) /corner profiles (13) of the container which are located opposite the door leafs. Each of these corner posts (4) will be provided by a top and bottom securement device (1). The straps (10) used for securing the load (11) are passed through a first aperture (2) of the securement device (1) and are subsequently passed through a second aperture (2'), in direction opposite to the first passage of the strap. The strap is retained by means of the intersection (3) of the device (1). The straps are subsequently lashed around the load and will subsequently be attached to the straps coming from the second corner post (not visible on the cross section) whereby they will be joined together and secured by means of a buckle. Figure 1B shows a detailed view of a corner post (4) /corner profile (13) suitable for receiving a device (1) according to the current invention. The shaded surface represents the optimal position of the device (1) at the corner post. If not positioned correctly (e.g. outside this position) than the devices risk hindering the load in the container.

Referring to Figures 2A to 2E, there are shown various embodiments of the wall securement devices according to the current invention. These devices (1) are all characterized in that they comprise leafs (14, 14') provided by apertures (2), preferably two apertures (2, 2'), which are separated by an intersection (3). The apertures (2, 2') allow passage of the straps (10), whereby the intersection will provide support to the straps. All embodiments show devices with 2 apertures, but it should be understood that multiple apertures, preferable even in number, equally fall under the scope of the current invention.

As shown in Fig.2A and 2C, the securement device (1) may be essentially flat, whereby each of the two apertures (2, 2') lie in a virtual plane which forms an angle of 180°. The device may be rectangular or square, and may be provided with rounded corners such as a hysteresis form.

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In another embodiment, as shown in Fig. 2B, the securement device (1) may have a curvature.

5 In embodiments 2D and 2E, the leafs form an inner angle which is preferably an obtuse angle. Each of the leafs are provided with an aperture (2, 2').

As shown in figure 2E, the leafs (14, 14') are separated by an intersection (3), said intersection (3) has a rod-like appearance.

10 Each of said leafs (14, 14') is provided with a beveled edge (16), whereby the two intersecting sides A and B (or A' and B') form an angle β (or β'). Said angle β is preferably an obtuse angle. Said angles of each leafs are on opposite sides seen from the intersection (3).

15 Referring to Fig. 3A, there is shown a top view of a container to be used in conjunction with the current invention. As outlined above containers comprise a steel framework, consisting of four corner posts. These corner posts (4) serve as the load-carrying elements of containers and in the current invention also as load carrying elements for securement of the load. The steel framework furthermore comprises two bottom side rails, two top side rails, two bottom cross members, a front top end rail and a door header. The side and end walls and the roof are the components of a standard box container which are capable of bearing the least load.

25 Fig. 3B shows possible ways of how said wall securement device may be attached to the corner posts of the container. The devices may be fixedly or removably attached. Attachment may occur by mechanical means (welding, gluing, magnetism) or by physical means (e.g. by friction).

30 Figure 3 C shows a detail of a preferred embodiment according to the current invention installed in the corner profile of a corner post. The device (1) is positioned in the corner post, with two sides parallel to the intersection (3) positioned against the wall of the corner post. The device (1) is positioned on a certain distance from the edge of the corner post. The latter is important, as otherwise the device risks to 'escape' the corner post whilst securing the load. Due to the angle formed by the leafs (14, 14') of the device (1), a space between device and wall, suitable for passage of the straps, is formed.

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Figure 3D shows a device (1) positioned in a corner post used for securing a load with straps. A strap will be brought through the first aperture (2), and secondly through the second aperture (2') in a direction opposite to the direction of the first pathway of the strap. F shows the direction of the force applied to the straps. The direction of the applied force F will be equally opposite to the direction of the first pathway of the strap. When securing a load, the direction of the first strap-pathway.

In order to ensure adequate attaching to the corner post, the device according to the current invention may be provided by attaching aids. As shown in figure 4A such attaching means (15) may comprise a metal element, preferably manufactured from spring steel, positioned or attached at the rear of the device (1) and which aids the clamping of the device (1) to the corner profile.

Alternatively, as shown in figure 4B and 4C, the device may be provided with a foam element (15) at the rear side of the device.

Referring first to figure 5A and 5B, where a buckle is shown for securing a strap for goods. The manner in which the strap is passed through the buckle is fully known to the person skilled in the art so that it is not necessary to explain this or to show in the figures how the strap is passed through the buckle. The tensioning side of the buckle is indicated with arrow A.

The buckle (5) shown in figure 5A and B comprises a body that possesses two side walls (8, 9), and bars (6, 7) extending between these side walls (8, 9), which bars are provided with a peripheral roughening (11 or 12).

The buckle is embodied in that the bar or bars are provided at least at the tensioning side A of the body, which are provided with a profile such as to allow the strap to pass through, and in particular, such that the least strain on the strap causes the profile of these bars to bite into the strap.

The figures, and especially figures 7 and 8, respectively, clearly show that the bars are provided with a peripheral roughening. This applies to the bars 6 as well as to the bars 7.

The roughening on the bars is a positive roughening with respect to the one that is (or may be) provided on the bars, meaning that the profile comprises a serration that is oriented opposite to the strap's direction of strain.

As clearly shown in figure 7, the profile of the bars takes the form of a grid (12) whereby the same is provided with a plurality of individual contact surfaces, with each contact surface during use exerting a point load on the strap.

