CLAIMS

1. A frame structure for a multi-level container handling and storage facility comprising:

at least two rows of spaced supports, the supports in each row joined by at least one horizontal beam to form spaced adjacent beams ~~of respective horizontal beams~~ at an intermediate level;

wherein the supports are spaced at a distance allowing storage of at least one container therebetween below the intermediate level;

and wherein the spaced adjacent ~~horizontal~~ beams are spaced at a distance in accordance with a dimension of a container allowing storage of at least one container thereon above the intermediate level~~.~~;

at least two rows of spaced location columns extending above the intermediate level, wherein the opposing spaced location columns in adjacent rows are spaced at a distance allowing storage of at least one container therebetween above the intermediate level;

at least one overhead container handling mechanism mounted in between each row of support or location columns to allow vertical and longitudinal transport of containers below each respective intermediate level and below a vertically adjacent intermediate level;

wherein in operation, at least two containers are stackable vertically on the adjacent beams at each intermediate level and below a vertically adjacent intermediate level by the overhead container handling mechanism.

2. A frame structure as claimed in claim 1 wherein the supports are formed by at least two rows of spaced support columns, with each adjacent column in a row joined by a respective horizontal beam and corresponding adjacent beams in an adjacent row similarly connected by a respective horizontal beam to form rows at an intermediate level of spaced adjacent horizontal beams;

wherein the rows of support columns are spaced at a distance allowing storage of at least one container therebetween below the intermediate level;

and wherein the adjacent horizontal beams are spaced at a distance in accordance with a dimension of a container allowing storage of at least one container thereon above the intermediate level.

3. A frame structure as claimed in claim 2 wherein each support column and a respective location column substantially linearly align. ~~including at least two rows of spaced location columns extending above the intermediate level, wherein the spaced support columns are spaced at a distance allowing storage of at least one container therebetween above the intermediate level;~~

4. A frame structure as claimed in claim 3 wherein the front elevation of the intersection of horizontal beam and support column and a respective location column forms a cross-shape. ~~each support column and a respective location column substantially linearly align.~~

5. A frame structure as claimed in claim 1 including at least two intermediate levels vertically adjacent, allowing storage of at least one container between the vertically adjacent intermediate levels and at least one container above the top vertically adjacent intermediate levels. ~~wherein the front elevation of the intersection of horizontal beam and support column and a respective location column forms a cross-shape.~~

6.A frame structure as claimed in claim 5 wherein the at least two intermediate levels vertically adjacent, are formed by support columns below the intermediate level forming load bearing of the spaced apart horizontal beams and location columns above the top intermediate levels forming location means of the containers above the intermediate level. ~~including at least two intermediate levels vertically adjacent, allowing storage of at least one container between the vertically adjacent intermediate levels and at least one container above the top vertically adjacent intermediate levels.~~

7. A frame structure as claimed in claim 1 wherein an intermediate level is dimensioned relative to the number of containers that can be supported on each other.~~6 wherein the at least two intermediate levels vertically adjacent, are formed by support columns below the intermediate level forming load bearing of the spaced apart horizontal beams and location columns above the top intermediate levels forming location means of the containers above the intermediate level.~~

8. A frame structure as claimed in claim 1 wherein stacking height of containers on each intermediate level is configured to any desired height in line with the maximum loading weight of the column and beam designed.~~an intermediate level is dimensioned relative to the number of containers that can be supported on each other.~~

9. A frame structure as claimed in claim 1 wherein at least the four corner castings of the supported container are in contact with and supported by the beams.~~stacking height of containers on each intermediate level is configured to any desired height in line with the maximum loading weight of the column and beam designed.~~

10 .A frame structure as claimed in claim 1 wherein the columns within each row are spaced at a distance proportional to the desired number of

container stack.~~at least the four corner castings of the supported container are in contact with and supported by the beams.~~

11. A frame structure as claimed in claim 10 wherein bracings such as tie-beams or wired ropes can be integrated between columns.~~1 wherein the columns within each row are spaced at a distance proportional to the desired number of container stack.~~

12. A frame structure as claimed in claim ~~1~~1 wherein the overhead container handling mechanism is an overhead bridge crane (OHBC).~~bracings such as tie-beams or wired ropes can be integrated between columns.~~

13. A frame structure as claimed in claim ~~1~~12 wherein only selected rows of pairs of location columns are erected on the highest level forming multiple rows of containers on three or more spaced apart beams and an OHBC extends across a plurality of rows of containers between the selected rows of pairs of location columns.~~at least one overhead bridge crane (OHBC) is mounted in between each row of columns at each intermediate level to allow transport of containers below each respective OHBC.~~

14. A frame structure as claimed in claim ~~1~~12 wherein a pair of OHBC runways is integrated within 2 rows of columns at equal height. ~~at least one overhead bridge crane (OHBC) is mounted on runways in between each rows of support columns or location columns at each intermediate level to allow transport of containers below each respective intermediate level and below a vertically adjacent intermediate level therebelow.~~

15. A frame structure as claimed in claim ~~13~~12 wherein at least one OHBC is integrated on OHBC runways between two rows of columns at or adjacent each intermediate level. ~~only selected rows of pairs of location columns are erected on the highest level forming multiple rows of containers on three or more spaced apart beams and an OHBC extends across a plurality of rows of containers between the selected rows of pairs of location columns.~~

16. A frame structure as claimed in claim ~~1~~ 12 wherein ~~a pair of~~ runways of the OHBC on upper levels are extended longer than the lower level sufficient for the transfer of containers between the upper levels and the ground floor. ~~runways is integrated within 2 rows of columns at equal height.~~

17. A frame structure as claimed in claim 1 wherein ~~at least one OHBC is integrated on OHBC runways between two rows of columns at or adjacent each intermediate level~~ containers stored in at least one of the intermediate levels are accessible by at least one ramp.

18. A frame structure as claimed in claim ~~14~~ 1 wherein the structure is an independent structure. ~~runways of the Overhead Bridge Crane (OHBC) on upper levels are extended longer than the lower level sufficient for the transfer of containers between the upper levels and the lower level.~~

19. A frame structure as claimed in claim 1 wherein the structure is integrated with another building, such as a warehouse or container

terminal.~~containers stored in at least one of the intermediate levels are accessible by at least one ramp.~~

20. A frame structure as claimed in claim ~~1~~17 wherein the structure includes driveways to accommodate quay side operations (transfer of containers from ship to shore or vice versa) and to accommodate quay to yard transfer and the structure is open air, covered roof or partially covered with the capability to accommodate applications such as solar panels .~~is an independent structure.~~

21. ~~A frame structure as claimed in claim 1 wherein the structure is integrated with another building, such as a warehouse or container terminal.~~A method of handling and storing a plurality of containers in a storage facility including the steps of:

a. providing at least two linear parallel spaced support beams at an intermediate level dimensioned relative to the number of containers that can be supported on each other;
b. storing a plurality of containers up to their support weight between the spaced support beams below the intermediate level
c. storing a plurality of containers up to their support weight on the spaced support beams above the intermediate level;
d. providing at least one overhead container handling mechanism means to allow vertical and longitudinal transport of stored containers; wherein the at least one overhead container handling mechanism includes an OHBC mounted above the number of containers that can be supported on each other; and
e. stacking the storage containers vertically by the overhead container handling mechanism on the adjacent beams at an intermediate level and below a vertically adjacent intermediate level therebelow.

22. ~~A frame structure as claimed in claim 19 wherein the structure includes driveways to accommodate quay side operations (transfer of containers from~~ A method of handling and storing a plurality of containers in a storage facility as claimed in claim 21 wherein the at least one access and transport means is a ramp wherein containers stored in at least one of the intermediate levels are accessible by at least the ramp.

~~ship to shore or vice versa) and to accommodate quay to yard transfer and the structure is open air, covered roof or partially covered with the capability to accommodate applications such as solar panels.~~

23.A method of handling and storing a plurality of containers in a storage facility ~~including the steps of:~~

~~a. providing at least two linear parallel spaced support beams at an intermediate level dimensioned relative to the number of containers that can be supported on each other;~~

~~b. storing a plurality of containers up to their support weight between the spaced support beams below the intermediate level~~

~~c. storing a plurality of containers up to their support weight on the spaced support beams above the intermediate level;~~

~~d. providing at least one access and transport means to allow selective movement of stored containers; and~~

~~wherein the at least one access and transport means includes an OHBC mounted above the number of containers that can be supported on each other.~~as claimed in claim 21 wherein the at least one OHBC is integrated on an OHBC runway between two rows of columns at or adjacent each intermediate level and wherein the runway of the Overhead Bridge Crane (OHBC) on upper levels are extended longer than the lower level sufficient for the transfer of containers between the upper levels and lower level.