The serration (11) provided on the bars and, as explained above, extending substantially over the entire length of the bar or bars, achieves that the least strain on the strap causes the serration to be pressed into the material of the strap, which prevents the strap from slipping back when a relief moment occurs, as is possible during the transport of a dynamic load.

At the same time, the serration is of such a nature that the strap is simple to fit and easy to pass through the buckle according to the invention without, however, losing the feature of this serration, which engages the strap at the least strain during transport of a load.

It is supposed that the present invention is not restricted to any form of realization described previously and that some modifications can be added to the presented example of fabrication without reappraisal of the appended embodiments.

Example 1: Stability test

Feasibility was confirmed during a stability test.

During this test the cornerprofiles of a container were loaded with

- 94 ton vertical
- 15 ton horizontal

Furthermore an additional load at the corner profile was supplied via 2 securing devices according to an embodiment of the current invention.

A maximal force of 6 ton per device was applied without damaging the container corner profile.

Example 2: Securing of a load

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Securing of 18 ton of load (18 field IBC containers in a setup similar to what is shown in Figure 1).

- 2 securing devices with a Cordstrap composite lashing (CC150UF) with 2 (dynamic load) buckles were positioned at a height of 50 cm and used to secure 10 IBCs which are standing at the container floor
 - 2 additional devices (1) with a Cordstrap composite lashing (CC150UF) with 2 dynamic load buckles were positioned at a height of 170 cm and used to secure 8 IBC which are standing at a first layer of IBC's
- 10 A tilting test up to 43° was performed, which corresponds to a force of 0.8 g. The test showed that the cargo was secured properly.

Features relating to the figures

- 15 1: wall securement device
- 2: first aperture (2)
- 2': second aperture
- 3: intersection
- 4: corner posts
- 20 5: buckle
- 6: bar
- 7: bar
- 8: side wall
- 9: side wall
- 25 10: securing means
- 11: serration
- 12: grid
- 13: corner profile
- 14: leaf
- 30 15: attachment aid
- 16: beveled edge

CLAIMS

1. A method for securing cargo load in a container whereby the container comprises 3 side walls, door leafs, a roof, floor and four corner posts, comprising:
 - providing a wall securement device comprising two or more apertures allowing the passage of securing means such as straps, which wall securement device is attached to an inner rigid structure of the wall;
 - lashing the cargo load with securing means by use of the wall securement device;

characterized in that said wall securement device is located at the corner post of said container.
2. Method according to claim 1, **characterized in that** said securing means run substantially perpendicular to said posts.
3. Method according to any of the previous claims, **characterized in that** said wall securement device is fixedly or removably attached to said wall.
4. Method according to any of the preceding claims, **characterized in that** said wall securement device is adjustable in position, more specifically adjustable in height.
5. Method according to any of the preceding claim, **characterized in that** said one wall securement device is provided.
6. Method according to any of the preceding claims, **characterized in that** said two wall securement devices are provided per corner post.
7. The method according to any of the preceding claims, **characterized in that** during lashing of said load the securing means are passed through a first aperture of the wall securement device and subsequently through a second aperture of said same wall securement device in a direction opposite to the first path of said securing means.
8. The method according to any of the preceding claims, comprising joining the securing means by a buckle.
9. The method according to any of the preceding claims, **characterized in that** said wall securement device is located at the rear wall of the container, opposite to the door leafs of said container.
10. The method according to any of the preceding claims, wherein the container is located on transport means.
11. A wall securement device for securing a cargo load in a container, attachable to an inner rigid structure of a container, said wall securement

device comprises leafs, said each leaf is provided with an aperture allowing the passage of securing means such as straps, **characterized in that** said leafs form an inner angle of between 45° to 180°.

- 5 12. Wall securement device according to claim 11, **characterized in that** said leafs form an inner angle of between 90° and 120°.
13. Wall securement device according to any of the preceding embodiments, **characterized in that** said device is provided by attachment aids for assisting the attachment of said device to a corner post of a container.
- 10 14. Wall securement device according to claim 13, **characterized in that** said attachment aid comprises a foam.
- 15 15. Wall securement device according to any one of the previous claims **characterized in that** said apertures are separated by an intersection for supporting the securing means when passed through said apertures, whereby said intersection is placed in a plane reverse to the direction of strain of said securing means.
- 20 16. Wall securement device according to the previous claim, **characterized in that** said apertures comprise between 10 and 80%, preferably between 25 and 60% of the total surface of said wall securement device.
17. Wall securement device according to any one of the preceding claims, **characterized in that** said wall securement device is provided with a peripheral roughening, said roughening preferably located at the intersection.
- 25 18. A kit comprising a wall securement device according to any of the embodiments 11 to 17, and securing means such as straps.
19. The kit according to claim 17, characterized in that said straps are manufactured from a material having a Young's Modulus lower than 1400 MPa.
- 30 20. The kit according to claim 18, **characterized in that** said securing means are straps comprising polyester yarns.
21. The kit according to claim 18 or 19, **characterized in that** said strap comprises woven polyester yarns.
22. The kit according to any one of the previous claims, **characterized in that** said strap comprises composite polyester yarns embedded in a polymer coating.
- 35 23. The kit according to the previous claims, further comprising a buckle for joining said securing means.

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24. The kit according to any one of the preceding claims, **characterized in that** said kit further comprises a tensioner for applying a tension on said securing means.