24.A method of forming a handling and ~~storing~~ storage facility for a plurality of containers ~~in a storage facility as claimed in claim 23 wherein the at least one access and transport means is a ramp wherein containers stored in at least one of the intermediate levels are accessible by at least the ramp.~~ including the steps of:

providing at least two rows of spaced support columns, with the support columns in each row joined by at least one horizontal beam to form spaced adjacent beams at an intermediate level, wherein the spaced support columns are spaced at a distance allowing storage of at least one container therebetween below the intermediate level, and

wherein the spaced adjacent beams are spaced at a distance matching the dimension of a container allowing storage of at least one container thereon above the intermediate level;

providing at least two rows of spaced location columns extending above the intermediate level, wherein the opposing spaced location columns in adjacent rows are spaced at a distance allowing storage of at least one container therebetween above the intermediate level; and

mounting at least one overhead bridge crane (OHBC) in between each rows of support columns or location columns to allow transport of containers below at least one intermediate level and below a vertically adjacent intermediate level.

25.A method of forming a handling and ~~storing a plurality of containers in a~~ storage facility ~~as claimed in claim 23 wherein the at least one OHBC is integrated on an OHBC runway between two rows of columns at or adjacent each intermediate level and wherein the runway of the Overhead Bridge Crane (OHBC) on upper levels are extended longer than the lower level sufficient for the transfer of containers between the upper levels and the lower level.~~for a plurality of containers according to claim 24 further including the steps of providing at least one ramp to an intermediate level wherein containers stored in at least one of the intermediate levels are accessible by the at least one ramp.

~~26. A method of forming a handling and storage facility for a plurality of containers including the steps of:~~

~~providing at least at least two rows of spaced support columns, with the columns in each row joined by at least one horizontal beam to form spaced~~

~~adjacent beams at an intermediate level, wherein the spaced support columns are spaced at a distance allowing storage of at least one container therebetween below the intermediate level, and wherein the spaced adjacent beams are spaced at a distance matching the dimension of a container allowing storage of at least one container thereon above the intermediate level;~~

~~providing at least two rows of spaced location columns extending above the intermediate level, wherein the spaced support columns are spaced at a distance allowing storage of at least one container therebetween above the intermediate level;~~

~~mounting at least one overhead bridge crane (OHBC) in between each rows of support columns or location columns at each intermediate level to allow transport of containers below each respective intermediate level and below a vertically adjacent intermediate level therebelow.~~

~~27.A method of forming a handling and storage facility for a plurality of containers according to claim 26 further including the steps of providing at least one ramp to an intermediate level wherein containers stored in at least one of the intermediate levels are accessible by the at least one ramp.~~

CLAIMS

1. A frame structure for a multi-level container handling and storage facility comprising:

at least two rows of spaced supports, the supports in each row joined by at least one horizontal beam to form spaced adjacent beams at an intermediate level;

wherein the supports are spaced at a distance allowing storage of at least one container therebetween below the intermediate level;

and wherein the spaced adjacent beams are spaced at a distance in accordance with a dimension of a container allowing storage of at least one container thereon above the intermediate level;

at least two rows of spaced location columns extending above the intermediate level, wherein the opposing spaced location columns in adjacent rows are spaced at a distance allowing storage of at least one container therebetween above the intermediate level;

at least one overhead container handling mechanism mounted in between each row of support or location columns to allow vertical and longitudinal transport of containers below each respective intermediate level and below a vertically adjacent intermediate level;

wherein in operation, at least two containers are stackable vertically on the adjacent beams at each intermediate level and below a vertically adjacent intermediate level by the overhead container handling mechanism.

2. A frame structure as claimed in claim 1 wherein the supports are formed by at least two rows of spaced support columns, with each adjacent column in a row joined by a respective horizontal beam and corresponding adjacent beams in an adjacent row similarly connected by a respective horizontal beam to form rows at an intermediate level of spaced adjacent horizontal beams;

wherein the rows of support columns are spaced at a distance allowing storage of at least one container therebetween below the intermediate level;

and wherein the adjacent horizontal beams are spaced at a distance in accordance with a dimension of a container allowing storage of at least one container thereon above the intermediate level.

3. A frame structure as claimed in claim 2 wherein each support column and a respective location column substantially linearly align.

4. A frame structure as claimed in claim 3 wherein the front elevation of the intersection of horizontal beam and support column and a respective location column forms a cross-shape.

5. A frame structure as claimed in claim 1 including at least two intermediate levels vertically adjacent, allowing storage of at least one container between the vertically adjacent intermediate levels and at least one container above the top vertically adjacent intermediate levels.

6. A frame structure as claimed in claim 5 wherein the at least two intermediate levels vertically adjacent, are formed by support columns below the intermediate level forming load bearing of the spaced apart horizontal beams and location columns above the top intermediate levels forming location means of the containers above the intermediate level.

7. A frame structure as claimed in claim 1 wherein an intermediate level is dimensioned relative to the number of containers that can be supported on each other.

8. A frame structure as claimed in claim 1 wherein stacking height of containers on each intermediate level is configured to any desired height